

SMART VILLAGE DESIGN USING INDONESIAN GOVERNMENT ENTERPRISE ARCHITECTURE

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ABSTRAK

Hampir semua aspek kehidupan membutuhkan teknologi informasi, mulai dari aspek kebutuhan primer, sekunder, dan tersier. Teknologi dan inovasi digital dapat mendukung kualitas hidup, standar hidup yang lebih tinggi, layanan publik yang lebih baik bagi masyarakat, dan penggunaan sumber daya yang lebih baik untuk menjadi peluang baru bagi rantai nilai pedesaan dalam hal produk dan proses yang lebih baik. Desa pintar adalah konsep membangun desa mandiri dengan memberikan pelayanan. Penerapan smart village akan menjadi solusi tepat untuk membangun smart city yang tangguh dan berkelanjutan guna meningkatkan kualitas sumber daya dan layanan publik. Kerangka kerja IGEA (Indonesian Government Enterprise Architecture Framework) dirancang untuk membangun arsitektur enterprise di tingkat pemerintah Indonesia untuk mendukung pengembangan layanan TI menjadi lebih baik, lebih efisien, dan efektif. Fase-fase yang digunakan dalam perancangan arsitektur menggunakan IGEA adalah Fase Preliminary, Architecture Vision, Business Architecture, Data Architecture, Application Architecture, dan Technology Architecture. Penelitian ini bertujuan untuk menganalisis, merancang, dan menghasilkan cetak biru Enterprise Architecture dengan menerapkan konsep smart village untuk mengatasi permasalahan pelayanan publik dan meningkatkan kualitas sumber daya aparatur dan tata kelola yang akuntabel dalam pelayanan publik. Ruang lingkup penelitian ini hanya pada tahap awal arsitektur bisnis. Hasilnya adalah prinsip arsitektur, tujuan, visi dan misi, kebijakan dan regulasi, diagram konsep solusi, dan perbaikan dua belas proses bisnis, dan katalog layanan publik.

Kata Kunci: arsitektur perusahaan, desa pintar, e-government, IGEA, layanan publik.

ABSTRACT

Almost all aspects of life require information technology, starting from aspects of primary, secondary, and tertiary needs. Digital technology and innovation can support quality of life, higher standards of living, better public services for the community, and better use of resources to become new opportunities for a rural value chain in terms of better products and processes. Smart village is the concept of developing an independent village by providing services. Implementing smart villages will be the right solution to building a formidable and sustainable smart city to improve the quality of public resources and services. IGEA framework (Indonesian Government Enterprise Architecture Framework) is designed to build an enterprise architecture at the Indonesian government level to support the development of IT services to be better, more efficient, and effective. The phases used in architectural design using IGEA are the Preliminary Phase, Architecture Vision, Business architecture, Data Architecture, Application Architecture, and Technology Architecture. This study aims to analyze, design, and produce a blueprint for Enterprise Architecture by applying the smart village concept to overcome public service problems and improve the quality of apparatus resources and accountable governance in public services. The scope of this research is only in the preliminary phase of the business architecture. The result is architecture principle, goals, vision and mission, policy and regulation, solution concept diagram, and improvement of twelve business processes, and public service catalog.

Keywords: e-government, enterprise architecture, IGEA, public service, smart village.

I. INTRODUCTION

THE development of information technology has had a significant impact on people's lives. Smart Village aims to use information technology to empower rural communities, strengthen institutions and improve the welfare field [1]. The Smart Village concept can be used as a solution to overcome various problems that occur in the administration of village governance. Adopting the Smart City component makes it possible for the village to emerge as a national economic power based on MSMEs, superior human resources, clean and transparent government, and a good social environment [2]. Meanwhile, according to D. Herdiana [3] Smart Village aims to realize empowerment, institutional strengthening, and improving the welfare of rural communities based on the use of information technology. The results show three main elements of a smart village: smart government, smart community, and smart environment. These three elements are the basis for achieving the goals of smart village development in the form of a "smart relationship", namely, a constructive relationship that arises from the

relationship of the three elements of a smart village. Thus, the use of information technology will improve rural communities' welfare.

Smart village is the concept of developing the village in such a way that it is independent and independent in providing services [4]. Smart village is an access to modern energy that can be developments in the fields of education, health, productive enterprises, clean water, sanitation, environmental sustainability, and participatory democracy that help support further improvements in energy access [5]. Smart village is a concept that utilizes existing resources for the development of an area with the use of technology to solve problems in the region effectively and efficiently [6]. The benefits of the smart village efforts are expected to be tremendous. The smart village concept has a high potential for replication in other developing countries [7]. The digital technology accessibility is not the main obstacle to the more intensive use of the smart village concept, but rather the rural population's lower level of qualification and conservatism. It is recommended that more attention be paid to improving rural digital literacy [8].

Cibeureum Village in Kertasari District, Bandung Regency, is one of the villages that has successfully implemented the smart village concept. The purpose of implementing E-Desa is to improve administrative services and disseminate information to the community, especially for farm workers and MSMEs in developing village potential [9].

According to M.Mishbah [10], the concept of a smart village is more related to the management of village characteristics or village identity, especially with regard to the economic potential to improve the living standards of rural communities. Dimensions are areas that are the focus of the development of the smart village program. Based on the meta-analysis process, several dimensions are part of the conceptual model of a smart village, namely Energy, Economy, ICT, People, Governance, Environment, and Living. Smart village initiatives for the future involve the application of information and communication technology in new and innovative ways to empower residents, institutions, and the region to carry out implementation in three phases; social empowerment, smart village ecosystem development, and economic empowerment [11].

Enterprise Architecture (EA) is a system concept embodied in a set of design elements, relationships and design principles that exist today and, in the future, to achieve a balance between usability, understanding and concepts drawn from relevant standards to achieve goals. business for profit [12]. The IGEA framework is designed to build EA at the government level, especially in Indonesian ministries. The IGEA framework can be used in decision-making to support the development of IT services to be better, more efficient, and practical, especially to avoid redundant, independent, and unintegrated IT implementations in the government sector. As mentioned in Figure 1, the phases used in architectural design using IGEA are the Preliminary Phase, Architecture Vision, Business architecture, Data Architecture, Application Architecture, and Technology Architecture [13].

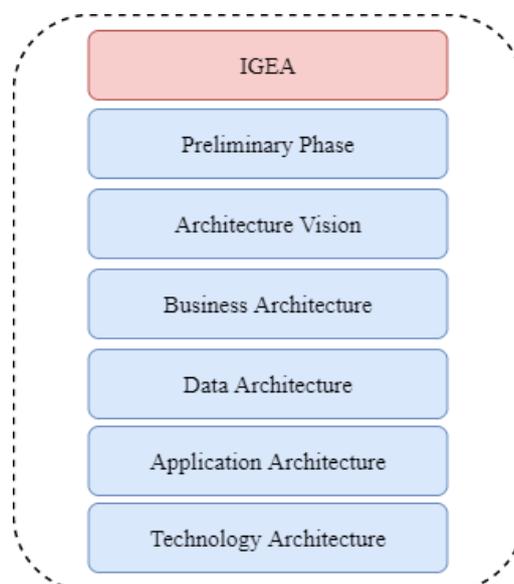


Figure 1 IGEA Phase

The development of information and communication technology can be utilized as much as possible to improve the implementation of government duties and overcome public service problems, especially in the Wirosari District area. The demands of public services need to be supported by a good Information System/Information Technology in terms of accessing, processing, and utilizing information for the Wirosari Regency Government. The current utilization of information systems and information technology in the Wirosari Regency Government cannot be used optimally considering the enormous benefits of information systems and technology, so a paradigm is needed in planning, designing, and managing information systems called enterprise architecture. The utilization of information systems and information technology that has not been maximized is what makes the performance of implementing these tasks not utilized optimally.

This research was carried out using the IGEA (Indonesian Government Enterprise Architecture) framework as one of the new methods of Enterprise Architecture which provides a formal and highly structured way to view and define an enterprise that has been adapted to the needs of the government in Indonesia. This framework consists of several coverage areas defined by the IGEA (Indonesian Government Enterprise Architecture) framework. Guiding the government in making investment decisions in the field of information technology and being able to explain the data, applications, and technologies used by the government. The IGEA framework was created based on the results of comparing the TOGAF, AGA and GEA-NZ frameworks at the architectural level, comparing the TOGAF, AGA and GEA-NZ frameworks at the artifact level and the determinants for building the IGEA framework [12]–[16]. This research is limited to the preliminary stage, architectural vision, and business architecture with artifacts from Architectural Principles, Architectural Objectives, Vision and Mission, Policies and Regulations, Solution Concept Diagrams, Business Process Diagrams and Public Service Catalogs and Public Service Functions Matrix. The assessment was tested using surveys and interviews with design results to measure quality and feasibility. The results of research evaluations and interviews indicate that EA documents need to be further improved in terms of integrity and maturity to achieve better quality in future implementation [13].

II. METHODOLOGY

As seen on Figure 2, there are five steps in this research method, namely identification phase, literatur study, confirm and validation phase, collecting data, analyze data, and propose a smart village design for Wirosari District

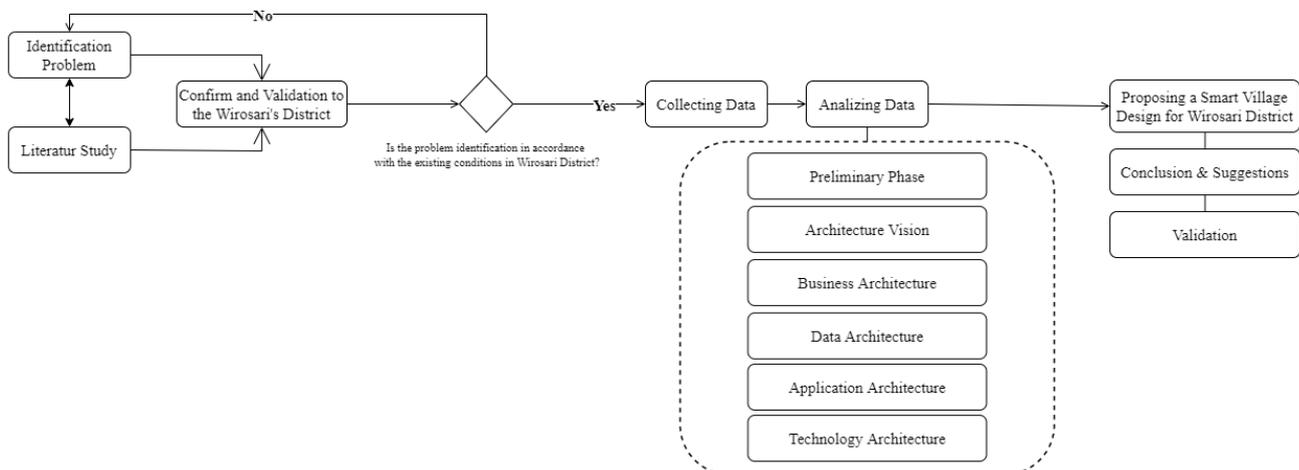


Figure 2 Research Method

A. Identification Phase

The results of the problem identification are formulated into a problem formulation which is then used as a reference in setting the objectives and limitations of the research.

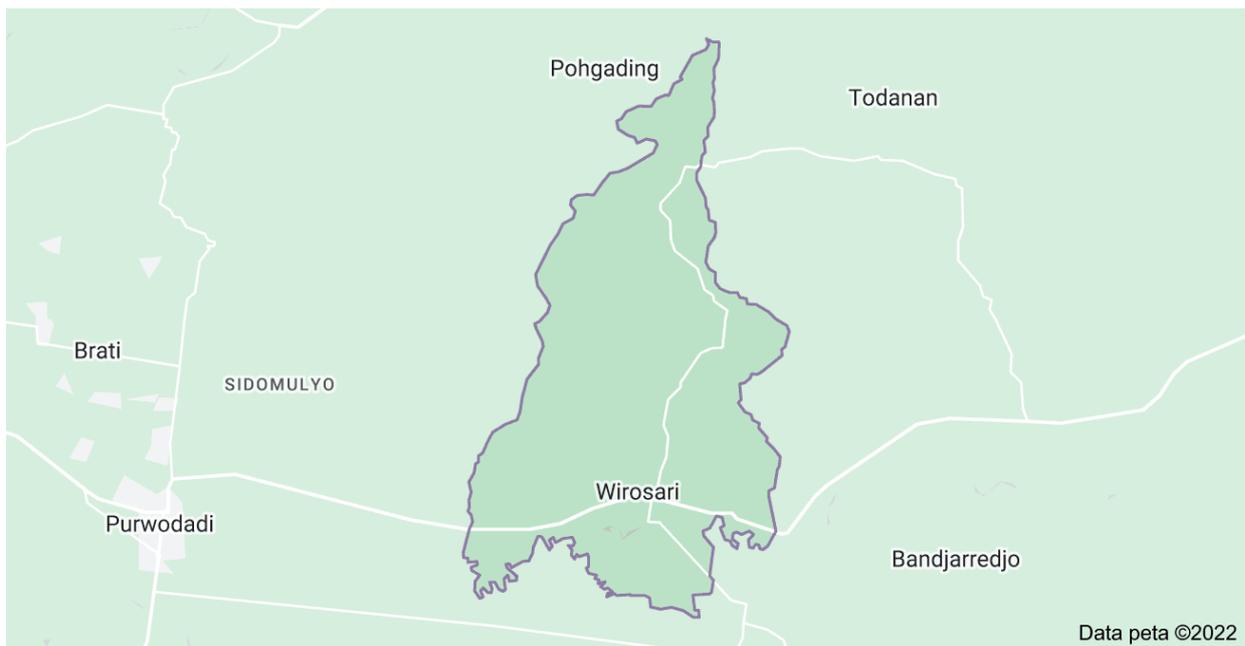


Figure 3 Maps of Wirosari

B. Literature Review Phase

This stage is the initial stage along with the problem identification stage through a literature review through related journals. The results of the study are formulated into several dimensions, aspects, and indicators which are then used as a reference in setting the goals and limitations of the research.

C. Confirm and Validation Phase

At this stage is to validate the identification of problems that have been carried out and reconfirm with the sub-district related to the sub-district requirements to overcome existing problems.

D. Data collection Phase

At this stage is to collect research data to design the district's smart village enterprise architecture. This activity begins with an introduction to the sub-district environment both internally and externally and in terms of technology. Furthermore, preparations were made, and conducted observations, interviews, and data validation. The qualitative data processing method is a method for collecting descriptive research data and uses analysis. The process and subject perspective are prioritized in this method by utilizing the theoretical basis as a guide so that the research focus is in accordance with the facts on the object in the field [17]. At this stage is the method of collecting data research to design the smart village. The activities in this qualitative method begin with an introduction to the sub-district environment, both internally and externally, in terms of technology. Furthermore, preparations were made, and observations, interviews, and data validation were conducted. Stakeholders related to this activity are the general service function, the sub-district head, the village / kelurahan head, and the stakeholder expert. The following are some of the data collection activities carried out, including:

1. Interviews: activities carried out by having conversations with the sub-district and asking questions to get the data needed in research.
2. Literature Study: an activity carried out by conducting research on writings about research on smart villages that have been carried out by previous researchers to solve research problems.
3. Observation: There are two types of data, including:
 - a. Primary data
Primary Data is data obtained directly from each stakeholder of the Wirosari District Public Service Function.
 - b. Secondary Data
Secondary data is data obtained from several external sources other than stakeholders of the Wirosari District Public Service Function. The external sources referred to include journals, papers, websites and other information from website links related to this research.

TABLE I
THE SIXTH MISSION OF GROBOGAN BASED ON RPJMD

The Mission of the Sixth District based on the 2016-2021 RPJMD of Grobogan Regency	District Mission Objectives based on the Strategy and Policy Direction of the Grobogan District RPJMD 2016-2021	Mission Targets based on the Strategy and Policy Direction of the Grobogan Regency RPJMD 2016-2021
Improving the quality of apparatus resources, accountable governance and the quality of public services.	Improving the quality of public services.	Increasing the quality of governance, Management of regional data/information and archives, as well as security password information.

TABLE II
THE FIFTH MISSION OF WIROSARI BASED ON RENSTRA

Fifth mission	Goals	Target	Strategy	Policy
Improving Service Delivery to be more ACCOMMODATIVE, ACTIVE, TRANSPARENT, NON-DISCRIMINATIVE, EASY, QUICK and CHEAP.	Improving the quality of service performance in the Wirosari District	The creation of excellent service conditions in the district	Peningkatan kualitas dan kapabilitas layanan Kecamatan	Improving the quality and capability of sub-district services Improving service quality is focused on the speed and accuracy of service delivery to the community.

TABLE III
PROBLEM OF WIROSARI BASED ON RENSTRA

Wirosari sub-district problems	Lack of facilities and infrastructure to support the performance of public services. Lack of public understanding in public services Lack of coordination of public services to the community in public services
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E. Data Analyze Phase

In the third stage is a collection of main activities in research that refers to the IGEA in designing the enterprise architecture that has been chosen as the framework in this research. Phases that will be implemented in enterprise architecture design include [13] :

1. Analysis and design of Preliminary Phase
 2. Architecture Vision
 3. Business architecture analysis and design
- F. Propose a Smart Village Design for Wirosari District Phase

1. Validation: At this stage, validation will be carried out by making research surveys and interviews which will be addressed to the relevant stakeholder in Wirosari District.

Conclusions & Suggestions: This stage will produce conclusions and suggestions from the problems in Wirosari District and then a solution will be given which will be packaged in the form of an enterprise architecture blueprint that has been mapped on each domain

III. RESULT AND DISCUSSION

The result of this research is the Preliminary stage, namely the Architecture Principle to identify the principles used in the Human Resources function. Then create a Principles Catalog to define the principles needed for the development of its enterprise architecture. and Vision architecture, this artifact refers to the second stage that was chosen to determine the goals, objectives, and objectives of an organization which is a description of the strategy and is the aspiration to be achieved by the company/organization. on Architectural vision. Vision and mission refer to the way in which services contribute to the achievement of the vision or business strategy. Policies and regulations: these artifacts are used to define government policies and for designing government IT solutions. Solution Concept Diagram: This artifact refers to the second stage, namely determining the solution and targeting the information technology to be achieved, and Organizational Structure: This artifact is used to define the main tasks and functions of each organizational unit that interacts with IT. Business Architecture is focused on defining business processes, and public services, namely Business Process Diagrams to identify business processes and information generated and required by each business function that can be automated and integrated, and Public Service Catalog: defines public services that include service standards provided by the government.

A. Preliminary Phase

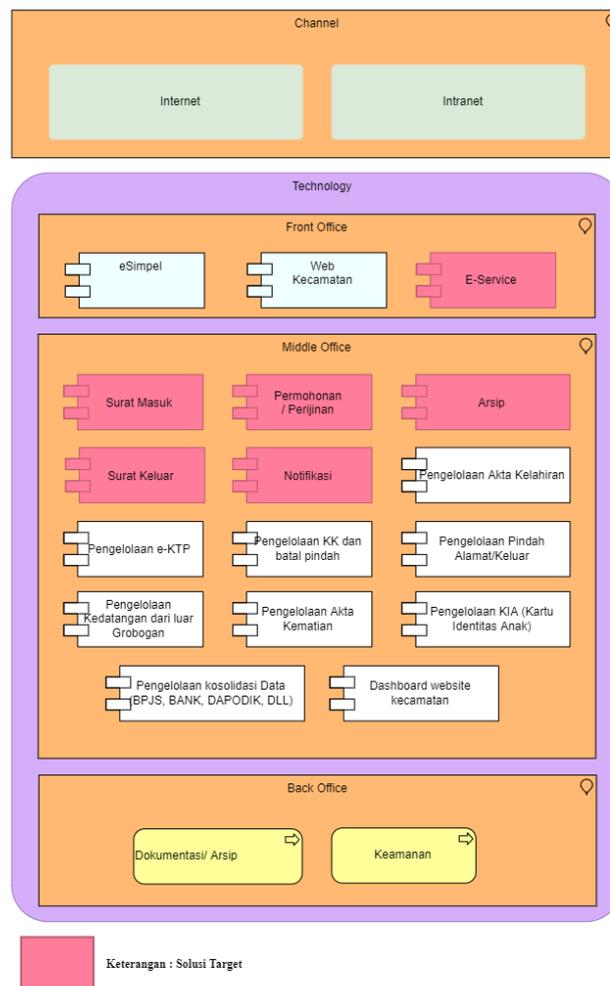
1. Architecture Principle : Identify the principles used in the Human Resources function. Then create a Principle Catalog to define the principles needed for the development of its enterprise architecture. The principles used are:
 - Operational Procedure Standard for Wirosari District in 2021
 - The jargon/symbol of Wirosari District is “WIROSARI GUMREGAH” which means Rise up with the residents to build Wirosari City from being better.
 - The 6th mission of Grobogan Regency, namely: Improving the quality of apparatus resources, accountable governance, and the quality of public services with the aim of improving the quality of public services. And from this goal, it is revealed to be the target of increasing the quality of e-government, managing data/information and regional archives, as well as securing password information.
 - Grobogan Regency Regulation No. 10 of 2008 concerning the Structure, Position and Main Duties of the Sub-District and Sub-District Organizations of Grobogan Regency;
 - Grobogan Regent Regulation No. 53 of 2008 concerning the main tasks, functions, job descriptions and work procedures of the Grobogan District Sub-district Organization; .
 - Regulation of the Regent of Grobogan No, 28 of 2010 concerning the Administration of Official Manuscripts within the Grobogan Regency Government
 - Regional Regulation of Grobogan Regency No. 6 of 2014 concerning Changes to
 - Grobogan Regency Regulation No. 10 of 2010 concerning Population Administration.
 - Government Regulation no. 9 of 1975 article 3 paragraph 3 concerning marriage
 - Grobogan Regent Regulation No. 34 of 2014 concerning Delegation of part of the authority to process and Sign Permits and Non-Permits to the Camat
2. Architecture Goals : This artifact refers to the second stage that was chosen to determine the goals, objectives, and goals of an organization that represent the decomposition of strategies and are the aspirations to be achieved by the company/organization. The goals to be achieved to the objectives of the research object are:
 - Vision : Becoming a District Ready to Provide Excellent Service to the Community and Integrated Regional Trustees.
 - Goals : Improving the quality-of-service performance in the Wirosari sub-district
 - Objective : The creation of excellent service conditions in the district
 - Strategy :
 - Improving the quality and capability of sub-district services (E-Service)
 - Dissemination of digital Public Service (E-Service) through village/sub-district events or activities

B. Architecture Vision

1. Vision and Mission : Vision and mission based on a mission and vision statement that concisely captures the purpose and direction of the organization. Vision and mission refer to the way in which a service contributes to the achievement of a business vision or strategy. The president’s vision, mission and priority programs are translated by the ministers into the initial draft of the Strategic Plan or Regional Medium-Term Development Plan (RPJMD).
 - Vision
Becoming a District Ready to Provide Excellent Service to the Community and Integrated Regional Trustees
 - Mission
 - a) Increasing the Provision of Representative Offices and Service Places.
 - b) Provide Instructions for Service Mechanisms that are Easy to Understand by the Community.
 - c) Improving the Ability of Officers as Good Servants.
 - d) Ensuring the Certainty of the Supporting Components of the Service is Not Easily Error/Problematic.
 - e) Improving Service Delivery to be more accommodative, active, transparent, not

- discriminative, easy, quick and cheap.
- f) Provide opportunities for the community to play an active role in providing input on the services provided.
 - g) Improving Coordination Between Vertical Agencies and Between Agencies in the Wirosari District Area.
 - h) Improve Coordination with Community Leaders, Institutions and Organizations.
 - i) Improving the Implementation of Village/Kelurahan Development.
- b. Policy and regulation: this artifact is used to determine government policies and regulations that will be used as the basis for designing government IT solutions. This artifact refers to the provision of critical policy, programmatic and managerial foundations to support government operations in the provision of government services to individuals, businesses and other organizations.
- Presidential Regulation No. 95 of 2018 concerning Electronic-Based Government Systems
 - Central Java Regional Regulation No. 11 of 2019 concerning the Implementation of Smart Central Java Province
 - Grobogan Regency Regent Regulation No. 40 of 2019 concerning Electronic-Based Governance System
- c. Solution Concept Diagram: This artifact refers to the second stage, namely determining the solution and targeting the information technology to be achieved. As mentioned in Figure 3, The solution-based Concept Diagram provides a high-level orientation of the solutions considered to meet the objectives of the architectural engagement.

Visual Paradigm Online Academic Partner Program



Visual Paradigm Online Academic Partner Program

Figure 3 Solution Concept Diagram

- d. Organization Structure: These artifacts are used to define the main tasks and functions of each organizational unit that interacts with IT. As mentioned in Figure 4, organization structure Wirosari's District consist of head, etc.

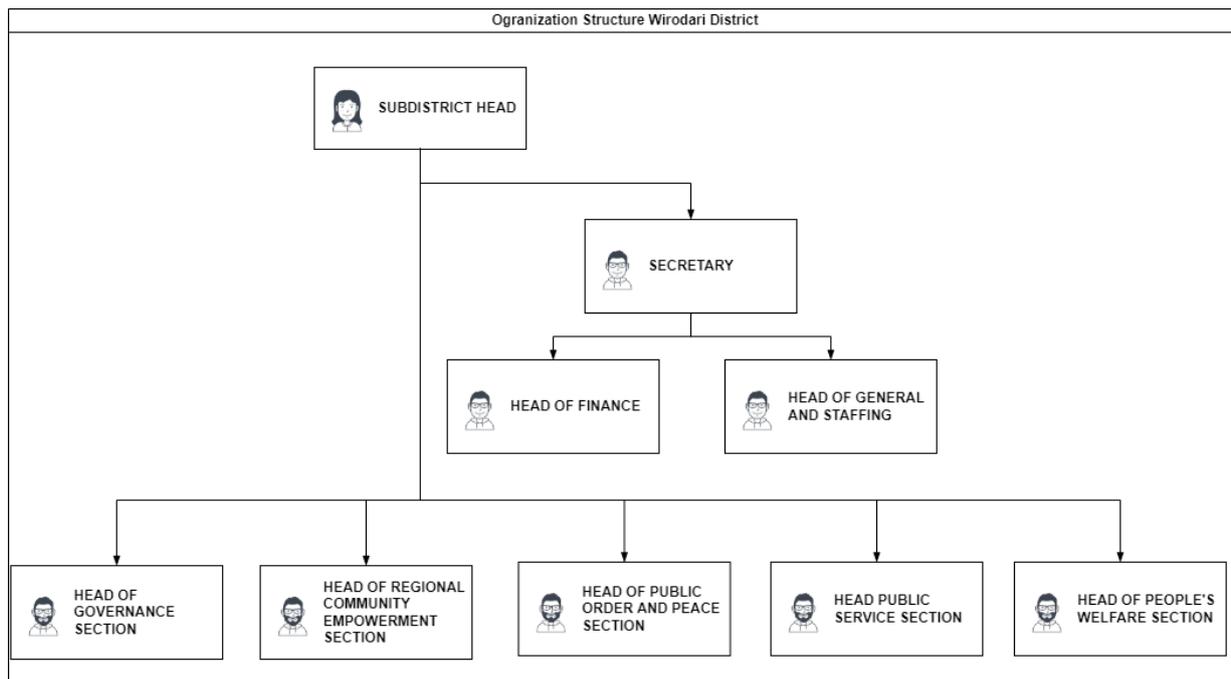


Figure 4 Organizational Structure

C. Business Architecture

Business Architecture is focused on defining business processes, and public services,

- Business Process Diagram: identifies business processes and information produced and required by each business function that can be automated and integrated. The business program will be explained in figure 5 and figure 6.

o Existing Business Process

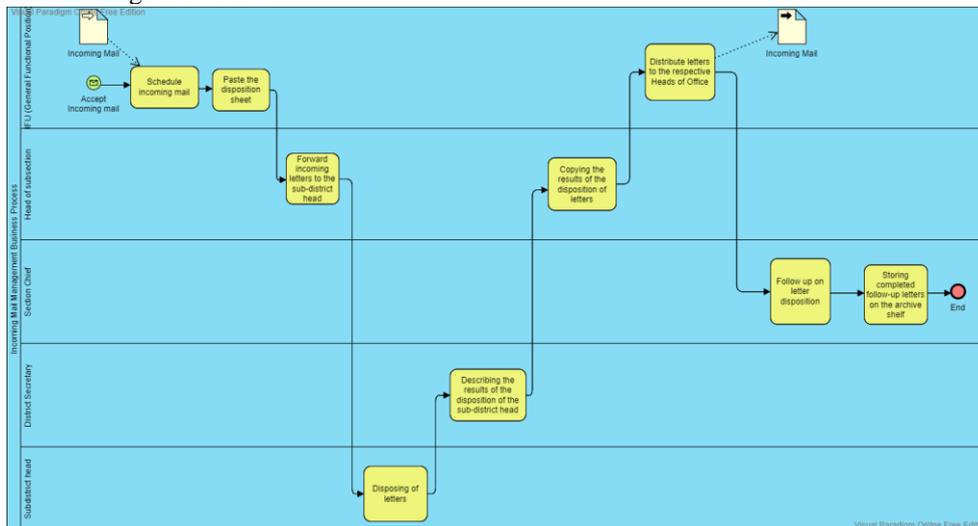


Figure 5 Incoming Mail Management Eksisting

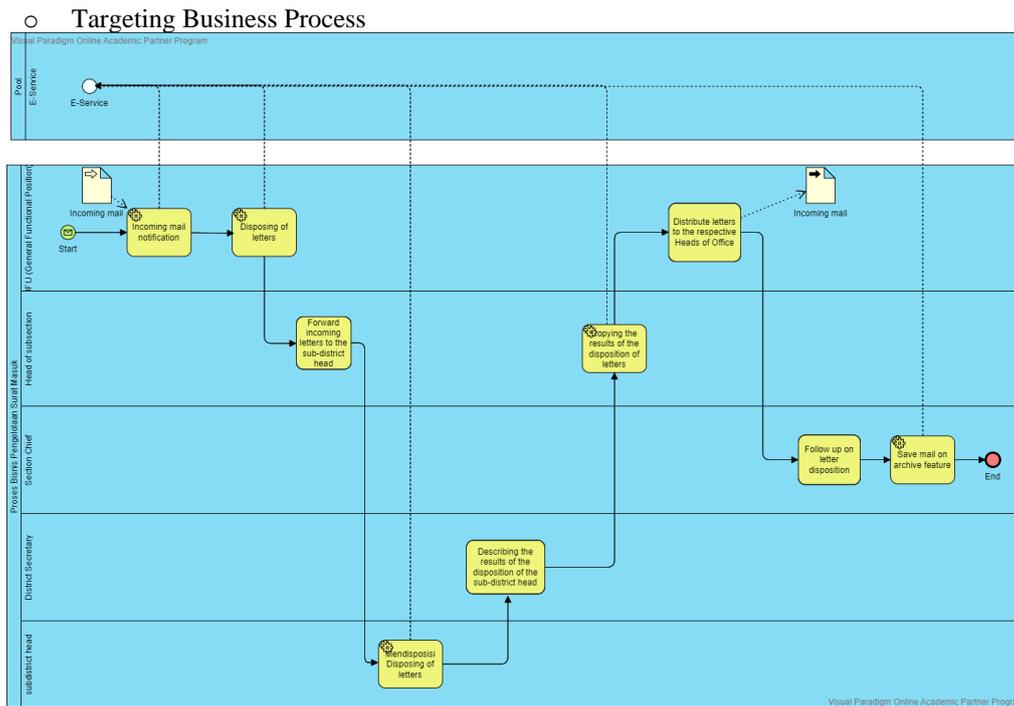


Figure 6 Incoming Mail Management Targeting

- **Public Service Catalog:** defines public services that include standard services provided by the government. The public service catalog be explained in table 1.

TABLE I
 PUBLIC SERVICE CATALOG

No	Public Service	Description	IT/Systems
1.	Incoming Mail Management	Operational Procedure Standard for the management of incoming letters	-
2.	Outgoing Mail Management	Operational Procedure Standard outgoing mail	-
3.	Verification and Validation of KK Application (Family Card)	Operational Procedure Standard for Verification and Validation of KK (Family Card) Applications	e-simpel
4.	Verification and Validation of Application for KTP (Resident Identity Card)	Operational Procedure Standard for Verification and Validation of Application for KTP (Kartu Identity Card)	e-simpel
5.	Request for Information on Moving Population Between Districts in One Regency	Operational Procedure Standard for submitting an application for information on moving between sub-districts in one district	e-simpel
6.	Recommendation Information on Inter-Regency/Province Migration of Population	Operational Procedure Standard for submitting a Recommendation for Information on Inter-Regency/Province Migration of Population	e-simpel
7.	Recommendation for a Birth Certificate Application	Operational Procedure Standard for submitting a Recommendation for a Birth Certificate Application	e-simpel
8.	Marriage Recommendation Less Than 10 Days	Operational Procedure Standard for submitting a marriage recommendation in less than 10 days	-
9.	Recommendations for Submission of Proposals for the Development of Facilities for Worship and Religious Institutions	Operational Procedure Standard for Submitting Recommendations for Submission of Proposals for the Development of Facilities for Worship and Religious Institutions	-
10.	Application for a Business Permit Recommendation for the Implementation of a Tourist Attraction Business	Operational Procedure Standard for Submitting an Application for a Business Permit Recommendation for the Implementation of a Tourist Attraction Business	-
11.	Advertising Permit Application	Operational Procedure Standard for submitting an Application for an Advertising Permit	-
12.	Public Complaint	Operational Procedure Standard for handling public complaints	-

IV. CONCLUSION

Based on the results of the Enterprise Architecture design with the smart village concept in the general service function of the Wirosari District, it can be concluded that: Enterprise Architecture design with the smart village concept in the public service function in Wirosari District, using the IGEA framework starting from the preliminary phase, architecture vision, and business architecture. The development of the E-Districts application is a new proposal based on identifying priority goals for public services required by the Public Service function. So it can be said that the E-Districts Application can improve service performance for the Public Service function. Enterprise Architecture design produces an architecture blueprint for the existing and targeting conditions that describe the preliminary phase, architecture vision and business architecture.

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