

## I. INTRODUCTION

While data security has become a pressing concern globally, ensuring protection of sensitive information at the local village level presents distinctive challenges[1]. Administrations across Indonesia maintain crucial resident registration, financial records, and administrative archives, necessitating robust measures to forestall unauthorized access, data theft, or corruption[2]. Without sufficient safeguards, communities risk breaches exposing private details, compromising institutional integrity, and incurring costly damages[3]. However, data security accomplishes more than protecting individuals - it also cultivates trust among residents and mitigates potential harms across an entire populace.

In response, the national government instituted regulations like Government Regulation No. 71 of 2019 on Electronic System Monitoring[4] and Ministerial Regulation No. 5 of 2021 on Telecommunication Organization[5]. These mandate that local administrations, including villages, construct enduring protections for information like population records containing highly sensitive personal details inherently at risk of exploitation or misuse without diligent safeguards. Yet numerous villages still rely on antiquated storage and management leaving them prone to vulnerabilities such as access infractions and data corruption. These vulnerabilities highlight an urgent need for modern, resilient systems adequately shielding demographic information[6]. Bolstering security not only diminishes risks but also enables implementing policies fostering transparent, accountable governance at the community level. A comprehensive strategy for data protection can empower villages to handle information capably and productively. Implementation of information technology in different areas can be seen in following works [7], [8], and [9].

One potential solution entails deploying the Advanced Encryption Standard (AES), an internationally recognized encryption method delivering high security and functionality[10]. The most secure configuration, AES-256, is especially suited for sensitive data[11] like population data managed by village authorities. This research aims to design, develop, and apply a secure population management framework for Indonesian villages leveraging AES-256 encryption. Reinforcing security can minimize the likelihood of data misappropriation, regain public assurance in village-level administration, and ensure alignment with national statutes. Additionally, it offers an efficient, scalable approach to enhance administration and information management across communities in Indonesia[12].

