# DESIGNING A CLOUD-BASED IT INFRASTRUCTURE TO SUPPORT NEIGHBORHOOD ADMINISTRATION WEB APPLICATIONS

**Muhammad Rizqy Zufarrel[1] , Isa Faqihuddin Hanif[2], Dimas Birru Palgunadi[3],**

[123]Information Systems and Technology Study Program, Faculty of Industrial Technology and Informatics, Muhammadiyah University Prof. Dr. HAMKA

**Abstract**

Administrative management at the neighborhood level (Rukun Tetangga/RT) in Indonesia is still largely handled manually, often leading to data inaccuracies and delayed services. While a dedicated website offers a solution for digitalization, its effectiveness relies heavily on a robust underlying technology infrastructure. This research aims to design a cloud-based IT infrastructure specifically tailored for small-scale administrative needs with limited budgets. Adopting the Network Development Life Cycle (NDLC) methodology, the study analyzes technical requirements ranging from Virtual Private Server (VPS) selection and secure data storage to automated backup schemes. The findings indicate that cloud infrastructure not only ensures higher uptime compared to local physical servers but also offers significant cost efficiency. This proposed design is intended to serve as a practical guide for local community leaders in establishing reliable, transparent, and affordable information systems.

**Keywords**: RT Administration, Cloud Computing, IT Infrastructure, Digitalization, NDLC.

**INTRODUCTION**

As the fundamental building block of Indonesia's bureaucracy, the Rukun Tetangga (RT) plays a vital role in validating population data and disseminating government programs. However, many RTs continue to rely on antiquated paper-based systems or unorganized messaging platforms for data management. Existing research indicates that such web-based systems are essential for improving communication within the community (Kurnia & Rohman, 2023). Manual processes pose significant risks, ranging from physical record degradation to delayed data retrieval and a lack of financial transparency (Nugroho & Rohimi, 2020).

Digital transformation through a dedicated RT administration website is a strategic necessity to overcome these barriers. Such platforms can streamline services like cover letter requests and real-time financial reporting (Romadhon et al., 2025). The primary obstacle, however, lies in infrastructure limitations. Maintaining an on-premise server requires substantial capital for hardware and power stability. In contrast, cloud computing provides a scalable and cost-effective alternative, eliminating the need for physical hardware while maintaining high performance . This study formulates a cloud-based ecosystem designed to support neighborhood operations in a secure and economical manner.

**METHODS**

This research adopts a qualitative-experimental approach by implementing the Network Development Life Cycle (NDLC) methodology, which is a standard framework for sustainable network design (Ariyadi & Purwanto, 2023). The process is tailored for cloud environments through the following stages:

•        Analysis: Evaluating neighborhood workloads (approx. 100-200 households) to determine necessary server capacity and data throughput.

•        Design: Drafting logical topologies, selecting cloud providers, and configuring security protocols such as firewalls.

•        Simulation: Conducting stress tests on the selected cloud platform to measure responsiveness during peak user access.

•        Costing: Calculating monthly operational projections based on resource consumption.

**FINDINGS AND DISCUSSION**

The proposed architecture utilizes a cloud-native strategy to optimize resource allocation. This aligns with modern strategies for IT infrastructure management (Dan & Widodo, 2020).

•        Virtual Private Server (VPS): A Linux-based environment is used to host the web application, providing dedicated resources that outperform shared hosting .

•        Object Storage: Dedicated storage for resident documents (e.g., ID cards) ensures the main application server remains lightweight.

•        Security Strategy: To protect sensitive population data, the system employs database encryption and automated backups during low-traffic hours .

Economic Analysis: Cloud technology has proven effective for supporting small-scale organizations and infrastructure (Hartanto et al., 2022; Mulyono & Lubis, 2021). Compared to physical server procurement costing IDR 10-15 million, local cloud models in Indonesia require only IDR 100,000 to IDR 250,000 per month. This makes digitalization highly accessible even for neighborhood-scale budgets.

**CONCLUSION**

A cloud-based IT infrastructure is the most viable solution for modernizing RT administration. Similar implementations have shown success in enhancing village-level public service management (Situnggaling, 2025). This model ensures high availability without the complexity of managing physical hardware at the neighborhood office. Future iterations could integrate simple AI to help analyze social aid trends or predict community needs based on accumulated data.

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