Integration of Website, RSS Feed, and Digital Signage to Support Public Information Relay Between Villages in Nusalaut District

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Abstract.

The rapid development of information technology has significantly influenced how information is distributed and accessed by communities. However, many rural areas still rely on conventional information media such as bulletin boards and printed announcements, which are inefficient and difficult to update. This research aims to design and implement an integrated public information system using websites, RSS feeds, and digital signage in Nusalaut District, Central Maluku Regency, Indonesia. The study uses a Research and Development (R&D) approach consisting of requirement analysis, system design, implementation, and system testing. The developed system integrates multiple village websites with RSS feed technology and cloud-based digital signage using Raspberry Pi as the media player. The results show that three digital signage units were successfully implemented in Nusalaut District Office, Ameth Village, and Nalahia Village. In addition, seven village websites and one district portal website were developed to support information distribution. The integration of RSS feed technology allows real-time relay of information from the district portal to digital signage and village websites. The proposed system improves the efficiency, accessibility, and timeliness of public information dissemination in rural areas.

Keywords: Digital Signage, RSS Feed, Website Integration, Raspberry Pi and Information System.

1. INTRODUCTION

Information plays an important role in supporting decision-making processes and public services. In the digital era, access to accurate and timely information has become a necessity for communities and government institutions. Information systems supported by internet technology enable organizations to distribute information more effectively and efficiently [1].

Despite these technological advances, many rural areas still rely on traditional media such as notice boards and printed announcements to disseminate public information. These media are static and difficult to update, resulting in delays in information delivery [2].

Digital signage technology has emerged as an alternative medium for delivering dynamic information in public spaces. Digital signage systems allow multimedia content such as text, images, and videos to be displayed in real time and managed remotely [3]. Several studies have demonstrated that digital signage systems can significantly improve the accessibility and attractiveness of public information services [4].

Recent developments in embedded computing have enabled the use of microcomputers such as Raspberry Pi for digital signage systems. Raspberry Pi offers a low-cost and energy-efficient solution for multimedia content display and web-based applications [5]. Research by Ariawan et al. showed that Raspberry Pi-based digital signage systems can provide reliable performance for information display in public environments [6].

In addition to hardware platforms, web technologies also play an important role in information distribution systems. Websites function as centralized platforms where information can be published and accessed by users across different locations [7]. However, manually updating multiple websites can be inefficient.

RSS (Really Simple Syndication) technology provides a mechanism for automatically distributing web content updates. RSS feeds allow users and systems to receive updates without manually visiting multiple

websites [8]. Previous studies have shown that RSS technology is effective for automated information distribution systems and news aggregation platforms [9].

Cloud-based digital signage platforms further enhance the scalability of information systems. Cloud computing enables centralized content management and remote control of multiple display devices across different locations [10].

In government environments, integrated information systems combining websites, RSS feeds, and digital signage can significantly improve the efficiency of information dissemination [11]. Such systems allow centralized content management while ensuring that information is delivered simultaneously to multiple locations [12].

Based on these considerations, this research aims to design and implement an integrated system combining websites, RSS feeds, and digital signage to support public information relay between villages in Nusalaut District.

II. METHODS

This research adopts the Research and Development (R&D) approach to design and implement the proposed system. The R&D method is widely used in technology development studies because it allows iterative design, implementation, and evaluation of system prototypes [13].

The research stages include:
1. Literature study
2. Observation and requirement analysis
3. System design
4. System development
5. System testing
6. Implementation and evaluation

System Architecture

The developed system consists of three main components:
1. **Website System**

Websites serve as the primary information portal for the district and village governments. Web-based information systems are widely used because they allow users to access information anytime and anywhere through internet-connected devices [7].

2. **RSS Feed Integration**

RSS technology enables automatic distribution of content updates from the district website to other platforms. Studies have shown that RSS feeds can improve the efficiency of information dissemination and reduce redundancy in content management [8], [9].

3. **Digital Signage System**

Digital signage displays are implemented using Raspberry Pi devices connected to LCD screens and managed through the Yodeck cloud platform. Cloud-based digital signage systems allow administrators to update multimedia content remotely and manage multiple displays simultaneously [10], [14].

Hardware Components

The hardware used in the system includes:
1. Raspberry Pi microcomputer
2. LCD display monitor
3. Network connectivity devices

Raspberry Pi functions as a media player responsible for retrieving multimedia content from the cloud-based digital signage platform.

Software Components

The software used in the system includes:
1. WordPress Content Management System
2. Yodeck cloud-based digital signage platform
3. RSS feed integration technology

4.   Raspberry Pi operating system

III. RESULT AND DISCUSSION
System Implementation
        The implemented system integrates websites, RSS feeds, and digital signage displays into a centralized information network. Similar integration approaches have been successfully applied in previous research to improve information distribution efficiency [11], [12].
The system architecture consists of:
1.   1 district information portal
2.   7 village websites
3.   3 digital signage units
The district website acts as the main information source, while village websites function as local information portals.

Digital Signage Deployment
Three digital signage units were successfully installed in the following locations:
1.   Nusalaut District Office
2.   Ameth Village Office
3.   Nalahia Village Office
Each digital signage device is controlled by a Raspberry Pi microcomputer that retrieves multimedia content from the cloud-based management system.
Previous studies have confirmed that Raspberry Pi-based digital signage systems can provide stable performance for multimedia display applications [5], [6].

RSS Feed Integration
        RSS feed technology plays a key role in enabling automatic information relay between systems. When new content is published on the district website, the RSS feed automatically distributes the information to village websites and digital signage displays.
Figure 1 illustrates that eight websites were developed, consisting of seven village websites and one district website have been developed to serve as information platforms for village profiles, village information, and as information feeders using Rich Site Summary (RSS) for the digital information boards. Meanwhile, only three digital information boards will be installed, located at the Nusalaut District Office, Ameth Village, and Nalahia Village. This decision was made by considering the supporting infrastructure available at each location, such as adequate internet connectivity and the availability of existing devices that can support the system implementation.
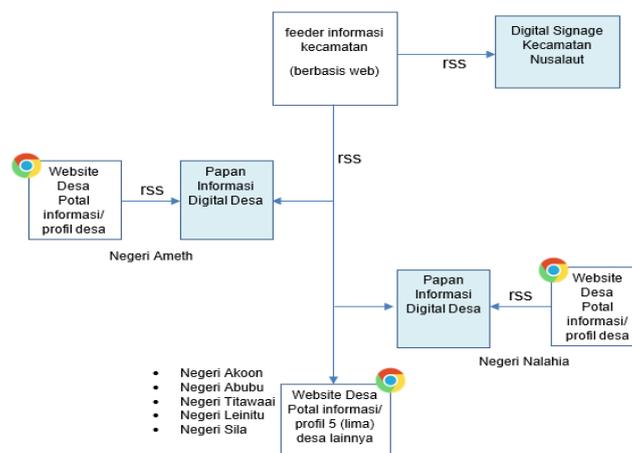

Fig. 1. Abstraction of the Information Process Diagram of the Proposed System

        Furthermore, the basic concept of cloud-based digital signage follows the principles of cloud computing, which enables data storage, processing, and access through online networks. The digital signage system designed and developed in this study offers several advantages compared to conventional information

boards or even traditional digital information boards. The accessibility provided by cloud technology allows administrators to modify layouts and update information from any location and at any time. As a result, the information displayed on the digital signage system can be delivered in real time.

Figure 2 illustrates the implementation design of the hardware devices and the communication model used in the system. A digital display media is installed in the lobby area of government institutions, specifically in the information service area or other public spaces within the district and village offices. The display media is controlled by a Raspberry Pi microcomputer that functions as the content player.

The microcomputer displays information in real time and according to a predefined schedule based on the layout design and content created by the information administrators. Through this mechanism, administrators are able to manage and update the displayed information anytime and from any location.

Fig. 2. Interconnection of the Developed System

The integration in this research involves the development of websites, the implementation of RSS feed features, and their deployment in digital signage systems at several locations. The overall information system is built using the Yodeck platform, which serves as the central digital signage management system. The actors involved in the overall system architecture are described in Table 1.

Table 1. Actors Involved in the Developed Information System

No	Actor	Description
1	Content Viewer	General users who access village information through digital signage displays and websites.
2	District Information Manager	Responsible for adding highlighted content required by each village through the district website, which is then distributed to digital signage information boards in the villages.
3	Village Information Manager	Responsible for managing general village content, adding and managing village tourism information, and managing information related to village development potential.

Fig 3. shows the configuration interface indicating that the device has been successfully connected to the cloud platform.
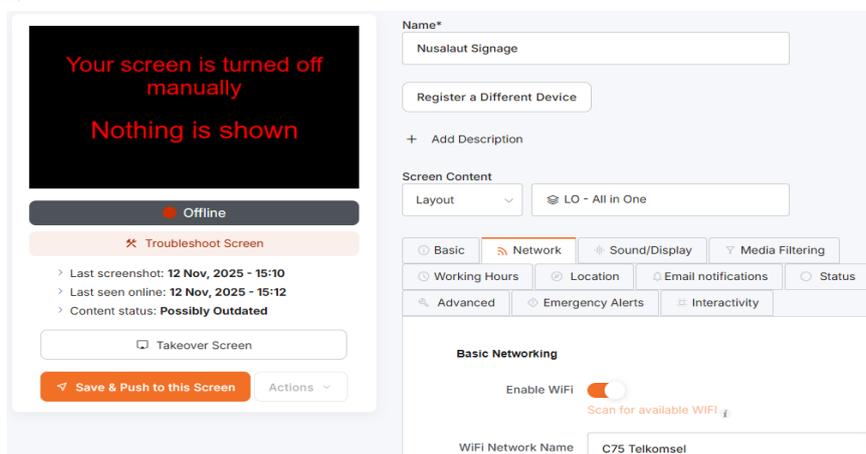

Fig. 3. Yodeck Player Configuration Interface in the Digital Signage System

Furthermore, to integrate the digital signage system with the news content available on the website, an RSS feed implementation was carried out from the Nalahia website to the digital signage system at the Nusalaut District Office. This integration process was successfully implemented. It should be noted that this stage was conducted primarily to test the success of the system integration. The news distribution workflow will later be adjusted according to the previously designed system architecture. The successful integration of website news content into the digital signage ticker can be observed from the web preview results shown in Figure 4.
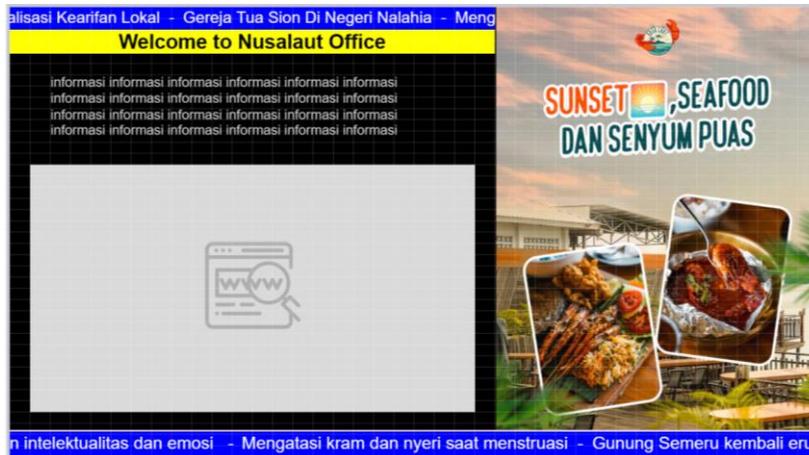

Fig. 4. Initial Web Preview Layout of the Digital Signage at the Nusalaut District Office

Each website developed in this research is administered through a hosting account on the Hostinger server. All websites were successfully built using the WordPress Content Management System (CMS) platform. Each village in Nusalaut District, namely Ameth, Nalahia, Titawaai, Akoon, Abubu, Sila, and Leinitu, has been able to manage and administer their respective website content independently. All websites developed in this study are managed under a single cloud-based hosting account using the Hostinger platform. This approach allows the management of hosting services, including account renewal, to be handled collectively, making the administration process more efficient and easier to manage.
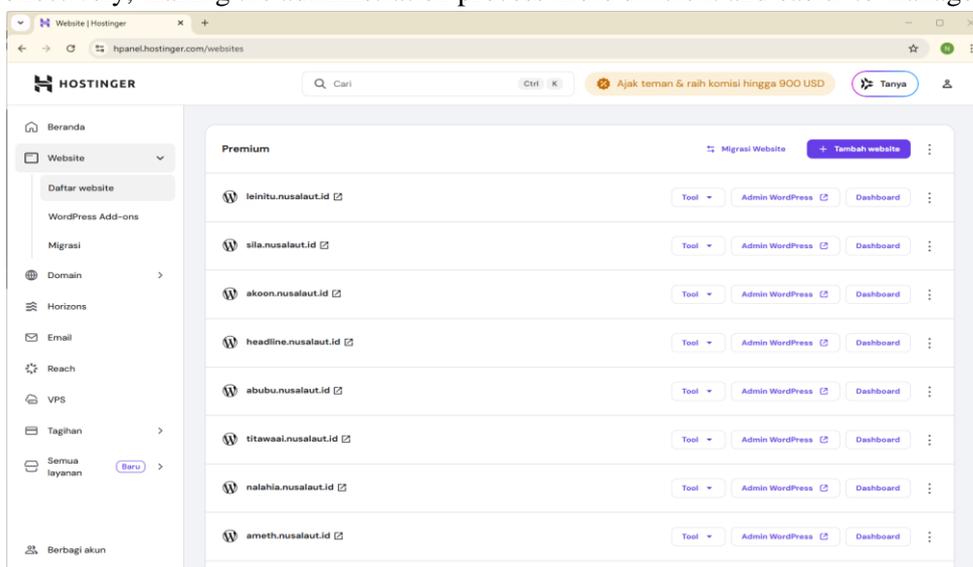

Fig. 5. Screenshot of the Websites Managed Under a Single Hostinger Server Account

IV. CONCLUSION

This research successfully developed an integrated public information system consisting of websites, RSS feeds, and digital signage in Nusalaut District. The system includes three digital signage displays, one district information portal, and seven village websites. RSS feed technology enables automatic relay of information from the district office to village websites and digital signage displays. The system improves the

efficiency and accessibility of public information dissemination in rural areas. Future work may focus on expanding the system to additional villages and integrating mobile-based information services.

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