Network Infrastructure Design and Website Management of Perumdam Tirta Bengkayang

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ABSTRACT

The management and optimization of IT infrastructure are vital for the Regional-Owned Enterprise Agency, Perumdam Titra Bengkayang, considering the number of connections on 2021 was 10.100 SR and the number continues to grow. This causes the need to improve services in the field of information technology, especially facilities and infrastructure for information disclosure of public bodies involving facilities such as network infrastructure and websites as well as online payment systems. Since the change of director and of name from PDAM to Perumdam Tirta Bengkayang, it is stated in the five year strategic plan to change the status of information disclosure from the black zone in 2019 at least to yellow for 2020-2022 and blue or green for 2023-2024. Through this activity, the design of a network system among the branches of the Perumdam Tirta Bengkayang office and website management to facilitate monitoring and evaluation of information disclosure for public agencies were done. This activity resulted in a network design based on inter-branch networks for future improvements and website management based on wordpress CMS.

Keywords: Network, Website, Wordpress CMS.

1. INTRODUCTION

In today's instant and practical era, accurate delivery of information is needed. One way of delivering information that is growing rapidly is by using the internet through network technology **(Yuniar 2018)**. Network technology does not only act as an infrastructure that can support the flow of information through virtual private servers and cloud hosting, but is also accompanied by appropriate and safe bandwidth management for the continuity of digital activities in the organization. In identifying the successful implementation of telecommunications network infrastructure technology, a topological design framework is needed that suits the needs of an organization so that when implemented it can have a good impact on employee performance and increase efficiency and productivity. **(Guan et al.,2018).** In addition to network infrastructure technology, it is necessary to develop and optimize application platforms for public information disclosure, one of which is using websites **(Andhica et al.,2018).** Currently, the existence of websites is mostly used by organizations to share important information for consumers, stakeholders, and the information technology audit process. Website becomes a communication tool of which

success in the process depends on usability, accessibility, search engine optimization and administrators **(Wang et al.,2018).** The existence of a website must be in line with consumer needs for information management and form a good image so that it is easy to remember and provides satisfaction in using the services of an organization **(Zarish et al.,2019).**

The combination of network infrastructure optimization and virtual private server systems will make it easier for system administrators to manage existing information technology in a company such as cloud website servers, company databases, bandwidth, BGP lines, and OSPF to balance load **(Towidjojo, 2014)**. A network with stable bandwidth and allocation of IP addresses that match the routing table, as well as the appropriate topology design will shorten network traffic paths so that bandwidth allocation runs smoothly and data entry and exit access becomes constant, which means easy access to web servers that run through the network infrastructure **(Towidjojo et al., 2016).**

In carrying out their functions and responsibilities in the public interest, government agencies have public communication function other than political communication, such as public relations and organizational communication. The existence of websites is proven as a change in the form of the use of information notification services by utilizing information technology. Until now, there have been various website portals that are required for government institutions as a medium of communication for both individual and group interests, including the interests of organizations managed by the government. The ownership of websites by the government is not only a media for publication, but also for promotion and interactive communication, so it can provide benefits for many parties **(Kemkes, 2021).**

Local Government Owned Water Utility Company (PDAM) is one of the business entities established and regulated by the Local Government based on Law no. 5 of 1962 with the aim of providing distribution and procurement services in the clean water sector. PDAM activities start from the procurement, production, processing, to distribution of clean water to consumers. With activities that involve many users and are under the supervision of the DPRD or regional legislative councils, it is necessary to monitor and evaluate the performance of PDAMs. Assessment is an effort to observe and at the same time measure the level of management performance in managing the company, so that the level of efficiency and effectiveness of the PDAM is known. In getting the results of the performance appraisal that can be accounted for, the performance achievement is assessed based on the PDAM's financial report which has been audited by the Public Accounting Firm and the PDAM Supervisory Board's performance evaluation report. The used performance appraisal indicators consist of four aspects, namely financial, service, operational and human resources **(BPPSPAM, 2016).**

PDAM exists as a Local Government Owned Company in Bengkayang. As the Bengkayang Regency Government responds to the need for adequate and sufficient clean water, after going through a long process the Bengkayang Regent issued Decree No. 114 of 2006 dated May 3, 2006 regarding the temporary appointment of the President Director of PDAM. In May 2006, PDAM started its operation, of which office was located behind the Pancasila Building on Jalan Ngura Bengkayang and completed by a core staff of clean water technicians trained by the Public Works Department, and Development section consisting of 9 people. Then in 2007 the location is moved to Jl. Bambang Ismoyo No. 15 Bengkayang **(Humas 2020).** Over time, the name changed from PDAM to Perumdam Tirta Bengkayang. This was done since the Bengkayang Regency Water Utility Company (PDAM) was ratified by the Raperda concerning Tirta Bengkayang Regional Public Water Utility Company as part of

Regional Regulation. The ratification of PDAM Bengkayang as PERUMDA for Tirta Bengkayang Water Utility Company is based on the transitional provisions, namely Article 402 paragraph (2) of Law No.23/2014 in conjunction with Law No.2 /prp/2015 in conjunction with Law No.9/2015 stating that all Regional Owned Enterprises are required to adjust its legal form to PERUMDA (local public companies) **(Pemda Bengkayang, 2020)**. For more than 13 years since the establishment of Perumdam Tirta Bengkayang, it has received an uninformative predicate from the West Kalimantan Information Commission, so that in 2020 the company planned to collaborate with the Shanti Bhuana Institute, specifically the Information Technology (IT) S1 study program regarding community service activity to provide assistance for 5 years onward, starting from 2020 to 2024 for network infrastructure management, website management, databases and other supporting applications with the aim of being able to realize the strategic plan of Perumdam Tirta Bengkayang moving from the black zone to the yellow zone (beyond the red zone) and continuing to the blue and green zones. In the early years of the community service activity, *i.e.* in 2021 and 2022, the focus is on giving assistance for the design of network infrastructure and website management for information disclosure.

The strategic plan for year 2020-2022 aims at achieving a yellow zone and for year 2023 at monitoring and evaluation so that the company is able to achieve a blue and green zone in 2024, 5 years since the change from PDAM Bengkayang to Perumdam Tirta Bengkayang. Monitoring and evaluation was carried out by the West Kalimantan Information Commission after the assistance program started, precisely on November 11, 2021, and it was stated that the monitoring evaluation of the Tirta Bengkayang Perumdam received a fairly informative predicate with a score of 57.20 **(Paulyn, 2021).**

2. METHODS

This community service activity is carried out using the ADDIE method in 2021 and 2022 on an ongoing basis including Analysis, Design, Development, Implementation, and Evaluation as shown in figure 1.
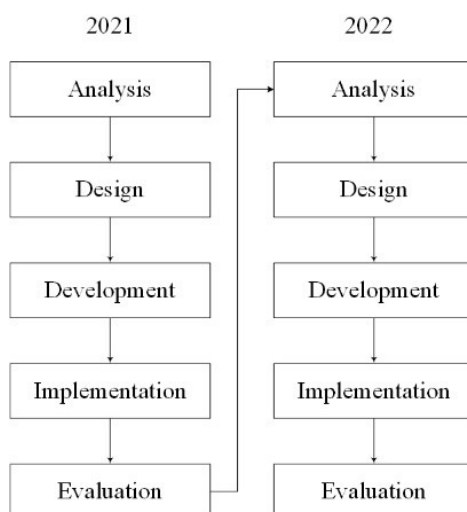
Figure 1 ADDIE Model in Community Service

For the shake of analysis, data collection and observations were carried out to find out the needs of the Perumdam Tirta Bengkayang which can be assisted in long term, namely

network and website management to support the achievement of public information disclosure. In the design section, the network schema design and website model are designed to be managed. Furthermore, in the development section, the process of making network designs and website management assistance designs is carried out. Next in the Implementation section, an explanation of the network design that will be built for the future is carried out then simulated, and in the website assistance section, management assistance is carried out from content to adding the account bill check feature. The results of the implementation were evaluated where in 2021 it received the predicate quite informative and in 2022 it is in the process of waiting for an adequacy assessment from the West Kalimantan Provincial Government. The mentoring was carried out in two different parts, i.e. firstly assistance for network infrastructure design and secondly assistance on website management where a team of Information Technology lecturers helped build and publish news to other important information on the official website of Perumdam Tirta Bengkayang. Both of these community service parts were carried out 30 meetings with the following details:

1. Assistance in network infrastructure design
   In this section, 15 assistance meetings were carried out related to the design of Virtual Private Servers and Cloud Network Allocations for the three largest branch offices, namely the Ledo Unit, Sanggau Ledo Unit, and the Serukam Unit. Network management was designed using GNS3 simulation and command line interface language scripts for mikrotik routers, making it easier for system administrators or IT teams of the Perumdam Tirta Bengkayang to allocate budget in the future for optimizing network infrastructure devices.
2. Assistance in managing the website of Perumdam Tirta Bengkayang
   Website management was focused on transferring knowledge for the public relations or public relations team in uploading news, and content on social media as well as the website of Perumdam Tirta Bengkayang. Additional features were also added on the website, such as checking customer water bills (rest-API) and adding information for monitoring and evaluation purposes which will be carried out in November 2022.

3. RESULTS AND DISCUSSION

The first result is that the network management section involves a billing system that will be integrated between units but is still within the scope of planning. The results of the planning can be seen in Figure 2 regarding the online design of the Tirta Bengkayang Perumdam unit.
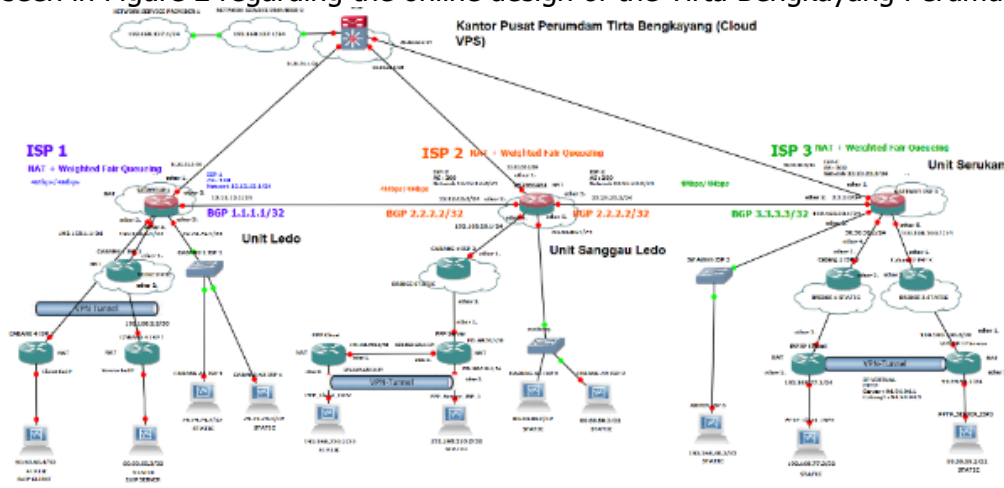

Figure 2. Online Design of Tirta Bengkayang Perumdam Unit

Figure 2 describes the Bengkayang unit office installed with a Virtual Private Server for the customer billing and payment or financial database system. It was distributed in BGP because it uses a dedicated network to facilitate file sharing between branch offices. Only 3 branch offices were chosen, namely the Ledo Unit, Sanggau Ledo Unit, and the Serukam Unit because they were looking for units that were close to transforming the existing network system. The BGP model is implemented between different ISPs so that they can connect dynamic and static routing between branch offices and make it easier for VPNs when implemented in each branch office for network security, such as the following syntax configuration snippet on the Ledo Unit Office router :

```
/routing bgp network
add disabled=no network=3.3.3.3/32 synchronize=yes
/routing bgp peer
add address-families=ip as-override=no default-originate=never disabled=no hold-
time=3m in-filter="" instance=default multihop=no name=peer1 nexthop-choice=default
out-filter="" passive=no remote-address=23.23.23.2 remote-as=200 remove-private-
as=no route-reflect=no tcp-md5-key="" ttl=255 use-bfd=no
/routing rip
set distribute-default=never garbage-timer=2m metric-bgp=1 metric-connected=1
metric-default=1 metric-ospf=1 metric-static=1 redistribute-bgp=no redistribute-
connected=no redistribute-ospf=no redistribute-static=no routing-table=main
timeout-timer=3m update-timer=30s
```

From branch offices to other branches using a VPN connection to facilitate online data exchange but still guaranteed data security that is carried out, namely using PPTP Tunnel and EoIP, the goal is to maximize the devices used between branch offices, such as the syntax configuration pieces on the unit office router as follows :

```
/ip ipsec proposal set [ find default=yes ] auth-algorithms=sha1 disabled=no enc-
algorithms=3des lifetime=30m name=default pfs-group=modp1024
```

The results of this network design were given to the Perumdam Tirta Bengkayang to be used as a study in determining the development of information technology infrastructure to support online units at the Ledo, Serukam, and Sanggau Ledo Units so that later the distribution of clean water recorded online can mostly be documented in the system as shown in the figure 3.

Figure 3. Submission of Application and System Design from Information Technology lecturer at Shanti Bhuana Institute to Perumdam Tirta Bengkayang

In the second part, assistance is provided for the management of the pdambengkayang.co.id website. In this management, it is focused on assisting the community relation team to be able to manage the website independently. The management of the wordpress cms website refers to several items such as Website Accessibility, Content, Periodic Announcements, PPID, Regulation, SOP, Availability, Finance. The 8 focus criteria for website assistance this time were based on the 2021 monev result documents as shown in figures 4 and 5.

Figure 4 Website Monitoring and Evaluation Criteria by the West Kalimantan Information Commission in 2021 part 1

Figure 5. Website Monitoring and Evaluation Criteria by the West Kalimantan Information Commission in 2021 part 2

In website assistance, content and news creation is carried out as shown in figure 6, but also added features, namely checking customer bills periodically through the site. Checking customer bills will make it easier for customers in the Bengkayang district to access their monthly water bill which is due every 20th of each month. The results of making a customer water bill check can be accessed at https://pdambengkayang.co.id/cek-tagihan/ by entering the Customer ID number in the Bengkayang area and an example bill can be seen as shown in figure 7.
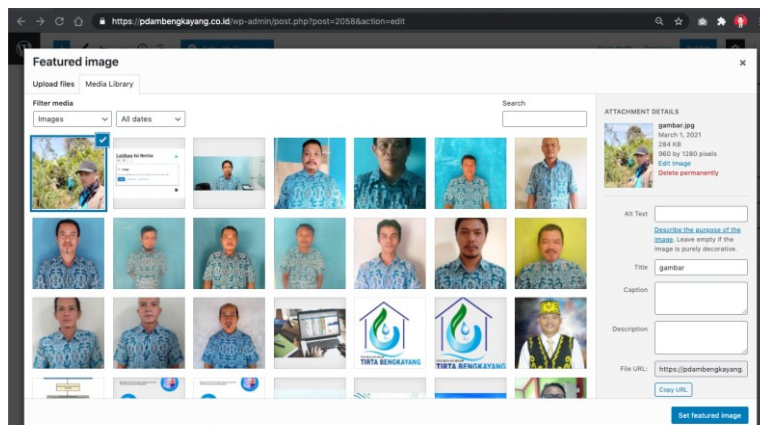
Figure 6. Adding news content and changing photo galleries for the website of Perumdam Tirta Bengkayang
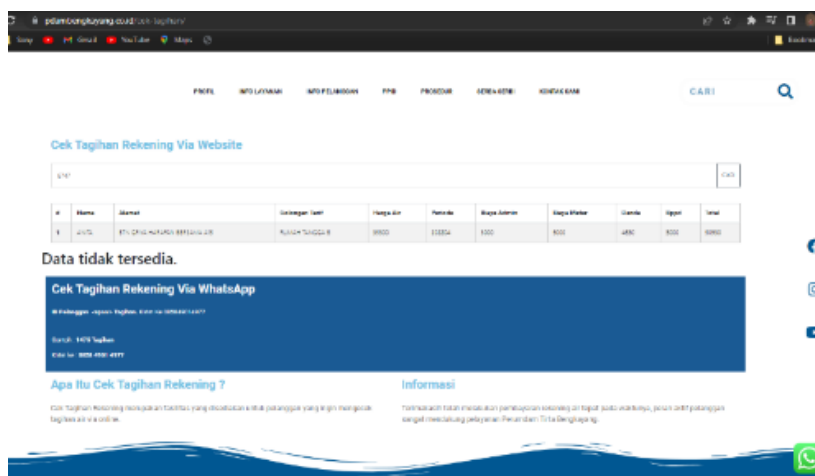
Figure 7. Link to check the water bill of the Tirta Bengkayang Perumdam customer

In addition, assistance is also provided for processing social media at Perumdam Tirta Bengkayang using an online linktree which can be accessed at https://linktr.ee/Perumdam Tirta Bengkayang which can be seen in Figure 8 The existence of this link is to facilitate access for customers of Perumdam Tirta Bengkayang who have difficulty checking bills, have difficulty consulting online for new water installations to complaints about water services at Perumdam Tirta Bengkayang.

Figure 8. Links to make it easier for Perumdam Tirta Bengkayang customers to find information

This training and assistance for community service took place for 2 further semesters after last year 2021 was successfully carried out for assistance in filling out and managing databases on the e-billing system of Perumdam Tirta Bengkayang, and this year 2022 it will be carried out again to improve the quality services available at Perumdam Tirta Bengkayang in the network sector and websites. During the training, face-to-face meetings were limited as shown in figure 9.

Figure 9. Website Content Training for Perumdam Tirta Bengkayang

The results of this community service are in the form of network system design, website management, and mentoring for 2 semesters, namely in 2021 and 2022. The results obtained from this community service are

1. Check customer bills
2. Links to facilitate information about the Tirta Bengkayang Perumdam
3. Network design draft
4. Assistance in website and network management
5. Additional information on the website according to the criteria of the West Kalimantan Information Commission for monitoring and evaluation.

At the end of 2021, Perumdam Tirta Bengkayang received a website assessment result with the title "Informative Enough" from the previous "Not Informative" as shown in figure 10. and further assistance will be carried out by the Information Technology Study Program at the Shanti Bhuana Institute to Perumdam Tirta Bengkayang.

4	PT. JAMKRIDA KALBAR	87,34	INFORMATIF	HIJAU
5	PDAM TIRTA MELAWI – KABUPATEN MELAWI	80,52	MENUJU INFORMATIF	BIRU
6	PT. PERUSDA ANEKA USAHA	79,71	MENUJU INFORMATIF	BIRU
7	PERUMDAM TIRTA RAYA – KABUPATEN KUBU RAYA	76,07	MENUJU INFORMATIF	BIRU
8	PT. BANK PEMBANGUNAN DAERAH -KALBAR	60,22	CUKUP INFORMATIF	KUNING
9	PDAM TIRTA BENGKAYANG – KABUPATEN BENGKAYANG	57,20	CUKUP INFORMATIF	KUNING
10	PDAM TIRTA LANDAK – KABUPATEN LANDAK	44,62	KURANG INFORMATIF	MERAH
11	PDAM MUARE ULAKAN – KABUPATEN SAMBAS	41,48	KURANG INFORMATIF	MERAH
12	PERUMDA BPR KHATULISTIWA – KOTA PONTIANAK	40,55	KURANG INFORMATIF	MERAH
13	PERUMDAM TIRTA PANCUR AJI – KABUPATEN SANGGAU	38,05	KURANG INFORMATIF	MERAH
14	PERUMDAM SIGIN MERAGUN – KABUPATEN SEKADAU	36,01	KURANG INFORMATIF	MERAH
15	PDAM TIRTA GALAHERANG – KABUPATEN MEMPAWAH	32,94	KURANG INFORMATIF	MERAH
16	PDAM TIRTA DHARMA PUTUSSIBAU – KABUPATEN KAPUAS HULU	2,44	TIDAK INFORMATIF	HITAM
17	PDAM PERUMDA TIRTA PAWAN – KABUPATEN KETAPANG	-	TIDAK INFORMATIF	HITAM

Figure 10. Getting the Predicate Sufficiently Informative for Perumdam Tirta Bengkayang after previously Not Informative

4. CONCLUSIONS

The existence of assistance in terms of network infrastructure design helps Perumdam Tirta in determining the criteria for the right network model for the future, as well as assistance in terms of website management can help Perumdam Tirta Bengkayang in implementing customer bill checks, links to facilitate information about Perumdam Tirta Bengkayang, additional information on the website according to the monitoring and evaluation criteria of the West Kalimantan Information Commission.

ACKNOWLEDGEMENT

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