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Bandwidth Optimization On Design Of Visual Display Information System Based Networking At Politeknik Negeri Bali

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Abstract. Information can not be separated from the social life of the community, especially in the world of education. One of the information fields is academic calendar information, activity agenda, announcement and campus activity news. In line with technological developments, text-based information is becoming obsolete. For that need creativity to present information more quickly, accurately and interesting by exploiting the development of digital technology and internet. In this paper will be developed applications for the provision of information in the form of visual display, applied to computer network system with multimedia applications. Network-based applications provide ease in updating data through internet services, attractive presentations with multimedia support. The application "Networking Visual Display Information Unit" can be used as a medium that provides information services for students and academic employee more interesting and ease in updating information than the bulletin board. The information presented in the form of Running Text, Latest Information, Agenda, Academic Calendar and Video provide an interesting presentation and in line with technological developments at the Politeknik Negeri Bali. Through this research is expected to create software "Networking Visual Display Information Unit" with optimal bandwidth usage by combining local data sources and data through the network. This research produces visual display design with optimal bandwidth usage and application in the form of supporting software.

1. Introduction

Information can not be separated from the social life of the community, especially in the world of education. One of the information fields is academic calendar information, activity agenda, announcement and campus activity news.

Information conveyed from information sources to information users often faces obstacles. There are several causes of obstacles or delays in the delivery of information such as: The form of presentation of information less interesting so neglected, Media distribution of information is not appropriate, Inaccessible delivery system or closed source information for users, Replacement of information for each display unit is relatively difficult, Bandwidth allocation for limited internet service.

In line with technological developments, text-based information is becoming obsolete. For that need creativity to present information more quickly, accurately and interesting by exploiting the



development of digital technology and internet(e.g.[1],[2]). Several research have done in information system development(e.g.[3]-[22]). Video displayed use direct streaming from internet network.

In this paper is done to develop applications for the provision of information in the form of visual display, applied to network-based computers with multimedia applications. Network-based applications provide ease in updating data through internet services and attractive presentations with multimedia support.

Application "Networking Visual Display Information Unit" can be used as a medium that provides information services for students, faculty, staff and guests with a more attractive form than the bulletin board. Information in the form of Running Text, Latest Information, Agenda, Academic Calendar and Video provides an interesting presentation and in line with technological developments at the Politeknik Negeri Bali.

2. Methodology

2.1. Research Flow

Sources of data in this study in the form of primary data and secondary data. Primary data is data directly collected from the Departments and Units at the Politeknik Negeri Bali (Bali State Polytechnic). Secondary data is the source of data collected by other parties concerning Visual Display, bandwidth, Network Performance and some journals related to visual display and computer network optimization.

The research step is reviewed from the work activities undertaken: System analysis, Design of problem-solving path, Data collection, Information Classification, Display Design, Database Design and data storage and distribution methods, Provision of hardware and support software, Programming, System test in laboratory, Analysis and evaluation, Implementation as an online test at the Department of Electrical Engineering.

System analysis is performed to see the data, processing and output requirements expected from the planned system. From the data, condition and information obtained, then arranged the flow of problem solving and planning steps and supporting resources needed.

Data collection is done based on the data needs of the initial guess and from the data needs of system analysis. And then do the classification of information as needed.

The design of the display is based on the need for information delivery and adjusted to the rules in the presentation of visual data so that it can be received comfortably and in accordance with the purpose of system design.

The visual information display system is supported by the data source before it is displayed in the display unit, for which it is designed data base, storage method as well as effective data distribution. Hardware and software are required in the translation of the design into the programming language, so as to obtain a design implementation in accordance with the performance of the system designed.

Laboratory testing is needed to see the implementation of the design into the programming language and system performance in accordance with the design such as the integrity of information, the speed of data distribution, the appropriateness of appearance and convenience.

Analysis and evaluation is done repeatedly until the system is obtained in accordance with the design and user needs. And the online test applied in the Department of Electrical Engineering is intended to see the performance of the system and the response in the application of the system in the Department of Electrical Engineering.

In this research use two data resource. Data from admin sent to the web service and manage as needed in visual display system. Every 30 minute, computer local host request to the web service. If admin was update and store new data, the data will download into the local host computer, else web service will ignore local host computer request.

Video Data streaming directly by local host computer to the display unit. With combined two data resource and web service management can reduce bandwidth need for visual display information system.

2.2. Hardware Design

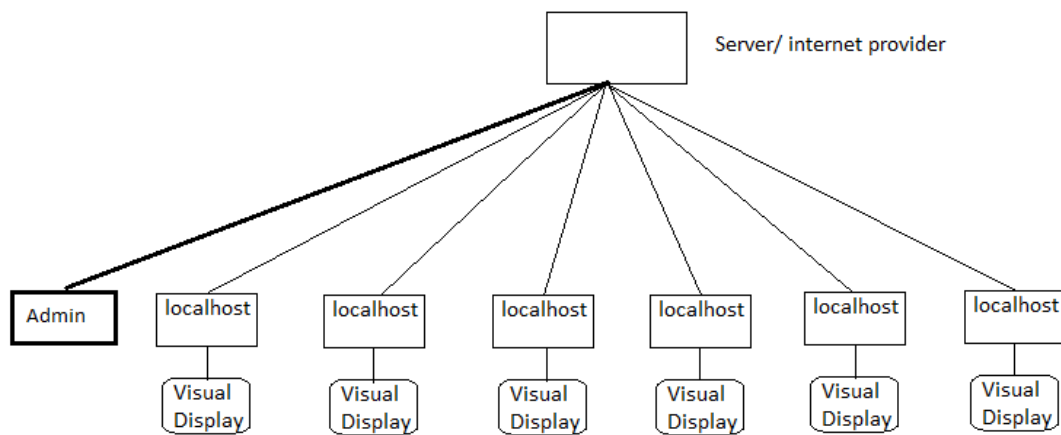


Figure 1 The Design Concept of Hardware

2.3. Testing and Conclusion

The test is performed in several stages, including testing the display with data residing on the local host network, testing data updates via internet network, system stability testing, and user comfort testing both from updating data and recipient information (in this case academic) Testing in the laboratory aims to obtain test data based on the design and implementation of the design to the actual software and equipment.

Test data obtained were compared and analyzed by design. Testing on the object is done simulation in the electrical engineering department of Politeknik Negeri Bali. This test data is used to analyze the convenience and fulfillment of the department's information needs. Thorough implementation can not be done considering the hardware supply requires a relatively large cost. Conclusions can be drawn from the test data obtained and the analysis performed on the test results

3. Result and Discussions

3.1. Visual Display System

Visual display system generated in the form of visual display design that is implemented using a TV with dimensions of 1920x1080 pixels. The software is built using PHP and Java Script programming language to support animation and multimedia applications. System structure in general can be seen in Figure 2.



Figure 2 Visual Display Structure System Design

The system is designed in three stages of testing, namely: Visual display design with local host based data source, Visual display design with internet based data source, Visual Display design using a combination of data sources.

The software that has been generated is used for testing with local host based data sources. From the experiments performed show the system can run normally without any video display delay. Testing with an internet-based data source, indicating a video display delay. This display delay is caused by the distribution of data that is not in accordance with the needs of video display (frames per second / FPS) of bandwidth . From the results of testing and analysis carried out, development is required to combine local data sources with internet data sources so that the system works optimally.

In this framework use local data source as video stream. For video stream do not need large internet bandwidth. Internet bandwidth used for data update when visual display content replaced.

3.2. Visual Display Design

The design pattern of visual display can be seen in figure 3. This pattern is produced from several considerations such as: Needs information to be delivered, Display Layout (Position, color composition, font size), Convenience and Attractiveness for Users.

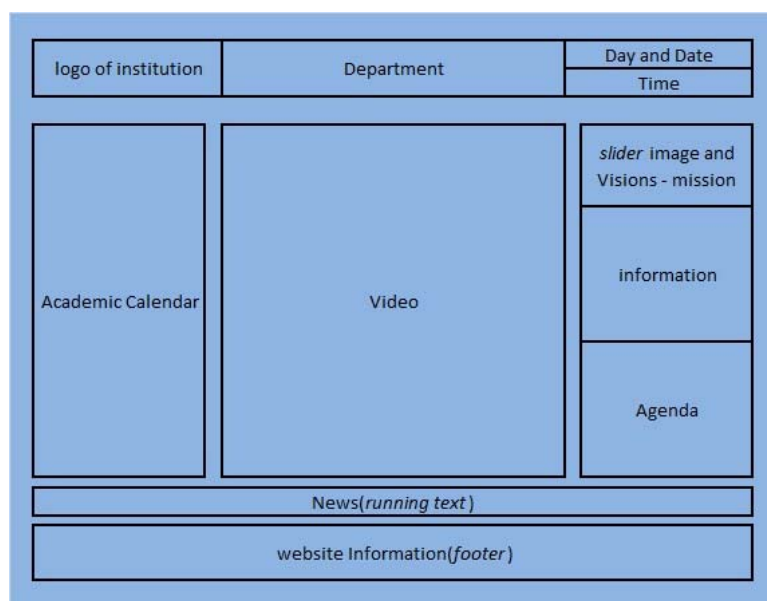


Figure 3. Visual Display View Design Pattern

The need for information can be seen in table 1.

Table 1. Information Needs on Visual Display

No.	Category	Type
1	Calendar academic information	dynamic text
2	Activity and bulletin information	dynamic text
3	Agenda information	dynamic text
4	News	running text
5	Visions and mission Study program information	Slider text
6	Institution profile	Video
7	Department Profile	Video
8	Ethic in campus environment	Video
9	Department Activity	Video
10	Student Activity	Video

Visual Display design after implemented with programming language can be seen in Figure 4



Figure 4. Visual Display

The visual display is designed by considering the need for information delivery at the Politeknik Negeri Bali, especially the Department of Electrical Engineering. Views are designed in several groups, consisting of: Academic Calendar Information (in the form of text that is dynamic), Activity Information (in the form of text that is dynamic), Agenda Information (in the form of text that is static), Latest News Information (in the form of text that is dynamic / running text), Information is Activity video, And Information of day, date and time.

3.3. Data Base Design

The database is designed to support the displayed information, which consists of: Table calendar , Information Table, Agenda Table, News Table. Data base "db_display" created with the table structure as in Figure 5

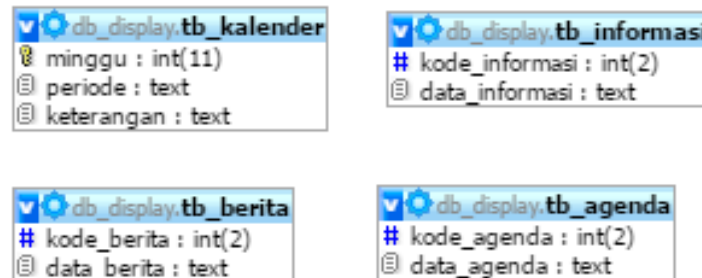


Table Name	Column Name	Data Type
db_display.tb_kalender	minggu	int(11)
	periode	text
	keterangan	text
db_display.tb_informasi	kode_informasi	int(2)
	data_informasi	text
db_display.tb_berita	kode_berita	int(2)
	data_berita	text
db_display.tb_agenda	kode_agenda	int(2)
	data_agenda	text

Figure 5. Table Structure in Data Base "db_display"

4. Conclusions

This paper presents a visual display board for display information in text, image and video. Video playback need large bandwidth at all the time stream. Our solution include an optimization framework with dual data resource concept. On running system use local host data storage and update data use internet as temporary storage before store into local system. This concept can reduce bandwidth needed. The information can be changed through the distribution of data using the internet.

The use of network-based distribution method is expected to facilitate the operational management of information delivery.

. In this research use two data resource. Data from admin sent to the web service and manage as needed in visual display system. Every 30 minute, computer local host request to the web service. If admin was update and store new data, the data will download into the local host computer, else web service will ignore local host computer request.

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References

- [1] N. Carlsson, Derek Eager, Vengatanathan Krishnamoorthi, Tatiana Polishchuk, 2017, *Optimized adaptive Streaming of Multi-Video Stream Bundles*, DOI 10.1109/TMM.2017.2673412, IEEE Transactions on Multimedia.
- [2] L. Zhi, Z. Xiaoqing, J. Gahm, P. Rong, H. Hao, A. Begen, and D. Oran, 2014, *Probe and adapt: Rate adaptation for HTTP video streaming at scale*, IEEE JSAC, vol. 32, no. 4, pp. 719–733.
- [3] V. Krishnamoorthi, N. Carlsson, D. Eager, A. Mahanti, and N. Shahmehri, 2015, *Bandwidth-aware prefetching for proactive multi-video preload-ing and improved HAS performance*, in Proc. ACM Multimedia.
- [4] J. Summers, T. Brecht, D. L. Eager, and A. Gutarin, 2016, *Characterizing the workload of a Netflix streaming video server*, in Proc. IEEE IISWC
- [5] J. M. Batalla, P. Krawiec, A. Beben, P. Wisniewski, and A. Chydzinski, 2016, *Adaptive video streaming: Rate and buffer on the track of minimum rebuffering*, IEEE JSAC, vol. 34, no. 8, pp. 2154–2167, Aug. 2016.

- [6] T. Fujihashi, Z. Pan, and T. Watanabe, 2014, *UMSM: A traffic reduction method on multi-view video streaming for multiple users*, IEEE Trans. Multimedia, vol. 16, no. 1, pp. 228–241, 2014.
- [7] Y. Wen, X. Zhu, J. J. P. C. Rodrigues, and C. W. Chen, 2014, *Cloud mobile media: Reflections and outlook*, IEEE Trans. on Multimedia, vol. 16, no. 4, pp. 885–902, 2014.
- [8] L. Toni, N. Thomos, and P. Frossard, 2013, *Interactive free viewpoint video streaming using prioritized network coding*, in Proc. IEEE MMSP, 2013.
- [9] J. Chakareski, 2013, *Adaptive multiview video streaming: challenges and opportunities*, IEEE Commun. Mag., vol. 51, no. 5, pp. 94–100, 2013.
- [10] V. Krishnamoorthi, N. Carlsson, D. Eager, A. Mahanti, and N. Shahmehri., 2013, *Helping hand or hidden hurdle: Proxy-assisted HTTP-based adaptive streaming performance*, in Proc. IEEE MASCOTS, 2013.
- [11] X. Xiu, G. Cheung, and J. Liang, 2012, *Delay-cognizant interactive streaming of multiview video with free viewpoint synthesis*, IEEE Trans. On Multimedia, vol. 14, no. 4, pp. 1109–1126.
- [12] T. Maugey and P. Frossard, 2013, *Interactive multiview video system with low complexity 2D look around at decoder*, IEEE Trans. on Multimedia, vol. 15, no. 5, pp. 1070–1082, 2013.
- [13] J. Chakareski, V. Velisavljevic, and V. Stankovic, 2013, *User-action-driven view and rate scalable multiview video coding*, IEEE Trans. Image Process, vol. 22, no. 9, pp. 3473–3484, 2013.
- [14] H. Huang, B. Zhang, S. Chan, G. Cheung, and P. Frossard, 2012, *Coding and replication co-design for interactive multiview video streaming*, in Proc. IEEE INFOCOM, 2012.
- [15] J. Huang, 2008, *Joint Source Adaptation and Resource Allocation for Multi-User Wireless Video Streaming*, in 258 IEEE Transactions On Circuits And System for Video Technology, vol 18 No 5.
- [16] IEEE Standard for Local and Metropolitan Area Networks, Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment : MAC sublayer, IEEE Computer Society, April. 16, 2012, online at: <http://standards.ieee.org/getieee802/download/802.15.4e-2012.pdf>
- [17] W. Zhang, S. Ye, B. Li, H. Zhao, and Q. Zheng, *A priority-based adaptive scheme for multi-view live streaming over HTTP*, Computer Commun., vol. 85, pp. 89–97, 2016.
- [18] T. Su, A. Sobhani, A. Yassine, S. Shirmohammadi, and A. Javadtalab, 2016, *A DASH-based HEVC multi-view video streaming system*, Journal of Real-Time Image Processing, vol. 12, no. 2, pp. 329–342.
- [19] T. Huang, R. Johari, N. McKeown, M. Trunnell, and M. Watson, 2014, *A buffer-based approach to rate adaptation: Evidence from a large video streaming service*, in Proc. ACM SIGCOMM.
- [20] X. Yin, A. Jindal, V. Sekar, and B. Sinopoli, 2015, *A control-theoretic approach for dynamic adaptive video streaming over HTTP*, in Proc. ACM SIGCOMM.
- [21] J. Jiang, V. Sekar, and H. Zhang, , 2012, *Improving fairness, efficiency, and stability in HTTP-based adaptive video streaming with FESTIVE*, in Proc. ACM CoNEXT.
- [22] V. Krishnamoorthi, N. Carlsson, D. Eager, A. Mahanti, and N. Shahmehri, 2015, *Bandwidth-aware prefetching for proactive multi-video preload-ing and improved HAS performance*, in Proc. ACM Multimedia.