ANALYSIS AND TESTING OF DATA TRANSMISSION OF PROVIDERS IN INDONESIA USING GSM AND CDMA MODEM

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Abstract─The technology of internet nowadays has become most important aspect and becomes primary need for certain group of peoples who work in some field like education,economy,health,etc. One of the biggest problem which mostly brought by so many people is speed in data transfer. This paper emphasize in directly testing the quality of data transmission from each transmission technology. The equipment used by this paper is ZTE Join Air help, the simcard provided by Telkomsel,XL, and indosat, while CDMA technology used simcard provided by smartfren and esia and modem provided by Smartfren which its series is EC176-2. The parameters used for testing in this paper are throughput, time, jitter dan packet loss. this paper used data gathering method, for each operator and the testing used by this paper is downloading some files from local and non local server, then comparing parameter value between operators.

Key word: provider, modem GSM ZTE Join Air Help, modem CDMA Smartfren EC176-2, throughput, time , jitter, packet loss.

I. INTRODUCTION

Internet technology is currently very rapidly growing especially in the field of information and telecommunications systems. The Internet today is indispensable for all people even have become the primary needs for some particular people, such as the circles of education, economics, health, and so on.

Basically everyone who is connected to the Internet, they can exchange information and data between one person with others, either in the form of images, sounds, video, text and more. With the it community, utilizing it in resolving the problem of the daily work that demands speed and accuracy. One of them is in the speed of the data transfer [1][3][5][7][9].

Mobile technology is also growing rapidly in line with the needs of the community to get communication service that is quick and easy. Some service providers mid-haul vying Indonesia good-based Global System for Mobile Communication (GSM) and Code Devision Multiple Access (CDMA). GSM has the privilege that is the existence of the standardization of interfaces between the respective sub systems. While CDMA is a form of multiplek which divides the channel and frequency with a special code. The operator always compete provides facilities and services to its customers in comfort. The operator parties establish a Base Station (BTS) Transseiver dibanyak place, with the goal of keeping the mobile operator services are able to reach out to the whole community. Related to the transfer of data there is a connection to the Internet network. Every day people from different countries to access Internet services and activities to help the problem. One of the technologies that offer the service in Internet access and data transmission is the process of using one device IE modem either with CDMA or GSM technology which is now widely circulating in the market [2][4][6][8][10]

These studies place the example device modem ZTE (Zhong Xing Telecommunication Equipment) Join the water Help and Smart Telecom EC176-2 which is one of the widely used modem device in the environment of the community. Both types of modem this modem is a kind of Universal Serial Bus (USB) which each have different facilities and services. ZTE (Zhong Xing Telecommunication Equipment) Join the water Help is a type of modem with GSM-based networks. While the Smart Telecom EC176-2 is a type of modem with CDMA-based network. Many release a USB modem on the market with an offer package that interests of consumers, then a product gets the value increases. However, many complaints are popping up in the use of the device to the detriment to its users. From the background above, research alan trying to test and analyze the process of transmitting data from both devices[11][12][13].

II. PURPOSE

To make analysis of data transmission provider-provider in Indonesia using GSM and CDMA modem so it can give consideration to the user.

III. METHODOLOGY

As for the stage of the research is as follows:

A. The study of Literature

Penelitian dilakukan dengan cara mencari, membaca danmengumpulkan dokumen-dokumen sebagai referensi tentang transmisidata, modem, GSM, CDMA dan parameter-parameter pengujianmelalui buku-buku ilmiah, buku referensi, artikel, *e-book,* jurnalpublikasi, *website* dan literatur tugas akhir yang berhubungan dengantopik yang dipilih penulis tentang transmisi data *provider-provider* diIndonesia menggunakan modem GSM dan CDMA.

A. Collecting Data

Research done by searching, reading and collecting documents as a reference about data transmission, modem, GSM, CDMA and testing parameters through scientific books, reference books, articles, e-books, journals, publications, the website and the final task of the literature related to the chosen topic authors about the transmission of the data provider-provider in Indonesia using GSM and CDMA modem.

B. Testing Parameter.

The next stage, namely the testing will be done to each parameter using the modem GSM and CDMA network, so it will produce accurate analysis resulting from network technology GSM or CDMA.
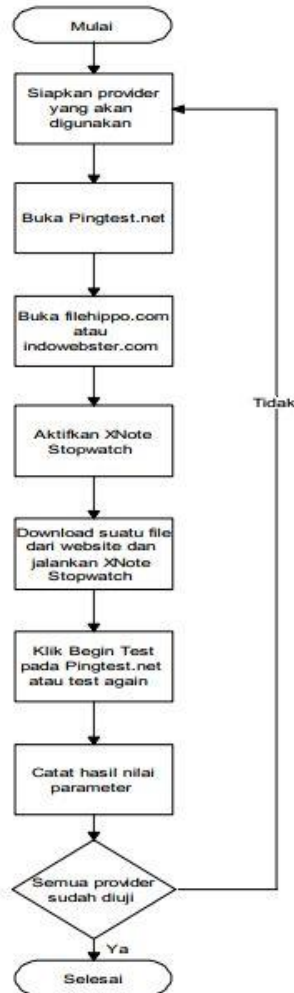
C. Evalution

The last stage, namely evaluation of the results of research that has been done.

IV. RESULT AND DISCUSSION

A. Graph the average Provider Parameter values
1) graph of average Throughput Parameter values on the Website of Foreign Affairs http://www.filehippo.com

On the value of the parameter value, the higher the throughput throughput will be the better. For the value of the average throughput on a foreign website http://www.filehippo.com on May 05, 2014 with file size 5.63 MB Smart Telecom provider gets the value most highly followed provider Telkomsel, Indosat, XL and Esia. Then on May 06, 2014 with file size 27.7 MB provider Telkomsel received the highest average rating than any other provider, and on 7 September 2014 until May 11, 2014 with the sequence of the file download size 10.16 MB; 4.58 MB; 4.53 MB; 1.22 MB and 10.7 MB Smart Telecom provider gets the highest average rating with a stable value, as well as provider Telkomsel and XL. While the provider Indosat and less stable Esia based on Figure 2.
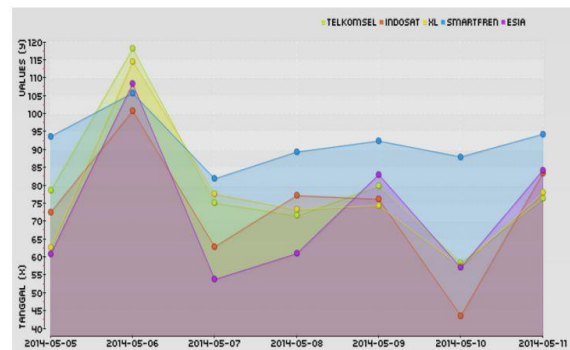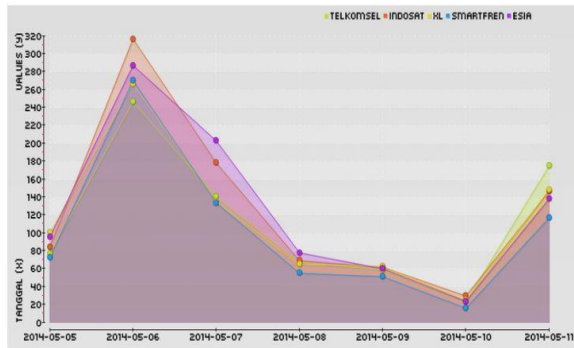

Figure 2. Graph of average throughput provider parameter values on the website of Foreign Affairs

2) graphs of average Parameter values Time (Time Download files) on the Website of Foreign Affairs http://www.filehippo.com

For the value of the parameter time (file download time) the smaller the value the better it will be. Based on the parameters of the Time (the time the download file) date may 05, 2014 Smart Telecom provider takes the shortest in downloading a file with a size of 5.63 MB compared to other provider. On 07 November 2014 with file size 27.7 MB provider Telkomsel takes the shortest in the download. Whereas on May 07 2014 until May 11, 2014 became the fastest Smart Telecom provider in downloading files with size order 10.16 MB; 4.58 MB; 4.53 MB; 1.22 MB and 10.7 MB. As for the date of 9 May and 10 may 2014 2014 all providers have download time which was almost the same as the order of file size 4.53 MB and 1.22 MB. This can be seen in Figure 3.
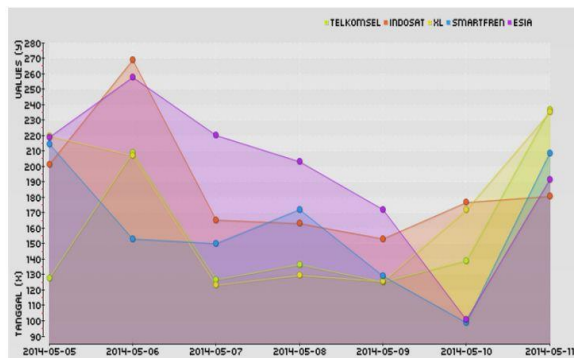
Figure 3. Graph of average parameter values time (the time a download file) provider on a foreign website

3) Charts the average Jitter Parameter values on the Website of Foreign Affairs http://www.filehippo.com

The smaller the value of jitter will be the better. For jitter parameters, provider Telkomsel got the average lowest value compared to other providers on May 05, 2014 with 5.63 MB file size. Then on May 06, 2014 Smart Telecom provider gets the value of the lowest ratarata and provider Indosat gained the highest median value for the file size 27.7 MB. Provider Esia on May 06, 2014 until 10 may 2014 has decreased significant value with the sequence file size 27.7 MB; 10.16 MB; 4.58 MB; 4.53 MB and 1.22 MB. Whereas on May 11, 2014 provider Indosat gets the lowest average value compared to other providers with file size 10.7 MB. This can be seen in Figure 4.
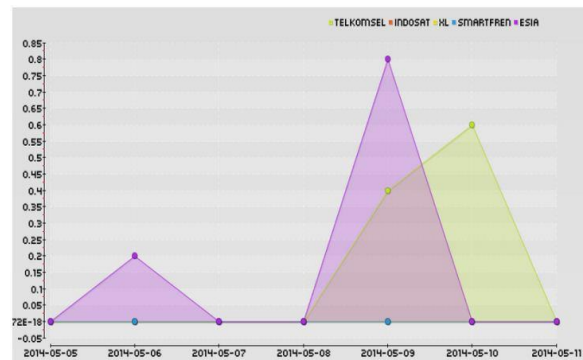

Figure 4. Graph of average jitter on the provider parameter values abroad.

4) Graph of average Parameter values of Packet Loss on a Foreign Website http://www.filehippo.com

For packet loss parameters, the smaller value of packet loss it will be getting better. For packet loss parameters, all providers on May 05, 2014 with 5.63 MB file size no one is experiencing packet loss. However on May 06, 2014 with file size 27.7 MB only provider Esia experiencing packet loss. On May 07 and 08 May 2014 2014 with each file sized 10.16 MB and 4.58 MB no provider that are experiencing packet loss. The date of 15 may 2014 provider Telkomsel and Esia experiencing packet loss with file size 4.53 MB where provider Esia has the average value of packet loss is higher than the provider Telkomsel. Then on May 10, 2014 only provider Telkomsel experiencing packet loss with file size 1.22 MB. Whereas on May 11, 2014 no provider are experiencing packet loss with file size 10.7 MB. This can be seen in Figure 5.

Figure 5. Graph of average packet loss provider parameter values on the website of Foreign Affairs.

5) Charts the average Throughput Parameter values on the Website of the Interior http://www.indowebster.com

On the value of the parameter value, the greater the throughput throughput will be the better. On the value of the average throughput may 12, 2014 with 4.75 MB file size, XL provider gets the highest average values are overtaken by provider Telkomsel, Indosat, Smart Telecom and Esia. Then may 13, 2014 until May 18, 2014 with the sequence file size 8.19 MB; 6.54 MB; 2.61 MB; 3.96 MB; 3.87 MB and 6.19 MB XL provider earns an average rating of stable. Smart Telecom provider from May 13, 2014 until May 15, 2014 with the sequence file size 8.19 MB; 6.54 MB and 2.61 MB experienced a decrease in the average value of which is quite significant. Then the provider Indosat from May 12, 2014 until May 18, 2014 with the sequence file size 4.75 MB; 8.19 MB; 6.54 MB;

2.61 MB; 3.96 MB; 3.87 MB and 6.19 MB also gets an average rating of stable, just that on May 15, 2014 has decreased the average value. While the provider Esia from May 12, 2014 until May 18, 2014 always gets the lowest average value compared to other providers. This can be seen in Figure 6.
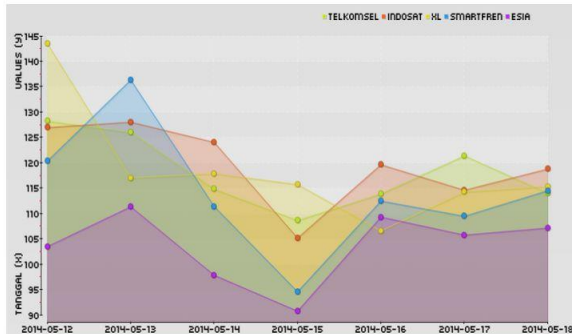

Figure 6. Graph of average throughput provider parameter values on the website in the country.

6) Graph of average Parameter values Time (Time Download files) on the Website In the country http://www.indowebster.com

For the value of time (download files), the less value it will be getting better. To the average value of time (download files), on May 12, 2014 XL provider gets the lowest average value followed by the provider Indosat, Telkomsel, Smart Telecom and Esia for file size 4.75 MB. Then on May 13, 2014 until May 15, 2014 with the sequence file size 8.19 MB; 6.54 MB and 2.61 MB provider Esia gets an average rating higher than most other providers and may 16, 2014 with file size 3.96 MB provider Indosat received the lowest average rating than any other provider. Then on May 17, 2014 with file size is 3.87 MB provider Telkomsel received the lowest average rating and on May 18, 2014 with file size 6.19 MB provider Indosat returned received the lowest average rating. This can be seen in Figure 7.
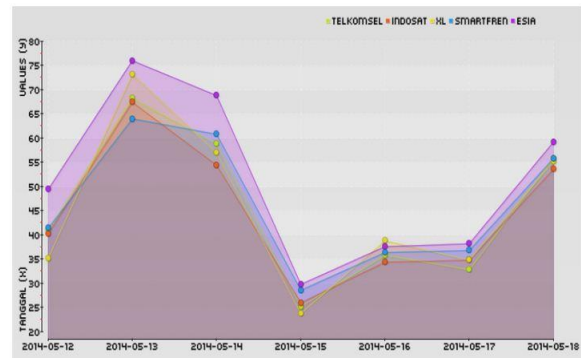

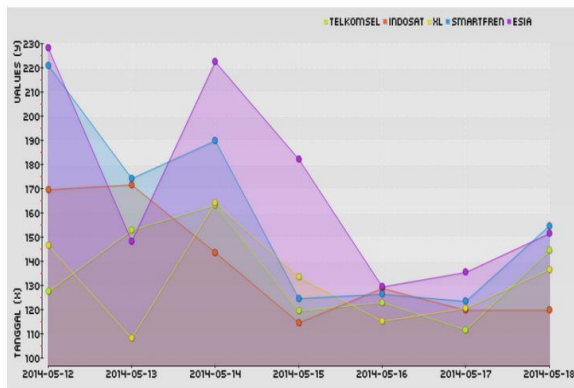**Figure 7.**Graph of average parameter values time (the time a download file) provider on a domestic website

Grafik Rata-Rata Nilai Parameter *Jitter* pada *Website* Dalam Negeri http://www.indowebster.com

Nilai parameter *jitter* berbanding lurus dengan nilai parameter *time*(waktu *download file*) dan *packet loss*, semakin kecil nilainya maka akan semakin baik. Pada parameter *jitter* tanggal 12 Mei 2014 dengan ukuran *file*4,75 MB *provider* Telkomsel mendapat nilai rata-rata terendah dibandingkan*provider* lain. Lalu pada tanggal 13 Mei 2014 dengan ukuran *file* 8,19 MB *provider* XL mendapat nilai rata-rata terendah disusul *provider* Esia,Telkomsel, Indosat dan Smartfren. Kemudian pada tanggal 14 Mei 2014 sampai tanggal 17 Mei 2014 dengan urutan ukuran *file* 6,54 MB; 2,61 MB;3,96 MB dan 3,87 MB *provider* Esia selalu mendapat nilai rata-rata tertinggi dibandingkan *provider* lain. Selanjutnya pada tanggal 18 Mei 2014 denganukuran *file* 6,19 MB *provider* Indosat mendapat nilai rata-rata terendah dan *provider* Smartfren yang mendapat nilai rata-rata tertinggi. Hal ini bisa dilihatpada Figure 8.
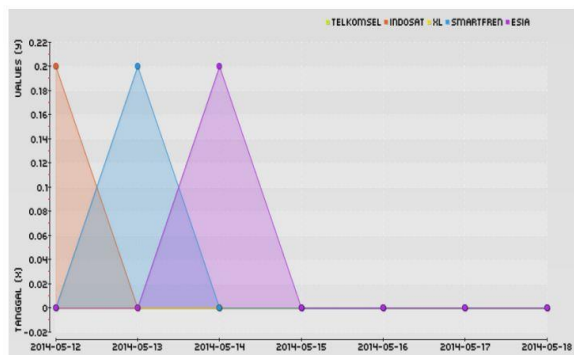
Figure 8. Graph of average parameter values jitter provider on the website in the country

7) Graph of average Parameter values of Packet Loss on the Domestic Website http://www.indowebster.com

On packet loss parameters, the smaller value of packet loss it will be getting better. For the parameters of the packet loss, on May 12, 2014 with file size 4.75 MB only provider Indosat experiencing packet loss. Then on May 13, 2014 with file size 8.19 MB only

Smart telecom providers that are experiencing packet loss and on 14 may 2014 with 6.54 MB file size only provider Esia who experience packet loss. Whereas on 15 may 2014 until May 18, 2014 with the sequence file size 2.61 MB; 3.96 MB; 3.87 MB and 6.19 MB no provider is experiencing packet loss. This can be seen in Figure 9.

Figure 9. Graph of average packet loss provider parameter values on the website in the country.

Conclusion

Based on the research that has been done, then the conclusion to be drawn as follows:

Parameters, throughput time, jitter and packet loss is used to analyze the good provider provider GSM CDMA or by way of comparing one provider parameters with the parameters of the other provider. Testing data transmission is done by downloading files from websites abroad and within the country. Testing results state that smart Telecom in particular CDMA network provider in terms of data transmission abroad against the more stable of the GSM network provider. Then for the website in the country, the GSM provider is more stable than CDMA provider, where no single provider IE Telkomsel, Indosat and XL that always dominate the throughput value results, time, jitter and packet loss. These statements are based on the results of the analysis conducted by the provider Telkomsel, XL, Indosat, Smart Telecom and Esia for two weeks against the foreign website i.e. http://www.filehippo.comand domestic website i.e. http:// www.indowebster.comstarting from the date may 05, 2014 until May 18, 2014, where such research refers to parameter values without considering how many users access the website of Foreign Affairs and the Interior when done testing values parameters, how much bandwidth can be provided abroad and within the country when done testing the value of the parameter.

REFERENCES

[1] Dewo, E. Setio. 2003. Artikel Bandwidth dan Throughput. http://ikc.dinus.ac.id/populer/dewo-bandwidth.php, akses 20 April 2014.

[2] Disastra, Indra. 2010. Perbandingan Kinerja dan Keamanan PC Router Zebra dan Mikrotik Routeros.Yogyakarta : Fakultas Teknologi Industri Universitas Islam Indonesia.

[3] Enterprise, Jubilee. 2010. Panduan Memilih Koneksi Internet untuk Pemula. Jakarta : PT Elex Media Komputindo.

[4] Green, DC. 1995. Komunikasi Data. Yogyakarta : Andi.

[5] Hartien, Siwi Novita. 2011. Pengujian dan Analisis Transmisi Data Dengan Modem Jaringan GSM dan CDMA. Yogyakarta : Fakultas Teknik Informatika Universitas Islam Negeri Sunan Kalijaga.

[6] Komputer, Wahana. 2008. Koneksi Internet Menggunakan Perangkat GSM+CDMA.Yogyakarta : Andi.

[7] Mulyanta, S.Si., Edi S. 2005. Pengenalan Protokol Jaringan Wireless Komputer.Yogyakarta : CV Andi Offset.

[8] Senopati, Dede. 2008. Instalasi dan Komunikasi Jaringan Komputer. Bandung : Informatika.

[9] Setiawan, S.Kom.,M.T., Deris. 2003. Teknologi Seluler CDMA dan GSM. Jakarta Jakarta : PT. Elex Media Komputindo.

[10] Syafari, Anjar. 2007. Artikel Sekilas Tentang Teknologi 3G. www.ilmukomputer.com, akses 20 April 2014.

[11] Usman, Uke Kurniawan. 2010. Pengantar Ilmu Telekomunikasi. Bandung : Informatika.

[12] Wardhana, Lingga dan Nuraksa, Makodian. 2010. Teknologi Wireless Communication dan Wireless Broadband. Yogyakarta : CV Andi Offset.

[13] Wibisono, G. Dan Gunadi Dwi Hantoro. 2008. Mobile Broadband Tren Teknologi Wireless Saat ini dan Masa Datang. Bandung : Informatika.