A New Approach For Global Cellular Messaging

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Abstract: *Multimedia messaging system is a system application by which a WAP client is able to provide a messaging operation with a variety of media types. This paper proposes a method for multimedia messaging for cellular communication. It can provide full connectivity all over the world for sending and receiving multimedia message with high security and reliability. It can also reduce the existing communication cost of multimedia message.*

KEY WORDS: Global Cellular Messaging, Full Connectivity, Low Communication Cost, and Security.

1. INTRODUCTION

Multimedia Messaging in Cellular Communication system has been made a great improvement over the years. This multimedia message can include text, sound, pictures etc. Unfortunately in some developing countries multimedia messaging haven't made enough impact. The ambition of this project is to find out a way using which one can send multimedia message to anybody all over the world with reduced communication cost.

In the existing system of International MMS, when a sender wishes to send MMS to someone residing in other country, two questions arise in his/her mind:

- Is it possible to send MMS from here to that country?
- How costly will it be to send international MMS?

In the existing system International MMS is only possible if there is an agreement between the two communicating network operators. If there is no agreement between two communicating network operators then it's not possible to send / receive MMS between them. Our method can handle this problem. We will use simple website based pc terminal system that can solve this problem very easily.

Another major problem of international MMS is high communication charge. For example dizycell Malaysia takes 0.25 Rm. as local MMS charge from the sender. But they take 1.50 Rm. for International MMS excluding Vat. At the same time Grameen Phone Bangladesh takes 2 taka for local MMS but takes 15 taka excluding vat for international MMS. By implementing our method it would be possible to reduce international MMS cost a great deal.

2. METHODOLOGY

Instead of using the traditional network for international MMS we will use local network and highly secured website. Simply, Sender will send the MMS to a local terminal **A**. This local terminal **A** will encode the MMS data and upload it into a website. Rather than doing agreement with the foreign network operator we intend to establish a terminal **B** at that country which will be very cheap in comparison with the cost related with agreement between two operators.

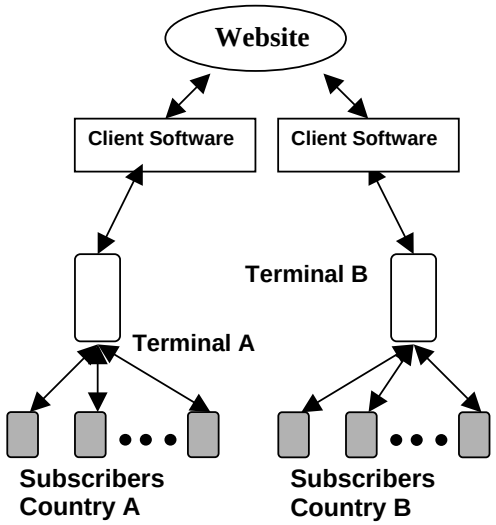

Fig.1: Simple proposed MMS communication from country A to Country B

If the country code of the recipient's cell number matches the country code of the terminal **B** then that terminal **B** will fetch the data from the website. Then decode it and send it to the recipient using the local network.

2.1 Basic Architecture

It consists of some logical and physical parts that will be used to implement the entire system.

2.1.1 Local Terminal:

Local Terminal is basically a mobile phone that will be used as a transceiver for MMS communication. It will interact with both the data client software and also with the subscriber. The network between the terminal and the subscriber will be local. As a result it will act as a local operator so charge will be reduced.

2.1.2 Client Software:

Data client software will be installed at a Computer connected with internet. This Client Software will be designed and used for the following purposes:

2.1.2.1 MMS Retrieve:

This part of the software will interact with the subscriber and retrieve MMS data from the local terminal. Then it will separate different type of data from the MMS message body.

2.1.2.2 MMS Encoding and Decoding:

This part encodes different type of data by different technique. Then all sorts of different type encoded data will be accumulated and then encoded again. Because of the fact that the message will be uploaded into a webpage, highly encoded data with lower redundancy is required.
MMS decoder is used to decode the encoded message after fetching it from the website. MMS Decoding technique will be the exact reverse process of the encoding technique.

2.1.2.3 FTP Client Software:

This part is used to automatically upload and download file from the website. This will be used at every terminal end. Every time FTP client software detects a new arrival of MMS in the data client it will upload the encoded file in the website.
FTP Client Software will also be used to download file from the website automatically. It will download file from the website if the country code of the local terminal's cell number matches with the country code of the recipient's cell number and there is an update in the website.

2.1.2.4 Routing Table:

A routing table will be available at every Data Client Software. Routing table will guide the MMS message so that if a network path is unavailable then alternative can be selected from the routing table. If more than one alternative path is available then the path with lower cost will be used for MMS communication.

Country	Country Code	To Operator	Charge in Tk.
Bangladesh	880	A	2
Bangladesh	880	B	3
Bangladesh	880	C	4
Malaysia	60	D	6
India	91	E	8
India	91	F	10
UK	44	G	12

Fig. 2: Routing Table

For example, a subscriber in Malaysia wants to send MMS from Operator D to a Bangladeshi Subscriber in Bangladesh who is using Operator B Then at first, routing table at the recipient's side local terminal will be searched for connectivity. The optimum search will find the operator B and send MMS to the recipient and also create an acknowledgement consists of the delivery message information and local charge information. According to the acknowledgement message, 3 taka will be charged from the sender's account balance. In this way we reduce the overall MMS charge cost a lot. If that sender wishes to send MMS in the traditional way from Malaysia to Bangladesh then he/she will have to pay around 35 taka excluding vat. But by implementing our method he/she only needs to pay 6+3=9 taka in total.

But full connectivity is not fully achieved. Suppose there is no local terminal established in India and a subscriber from Malaysia wanted to send MMS to an Indian subscriber using operator E. It will be possible to send MMS to India from Malaysia via using an operator from Bangladesh if it is possible to directly send MMS from Bangladeshi operator B to Indian operator E

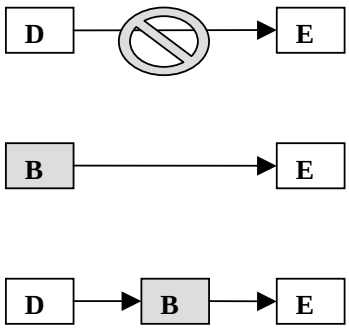

Fig. 3: Messaging via another Country

Then full connectivity can be achievable. Though, the sender will have to pay some extra charge due to using an extra network operator. It can be described by figure 3.

2.1.3 Shortest Path & Smallest Cost:

It may not be possible to set terminal at every country. In that case we need to set some terminal in some major country from where on it would be possible to send MMS to rest of the world. For that purpose we need to create a graph where each node is a terminal situated at different country. Before setting up a terminal at a specific country we need to look how many countries is directly reachable from that country. It may be possible to have two or more terminals at different countries that can send MMS to a non-reachable country. In that case we need to set up smallest cost & shortest path algorithm which will help the data client software at the terminal to select the path. Smallest cost will be the first requirement of the program and then shortest path will be searched. A modified version of Floyd warshall algorithm can be used to achieve the goal.

For example,
Suppose we are trying to send MMS/SMS message from country A to someone residing in country Z. But there is no terminal at country Z and it is not possible to set up a terminal at country Z. Or the terminal at country Z may be damaged or disabled or busy. As a result no terminals original country code will match country code of Z. In that case our data client software at every terminal will activate its shortest path & cost executable.

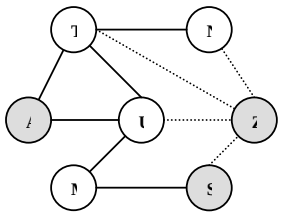

Fig. 4: Full Connectivity

If more than one terminal is capable of sending message at country Z then the algorithm will help to decide which terminal will take less charge and have shortest distance to country Z. That path will be used for sending message to the recipient at country Z.
From the graph of figure 2.3 we see that terminal T, N , S and U can directly send message to country Z. But the distance from terminal T to country Z is long.

So the algorithm will not select terminal T to send message to country Z. terminal S can send message to country Z with smallest cost and shortest path. So the algorithm will select terminal S for that purpose.
If terminal S is busy then the next terminal with smallest cost and shortest path will be selected for that purpose.

2.2 Sending Acknowledgement to the sender

After sending the data to the recipient then an acknowledgement will be sent to the local sending data terminal. Based on that acknowledgement, local data terminal will decide on charging the sender's account balance. The sender will be also acknowledged.

3. CONCLUSIONS

By implementing our Global Cellular Messaging System it might be possible to make multimedia messaging much fruitful and favorite to the people of developing countries. As it will provide –

1. Full Connectivity all over the world.
2. Cellular Data Communication will be possible from any country.
3. Reduced communication cost in large scale is possible as it will only take local communication charge instead of international.
4. Secured Message transfer.
5. High reliability. Because of multiple terminal. The percentage of successful MMS/SMS communication will be high.

If we only take the messaging cost into account, then we will see a huge amount of money can be saved by implementing our system. Along with the concept of full connectivity we think this is the most important target that might be achievable by this system.

References

[1] Wireless Application Protocol Forum, "WAP MMS Architecture Overview" , Version 25-April-2001, pp. 5-23.
[2] Ellis Horowitz, Sartaj Sahni, Sanguthevar rajasekaran "Fundamentals of Computer Algorithms", Galgotia publications pvt. limited, 2003-2004,pp. 264-268
[3]www.countrycallingcodes.com
[4]www.grameenphone.com
[5]http://www.digi.com.my/data_services/messaging/datamsg_mms_intlmms.do