Jari Ruokolainen
Tel. 040-5470739
jari.ruokolainen@datamo.biz

20.4.2003

REQUIREMENTS ON CHARGING AND BILLING SYSTEMS FOR 3G

1. INTRODUCTION

This writing describes shortly what kind of requirements the 3G will bring to the charging and billing systems. This writing is not profound study about the subject. Instead it tries to present couple of viewpoints relating to subject.

2. CURRENT SITUATION

From the charging and billing technology point of view the major changes of technologies have already happened along with GPRS, which brought the new network elements (Charging Gateway, GGSN, SGSN). These network elements will remain in 3G networks.

GPRS has not yet caused any major practical changes in charging and billing systems. In GPRS business the operators use old billing systems, which are to be modified minimally. It looks like that most of the operators are satisfied if they are able to provide flat rate mobile Internet connections to customers through GPRS network.

3. FUTURE BUSINESSES

The situation will change when the 3G infrastructure and phones will be available. There are basically two reasons for this

1. 3G networks can compete against the other networks by providing services, which cannot be produced by the other type of mobile networks (for example relating to speed of the network, IP based group wares etc.).

2. The other reason relates to the fact that the investments to the 3G licenses and technology require the growth of the business.

The over all expectations of the growth and services can be seen from Figure 1. As the Figure 1 indicates the growth will come from the new services.

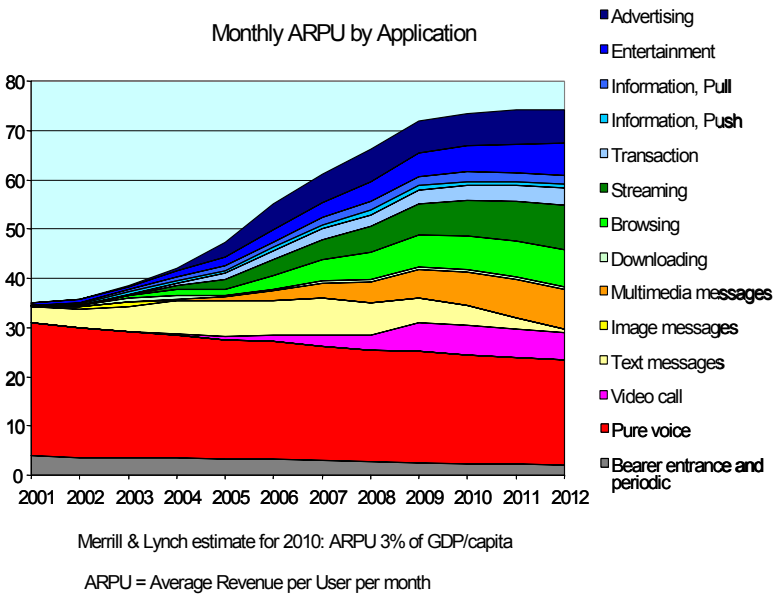

Figure 1: ARPU share between new and old application

Jari Ruokolainen
Tel. 040-5470739
jari.ruokolainen@datamo.biz

20.4.2003

4. NEW BUSINESS MODELS

The mobile phone related services will bring new business models into the telecommunication sector. The major changes in business come from several ways: (1) a lot new content will be provided. (2) The new mobile phone based payment methods will be come more common. (3) New type of groupware functionalities will come. (4) There will be different kind of roles in providing the services, which makes the revenue sharing rules important.

4.1 Value chain in the content business

The example of the value chain is as follows: Firstly there will be an artist who will make the content maybe under certain brands (Sony, Emi etc.). Secondly there will be dealers (service providers) who will distribute the content to the end-users. The operators or similar entities will provide the 3G media for distribution. There will also be mixture models i.e. operator which will create the content.

NTT DoCoMo has already launched service of providing new video clips for its customers. The video content is classified in three charging groups: (1) free of charge, (2) medium price and (3) high price.

4.2 Payments

The other business opportunity seems to come from the payment side. For payments operators has to develop different kind of new features like 'Advanced Credit Checking'. Advanced Credit Checking means that before accepting the payment the credibility of the payer can be checked. Advanced credit checking can be used for example in shopping etc

For small size of payments, the system is different: micro payment method will be used: micro (/nano) payments are common for example in paying tickets of public transport etc.

4.3 Revenue sharing

There will be new roles in telecommunication businesses. Especially the content providers will have a big role as the Figure 1 indicates. The banks and the credit card companies will have their own role in offering for example the secure payment possibilities (e.g. advanced credit checking). The revenue will be shared using certain rules, which can be quite complicated.

4.4 Additional services

Different kind of groupware and location service solution will be increased. Location services have already been developed for 2G networks. The effective use of the subscriber based location service might be possible when the

Jari Ruokolainen
Tel. 040-5470739
jari.ruokolainen@datamo.biz

20.4.2003

network speed increased: for example real-time tracking of the other subscriber by the user.

Some location related services are already provided for example for finding the nearest and cheapest gas station. This means that the services can be charged based on location, service type related to location and combinations of them.

The other possibility relates to group communication. 3G IP makes it possible to provide large scale of group call functionalities.

4.5 Tariffing

The tariffing systems should support different kind of campaigns. For example it is possible to compensate users by giving free of charge games after they have used certain amount of time. Campaigns can be based on same variables as in charging e.g. certain amount of discounts can be given based on location and time of the day.

4.6 Conclusion

The 3G Charging and Billing systems should be capable to charge using following variables: content/service, time, duration, location, volume activation/deactivivation, QoS, session etc. It should be able to support different value chains models i.e. sharing the revenue. The charging and billing system will be more complicated than before because also the complex tariffing rules.

Actually the technology offers vast variety of possibilities to implement charging and billing schemas. The problem in future is to find suitable and effective billing schemas with which the users can accept. The basic business of the operators has been based so far for voice transfer. The creation of voice transfer technology has been very focused. The creation of the new service (see the Figure 1) will spread the focus strongly. There might not be as much development intertia behind the creation of the services as there was in creation voice transfer system alone.

5. TECHNICAL REQUIREMENTS

5.1 DR

The description of the DRs can be found from Figure 2. It indicates what kind of charging and rating information will be handled.

Different sources produce DRs, which originate from the same user: GGSN and SGSN produce time and session DRs and services generate information relating to the services. This can make the charging and billing complicated because there will be many layers of charging information.

Jari Ruokolainen
Tel. 040-5470739
jari.ruokolainen@datamo.biz

20.4.2003

Description
DRs must be able to include at least the following components, when available and needed: 1. Requested QoS levels, 2. Provided QoS levels, 3. Session correlating ID to allow linking of multiple DRs generated for one access session, 4. User identity information, 5. Terminal equipment information, 6.Resource usage information*, 7 Time usage began, 8. Time usage ended or, Duration of usage, 9. Destination information, 10. Location of mobile, 11. Service type, 12.Value added charges type, 13. Orderly or disorderly deactivation, 14. Service options selected, 15. Location of service origination.

Figure 2: Description of DR

5.2 QoS/Multicast

It possible to provide prioritized services for the users. Some time critical services application needs higher priority than less time critical (phone call … email). Priorities are also needed when users wants buy bandwidth for themselves over the others. QoS functionality can be used to generate this kind of services. Between the operator and user SLAs are made. Charging and billing will be based partly how well the SLA has been achieved.

5.3 Volume

The volume of the services running through the charging and billing systems can be varied based on the population and the maturity of the services. The demand can exceed even several tens of millions DR per day. Therefore one the key requirements is the scalability. Prepaid 3G systems (real time) will require High Availability of the whole network. Even small errors in 3G systems will cause significant lost for the operator if volumes are high and the charging systems operates in real-time.

5.4 Conclusion

Most of the requirements for charging and billing are originated from the huge investments in 3G licenses and technology: current business models are based expectations of high volumes to cover the huge investments. Overall conclusion can be form in the list of the requirements:

List of requirements

1. Scalability (rating speed)
2. High availability (prepaid)
3. Complex charging rules
4. Advanced credit check
5. Micro payments
6. Revenue sharing

Jari Ruokolainen
Tel. 040-5470739
jari.ruokolainen@datamo.biz

20.4.2003

7. Content based charging
8. QoS based charging
9. Additional services (location, group calls etc.)
10. Campaigns with special “gifts” (FOC games)

6. VENDORS THE CHARGING AND BILLING SYSTEMS

The GPRS and 3G billing market has been divided to those operators, which want to upgrade their systems and to those which want to have additional systems to top of their existing billing systems. It has been evaluated that the majority of the operators want to stick their existing vendor also for GPRS and 3G.

On the other hand, it has been also assumed that the operators want to limit their financial exposure by purchasing Charging Plus Systems: keep the existing billing system untouched and to build suitable charging system to top of it.

From the below you find list the systems vendors for billing systems. The products of the IP billing system vendors could be suitable for 3G all IP environment. The major shortages have been that the volumes have been much higher in operator’s world than in ISP world.

For further information, see the list of the vendors of charging and billing systems:

Portal software: Infranet (IP billing)

Solect: IAF Horizon (IP billing)

Geneva:

Amdocs Ensemble

Cerillion Tech: Cerillion

Logica: FROST

Digiquant: IMS

EHPT: NextGen Billing

EMIS: Libertis

Kenan: Arbor/BP

Protek: Flagship

Sema: SemaVision

Smarten

TelesensKSCL: Jupiter