

Central Billing System for Personal Bills

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Abstract—In this paper we propose a new central billing system for personal bills such as utility bills, telecom bills, credit card bills, tax bills, medical bills, etc. The proposed system consolidates all bills for one user so the user will not need to track and pay the bills individually. Personal users can save a lot of time and effort on paying bills every month and will less likely forget to pay for the bills thus avoiding paying late payment fines. Billing organizations such as utility companies, telecom companies and banks can benefit from this system by getting payments from users in time and sending out less physical mails for bills, which can save a lot of costs as well as save the planet's resources. The proposed system can also provide functionalities for the users to track and view their expenses back in time and in different aspects online from anywhere. Expense reports can also be generated for all bills monthly, which is a very useful tool for users to know and plan their expenses.

Index Terms—Central billing system, consolidated bill, easy tracking, personal bills.

I. INTRODUCTION

Nowadays people receive bills all the time, utility bills, credit card bills, mobile phone bills, tax bills, house load bills, insurance bills, medical bills, etc. Some bills are received monthly, some quarterly or yearly, and some are ad hoc. Many people have more than one credit cards (according to [1], average number of credit cards per cardholder is 3.7 in 2009 in the US), so they receive multiple bills every month and it is very difficult to keep track of all the bills. Even if more than one bill is from different cards from the same bank, they are in different bills and you need to pay for them separately. Different bills have different payment deadlines and late payments usually result in substantial penalties. Additionally, if somebody forgets to pay the bills in time for multiple times, his/her credibility will also be severely damaged, resulting in barriers in his/her future financial applications, e.g., house loan applications and car loan applications.

One solution to this problem is GIRO (General Interbank Recurring Order), which can automatically transfer money from one bank account to another bank account automatically by stipulated dates and amounts [2]. In some countries, a few billing organizations (usually public services) accept GIRO payment automatically; however, it

is not widely used worldwide.

Hence a system to manage all the personal bills is of great use to individuals who have multiple credit cards and more than one bill to handle every month. In this paper we propose an idea to create a central billing system which can get all bills from one personal user from various organizations and consolidate the bills into one final bill, providing a convenient way for the personal user to manage his/her bills in time.

There are some research works about how to build billing systems for telecommunication/internet/mobile provider companies [3]-[10], however, no centralized billing system is proposed to consolidate bills from different sources.

II. RELATED WORKS

There are no related papers on central billing systems for personal bills, but there are some existing central billing systems in other areas, such as for grocery stores, in which they have a central billing account for their wholesalers and the wholesalers pay the individual suppliers separately [11]. Other central billing systems [12], [13] provide companies a more convenient way to consolidate all their procurement invoices from all their suppliers and let the companies pay only once a month to all the suppliers. Company users can also check their invoices in the system to see if there are any discrepancies and then track all the expenses. These systems are mainly for businesses and not for personal bills and their business models are different than the personal central billing system we are proposing here.

III. LIMITATION OF CURRENT SOLUTIONS

Currently, most of the bills are still paper based and it takes time and costs to send the bills to individual addresses. Some billing organizations provide electronic transaction history, but users have to check online by themselves. Some organizations provide electronic bills with email or sms alert for the bills, however, not every organization has this service. If a user changes address, he/she needs to inform all the billing organizations or they will miss their bills. This also causes a lot of trouble from personal user's perspective.

A. Utility Bills

Utility bills are usually generated once a month and sent to users' home addresses by physical mail. It usually takes 4 to 5 days for the mail to reach home and sometimes the mail can be lost on the road. In some places, all utilities (water, electricity, gas, waste, etc.) are in one bill, but in some places they are separate, which makes payment process even more inconvenient. Usually people need to go to banks or

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the utility branches to pay for utility bills, and in some places they can also pay online or through mobile.

B. Telecom Bills

Postpaid landline phone, mobile phone, cable TV and internet bills are generated once a month, and usually people need to go to banks or telecom providers for payment. In some countries, people can pay by internet banking and mobile banking as well.

C. Credit Card Bills

Credit card bills are also produced monthly with both electronic version and physical version available. Some banks allow users to automatically transfer money from another account of the same user in the same bank to make sure the credit card bills are always paid in time. However, the user has to make sure he/she has enough money in the other bank account by the time of payment. If the user wants to pay the credit card bills from another bank, he/she has to do it manually. Usually people have more than one credit card, and one bill will be generated for every credit card even though multiple cards are from the same bank, in which case bills are not consolidated within the same bank.

D. Other Bills

There are other bills that are not generated monthly, such as insurance bills, income tax bills, vehicle tax bills, maintenance bills, medical bills and some of them can be paid by bank transfer, and some not.

E. Problems of GIRO

GIRO is not a “pay when you want to pay” method, and once GIRO is setup, the user needs to make sure there is sufficient balance in his/her bank account or he/she will face penalty charges. If the account is a credit card account, the user may also face overdraft risks when they don’t have enough balance at time of GIRO payment. The users have to setup GIRO payment for different bills separately and terminate them separately. GIRO is only available for some countries (e.g., UK, Singapore, etc.) and it is not worldwide.

IV. PROSED SOLUTION

In this paper, we propose a centralized billing system which can receive all bills for one user and consolidate them into one bill. The user can just pay for the consolidated bill once a month and all the bills are settled by the central billing system.

A. Organizational Users

The central billing system should be able to connect to the billing interface of other billing organizations, such as utility companies, telecom companies, tax organizations, banks, etc. These organizations can register in the system as organizational users so the system will be able to retrieve billing information from the organizations. The system can get the billing information, such as user account, bill amount, bill date, bill deadline, bill breakdown details and minimum payment amount, and store them into database. As the bill deadlines for different organizations are different, after receiving all bills for one user from different organizations,

the earliest bill may have passed its deadline before the final consolidated bill is generated and sent to the user to pay. Hence the billing organizations should have an agreement with the central billing system provider that the system can act as a guarantor for the personal user that he/she will pay the bill even if the original bill deadline is already passed.

B. Personal Users

Personal users can register themselves in the system with their credentials to ensure they will pay for the bills. Usually they need to input their identity card number (or social security number), billing address, phone number, email address, etc. The system will first check the credibility of the user with other organizations and once the user is confirmed to be credible, he/she is allowed to register their billing accounts.

The system will provide a list of billing organizations that have mutual agreement with the system, and personal users can register their billing accounts according to corresponding organizations. Usually they need to input their account number, and probably they will be directed to the respective organization’s system to enter password to check their identity.

For a household, sometimes bills are not registered under one member of the family, hence one registered user of our system should also be able to receive bills for other family members if he/she can provide account number and password for the particular bill. As billing information may also be private and sensitive, the system should take care of the privacy issues if some users try to register bills from other people.

After all bills are registered by one user, he/she can activate the bill consolidation process. Then the system will compute a suitable deadline for the consolidated bill every month after receiving all the bills from the organizations. An notification will be sent to the user by email/mail/sms or the user can download an app to check the bills. The app will generate a push notification when the consolidated bill is ready. Users can then pay the consolidated bill by bank transfer or cheque or other means before the new deadline.

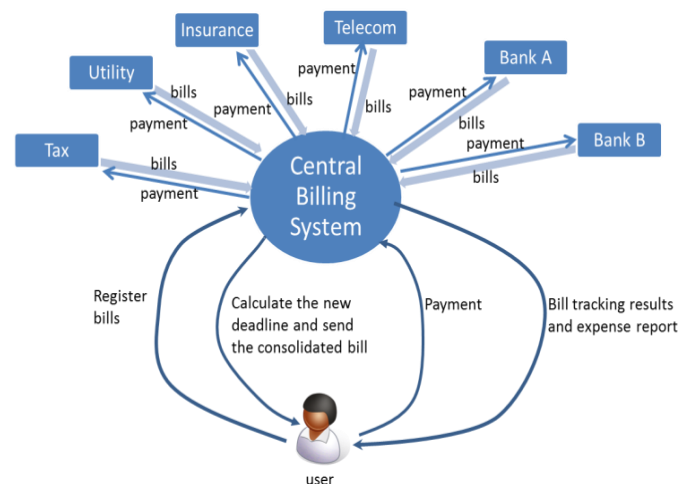


Fig. 1. Structure and work flow of the system.

Fig. 1 gives an illustration of the structure and workflow of the central billing system. Sample billing organizations

are shown in the figure.

V. DISCUSSION

There are a lot of benefits for the three parties involved in the new payment system. We will discuss the benefits from different point of views: personal users, billing organizations, and central billing system.

A. Personal Users

Our proposed central billing system brings great convenience for personal users. With this system, they don't have to keep track of their individual bills, which are around 5 to 6 bills on average, and there is less risk of late payment fines. With the proposed system, personal users can also check all their personal bills online from anywhere and the system can provide a more organized way for the users to track their bills. From the system, users can track all bills from one organization by timeline and see their trend. They can track bills from multiple organizations without logging into individual organization websites separately. As the system has the user's most expenses every month, it can analyze the expenses and generate reports for the user, so the user doesn't have to use a separate expense tracking tool or manually track the expenses. The user also doesn't have to receive multiple physical mails or emails from different organizations, saving time for the user as well as saving resources for the environment.

B. Billing Organizations

The process for individual billing organizations is also simplified by the central billing system. Instead of sending emails or physical mails to different users, now the billing organizations can just send all the billing information through the connection with the central billing system, saving man power and costs especially for the organizations sending out physical mails. As the users will be less likely to forget to pay bills because of the convenience brought by the central billing system, the billing organizations will receive payment more reliably and more promptly. The only slight drawback is that for some bill organizations whose deadlines are earlier than most of other bills for a particular user, the deadline for the consolidated bill may be later than some bills' original deadlines, resulting in late payment every month. In this case, the bill organization can adjust the bill date and bill deadline according to the user's other bills and then late payment can be avoided. The system can also consolidate payments for one organization and transfer money in one shot every month, hence there will be less bank transfers for the billing organizations, resulting in less man power needed.

C. Central Billing System

Central billing system can make a profit by providing services to both personal users and organizational users. At the start, the system can provide free services to both organizations and personal users. When people are used to the convenience the system provides, a small amount of service fee can be charged to the users. Also when the user base is big enough, the system can also charge the billing

organizations for service fees.

For some personal users whose credibilities are not perfect, the system can still provide services if the users put a deposit in the system. The deposit can be an estimated amount of total bills for that user in one month and it can be refunded to the user after he/she successfully completes the payment in time for a period of time. The system can also earn some profit by holding this money for some time.

VI. CONCLUSION

As nowadays people manage more and more bills on a regular basis, our proposed central billing system provides a more convenient way of organizing and tracking bills. Users will receive a consolidated bill sent by the central billing system instead of many bills separately. This makes them less likely to forget to pay the bills, saving both time and potential costs of late payments for the users. Personal users can also track and view different electronic bills from different organizations in one centralized system, and have a better understanding of their spending. Expense reports can be generated based on all their bills. On the other hand the billing organizations will have higher chance to get all the payments in time than the current solution due to that people sometimes forget to pay bills when there are too many bills. The central billing system can also benefit from its big user base and make a profit by charging a fee for the service.

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