

Online Payment – Innovation in Split Tender Payment

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ABSTRACT

Online Payment is the fastest and secured way of making payments for various purposes like making utility payments, transferring funds and making purchases online. This paper will help to uncover few important value adding features in Split tender payment method which will increase the utility and make it user friendly.

General Terms

This paper talks about a very niche area – online payment gateway and the improvement in existing features which will make it more efficient and user friendly.

Keywords

Online Payment, Split Tender Payment, Multi source Payment, Privacy, performance, vulnerability, PCI DSS.

1. INTRODUCTION

Online payment portals, though a powerful tool to make our life simple and gives the luxury to make all required payment transactions around any part of the world without leaving the room where you are. Though we can make the payment within few seconds, it involves lots of well defined steps for processing this payment. There are lots of challenges in terms of many systems to be interacted, different security measures to be handled, different protocols to be followed to make this payment to happen. There are increasing concerns about privacy, security and other issues in making online payments which are taken care when the online payment card industries major players comply with PCI-DSS[1]. PCI DSS provides the stamp of security and instills the sense of confidence to the users. In this paper we will discuss few online payment features and various modes of making payment. We will then bring out some additional features in Split Tender payment which will increase the utility, user friendliness of payment gateway systems.

2. SALIENT FEATURES OF ONLINE PAYMENT GATEWAY

Key Application features of any online payment gateway includes but not limited to Single Payment Options, Multiple Payment Options, Split Tender Payment Options, Single Sign On(SSO), API Payment Options, Scheduled Payment Options, Recurring Payment Options, Payment Refund, Tiered Convenience Fee Options, Customer Data Import, Bill Data Import, IVR Payment Options, CSR Payment Options, Various Reports.

Key Security Features of online payment portal includes Distributed Application, PCI Compliance System and Tokenization Features.

The [2] Payment Card Industry (PCI) Data Security Standard (DSS) was developed to encourage and enhance cardholder data security [3] and facilitate the broad adoption of consistent data security measures globally. PCI DSS provides a baseline

of technical and operational requirements designed to protect cardholder data. PCI DSS applies to all entities involved in payment card processing – including merchants, processors, acquirers, issuers, and service providers, as well as all other entities that store, process or transmit cardholder data . PCI DSS comprises a minimum set of requirements for protecting cardholder data, and may be enhanced by additional controls and practices to further mitigate risks. Below is a high-level overview of the 12 PCI DSS requirements grouped under the following categories namely Build and Maintain a Secure Network, Protect Cardholder Data, Maintain a Vulnerability Management Program, Implement Strong Access Control Measures, Regularly Monitor and Test Networks, Maintain an Information Security Policy.

3. INNOVATIONS IN SPLIT TENDER PAYMENT

3.1 Electronic Payment (Ecommerce)

Gone are the days when people used to go and do shopping or pay bills in person. Nowadays almost all items can be purchased online by making payment online. Users infact can view the things either as picture or video and can make decisions very quickly. They also have the luxury of making purchase anywhere in the world and getting it delivered right into the place of their choice in a short time. Users can make payment using any one of the payment modes provided by suppliers like credit card, debit card, net banking (savings account) and etc. While making online payment, there are chances that even if you have multiple credit / debit cards also, you cannot use more than one card at a time in a single transaction due to the restrictions provided by the supplier or payment gateway providers for the scenario in which you may want to use more than one card to pay for an item due to insufficient fund in single card. Split tender payment is introduced to alleviate this problem.

3.2 Split Tender Payment

Split Tender payment is the option to make payment for the purchase or to pay the fee using more than one mode of payment.

3.3 Options available in existing Split Tender Payment feature

The existing online systems or electronic payment systems allows the payment to be received from two sources. The payment can be made from loyalty cards in which reward points can be redeemed for money and remaining amount can be made from either credit/debit cards [4]. There is no system designed to make payment using more than two sources in existing split tender payment option. Consider the scenario of payment to be made is Rs.10000. If the user has reward points of 1000 which can be redeemed as Rs.1000 and if the user has

credit card which has the limit of only Rs.6000 and if he has debit card or access to bank account online (net banking), user cannot make the payment as the current systems allow only one type of payment other than reward points. Most of the online merchants who receive payment does not allow the payment from multiple payment processors like Master/Amex/Visa at a time (more than one payment processor in a split tender payment) due to the multiple transactions involved with various processors, ability to track each request and result, charges involved due to more than one payment transactions actually triggered here [5]. The limitation is forced due to various reasons like the ability to interact with more than one bank or service providers and ability of existing system to send request for multiple service providers, get each requests validated, get each request approved and track each responses which may incur more operation cost and technical challenges. Above all it also involves transactions with various payment processors for a single item/invoice which may incur more cost to the merchants concerned which sometimes can be charged from customers and sometimes not due to various business reasons. The possibilities of making split payments is also discussed by few systems in US patent site describing the payment split with royalty card or reward card and making use of one more payment system like credit card/ debit card or by cash [6]. Refer Figure 1 given below which depicts the general overview of existing Split Tender system.

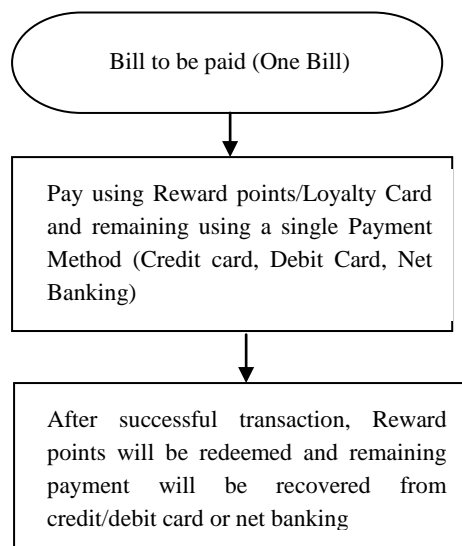


Fig 1: Traditional Split Tender Payment Feature

3.4 Proposed features to Existing Split Tender Payment Option

The new system will help in making the payments in the following efficient ways

Will allow bill to be paid in more than two or more modes of payments over the internet. Consider the scenario of paying Insurance Premium for Personal Health Policy from company1 is for Rs.10000. Under this proposed system, an user can pay the amount using various payment modes like using credit card, using net banking or using debit card, using reward points and etc. The best part of this is option can be even provided to use different types of credit/debit cards like Master, Visa and etc at the same time to make the payment. The payment will be processed based on methods of payment. Refer Figure 2 given below.

Another important feature is to allow the payment to be made from various payment provider type like Master, Visa and Amex. The bill can be paid using more than one credit or debit card each of which can be from various provider type like Master/Visa/Amex. For example, a bill of Rs.10000 can be paid using credit card itself by selecting payment method as "Credit card". Then the payment can be made from more than one credit card. One payment of Rs.5000 can be made from a Master Credit card, another Rs.2000 can be paid using a Visa credit card and another Rs.3000 can be made using a Amex credit card or can use existing Reward points to make this last part of payment.

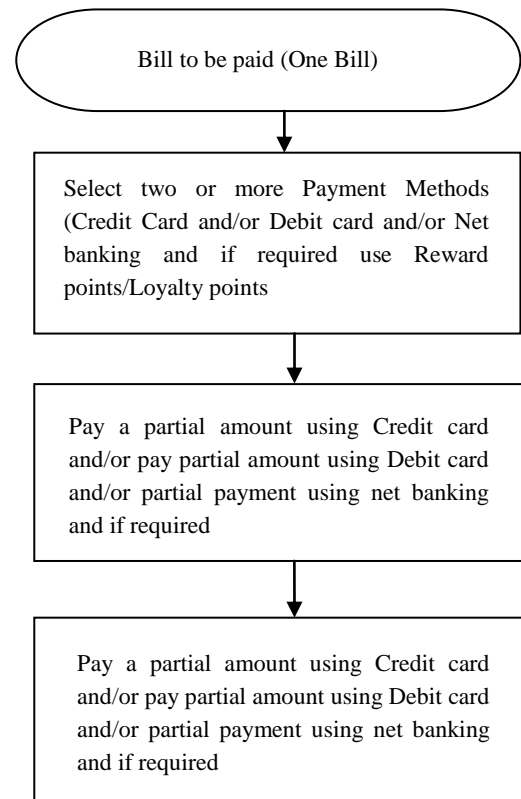


Fig 2: Proposed Split Tender Payment Feature

Table 1. Comparison between Split Payment Option mode used in Existing and Proposed Online Payment Gateway

Sl. No	Existing Online Payment Gateway using Split Payment Mode Option	Proposed Online Payment Gateway using Split Payment Mode Option
1	Splitting single payment to be paid in two modes only. For ex: using reward points and credit card/debit card/online banking	More than two payment modes can be used including credit card, debit card, online banking, check and etc at the same time
2	Cannot use two different credit card brands like Master, Visa , American Express and etc	Can use credit card to make payment at a time using multiple brands like Master/Visa/American Express and etc

3.5 Screens depicting suggested steps of implementing proposed Split Tender Feature

Given below the screens which will depict the various steps involved in implementing the proposed Split Tender Feature taking a sample invoice to be paid using multiple payment modes. The sequence of the screens and comment below each screen will guide to understand the proposed Split Tender Payment feature very clearly.

Refer Figure 3 : The screen shows the list of Merchants (Billers available within each Merchant), their invoice number and amount. User need to be registered with the Merchants to avail this facility. A Merchant can have multiple Billers. For example Merchant 1 can be TATA industries and can have multiple billers like Tata Docomo, Tata Motors, Telco and etc.

Refer Figure 4: This screen shows the list of payment modes available in the application through which user can make payment to the billers. There are many options that are configurable from the admin (back end) tool and couple of them are split tender payment, multiple payment, recurring payment and etc. Now in the application, as the split tender payment is enabled, user can choose more than one mode of payment to pay a single bill. Through this screen, user is selecting “Savings” payment mode to pay bill.

Refer Figure 5: This screen shows the details of making payment using Savings mode. Asks for specific information required to make payment here. This is the extension of Figure 4. User also has option to save the information so that it can be re-used when he makes payment using “savings” mode next time and this will make his task easy.

Refer Figure 6: This screen helps to make payment using credit card. Here use is making payment using multiple modes for a single bill. First scheduled partially through “Savings” mode and now scheduling payment through credit card payment mode here. User also has option to save the information so that it can be re-used when he makes payment using “Credit Card” mode next time reducing many information which he needs to enter the next time.

Refer Figure 7: This screen helps to make payment using Check. Here we are using a single bill and making payment using savings, credit card and check payment mode. User also has option to save the information so that it can be re-used when he makes payment using “Check” mode next time reducing many information to be keyed in again.

Refer Figure 8: This screen captures the information like date of making payment using which user can schedule payment. User can also choose to pay the convenience fee which needs to be paid to Merchant to facilitate the payment and this can also be paid using any of the payment mode selected. User can also split the convenience fee and pay using various payment modes selected or can make payment using single payment mode as shown in the figure 7.

Refer Figure 9: This screen shows the summary of schedules made to make payment. It shows the invoice number, biller information, mode of payment opted, amount to be paid for the particular bill, status of the payment (shows “Pending” for scheduled payments that are to be processed, “Paid” for payments made, “New” for new record created for the partial payment made with outstanding amount to be paid) and with Action column that has options like “Void” to stop the payment processing which is scheduled where the status will be “pending”, “selected” to select specific scheduled bills or split tender payment to be made using multiple modes of payment, “pay” to select an invoice to schedule the payment. This screen also shows the payment method selected like split tender payment or single payment and etc with the amount to be paid, amount scheduled in this process to be paid and balance amount to be paid if the payment method opted is split tender payment.

Refer Figure 10: This screen shows the Payment confirmation made with all comprehensive details about Biller, invoice, mode(s) of payment made and convenience paid details. User can take print of this page for his record.

Whatever be the Payment method mentioned above, we need to call the payment processor api with required parameters like credit card/debit card details with expiry date, cvv number and type of card and similarly for all other payment modes. Payment processors will process the data and respond with process status (success or failure) and also message indicating the success/type of failure happened. Each payment will be processed based on merchant (here in our above example “sujay”) settings on settlement time on that day and merchant (sujay) may receive payment in couple of days based on arrangement he has with payment gateway providers. A successful transaction can be cancelled (made void) before settlement is made by payment gateway providers by sujay himself and if to be cancelled after the settlement, refund can be made by making a request to payment processor with another api with required parameters.

Make Payment

Click on the 'Pay' action to make a payment on this account. A 'Pending' status indicates a payment has been made and is in process.

Name	Invoice Number	PO Number	Currency	Biller	Bill Amount	Min Due Amount	Bill Due Date	Amount Paid	Status	Action
Sujay Profile	CS101119-5	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010	\$0.00	New	Pay
Sujay Profile	CS101119-6	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010	\$0.00	New	Pay
Sujay Profile	CS101119-7	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010	\$0.00	New	Pay

Fig 3: Shows the list of Invoices to be paid. Demonstrating "Split Tender Payment Mode" using Invoice CS101119-6.

Payment Method Selection

Please enter the payment amount, the payment date and then choose your method of payment
 How would you like to pay?

Your Information

Account Being Paid: sujay
 Customer Name: Sujay Profile
 Identity Number: sujay7
 Account Number: 1234
 Invoice Number: CS101119-6
 PO Number: PO123
 Currency: USD

How much do you want to pay?

- \$ 800.00 Total Amount Due
 - \$ 100.00 Minimum Amount Due
 - \$ 100.00 Other Amount
- \$ 100.00 Total Amount Paid

- Credit / Debit Card
- ATM Card
- Check
- Savings
- Cash
- Certified Check
- Money Order
- Wire Transfer



Add Payment Method

Back

Fig 4: Shows the list of payment methods available. Selecting "Savings" methods here and other methods to follow.

Savings Account Information

Account Type: Savings

ABA/Routing Number: 053101121 *

Account Number: 1234567 *

Re-Enter Account Number: 1234567 *

First Name of Account Holder: Sujay *

Last Name of Account Holder: Profile *

Street Address: Church Road *

City, State/Province, Zip Code: California CA 10001 *

Telephone Number: (770) 422 - 3333 *

Save this Payment information for future use?

Continue Reset Back

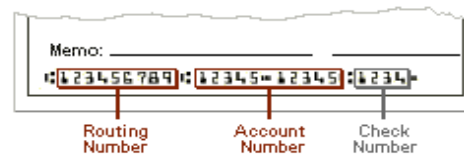


Fig 5: Scheduling a payment of \$100 through Savings Account for Invoice CS101119-6.

Credit Card Information

Account Type Credit Card

Credit Card Type *

Credit Card Number *

Credit Card Expiration Date / *

Card Security ID Number (see card example for location)

First Name on Credit Card *

Last Name on Credit Card *

Street Address *

City, State/Province, Zip Code *

Telephone Number () - *

Save this payment information for future use?



Fig 6: Shows the scheduling of payment \$100 through Credit Card for Invoice CS101119-6

Checking Account Information

Account Type Check

Check Type *

ABA/Routing Number *

Account Number *

Re-Enter Account Number *

First Name of Account Holder *

Last Name of Account Holder *

Street Address *

City, State/Province, Zip Code *

Telephone Number () - *

Save this Payment information for future use?



Fig 7: Scheduling a payment of \$100 through Checking Account for Invoice CS101119-6

Please enter the payment amount, the payment date and then choose your method of payment

When do you want to pay?

Account Being Paid sujay 8/23/2012 (Effective Date)
 Customer Name Ram R 9/16/2010 (Payment Due Date)
 Identity Number sujay7 8/24/2012  (User Selected Date)
 Account Number 1234 Thank you for your payment. We value you as a customer and we look forward to continuing to serve you.

How should the Conv/Service Fee Amount be applied?

CreditCard-XXXX-4444 \$4.95
 Check-XXXX-4567 \$
 Savings-XXXX-4567 \$
 Convenience Fee Amount \$4.95

How much do you want to pay?

Selected Payment Method 3 [View](#)
 \$ 300.00 Total of Multiple Payment Methods
 \$ 4.95 Convenience Fee Amount
 \$ 304.95 Total Amount Paid

Since your are paying with different payment methods, you can choose how the amount should be applied.

Please note that a Convenience Fee has been applied to this payment amount.

Optional Payment Confirmation Via Email or SMS Text

Email Address

Fig 8: Scheduling Convenience Fee and opting to pay using Credit Card for the Invoice CS101119-6. It can be split across other modes of payment too if needed.

Click on the 'pay' action to make a payment on this account.

Identity Number :sujay7

Account Number :1234

Name	Invoice Number	PO Number	Currency	Biller	Bill Amount	Min Due Amount	Bill Due Date	Amount Paid	PayMethod	Status	Action
Sujay Profile	CS101119-5	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010	\$100.00		Pending	Void
Sujay Profile	CS101119-5	PO123	USD	sujay	\$900.00	\$100.00	9/16/2010			New	Pay
Sujay Profile	CS101119-6	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010	\$100.00	Credit Card	Pending	Selected
Sujay Profile	CS101119-7	PO123	USD	sujay	\$1,000.00	\$100.00	9/16/2010			New	Pay
Sujay Profile	CS101119-6	PO123	USD	sujay	\$900.00	\$100.00	9/16/2010	\$100.00	Check	Pending	Selected
Sujay Profile	CS101119-6	PO123	USD	sujay	\$800.00	\$100.00	9/16/2010	\$100.00	Savings	Pending	Selected
Sujay Profile	CS101119-6	PO123	USD	sujay	\$700.00	\$100.00	9/16/2010			New	Pay

Split Tender Payment Method :

Amount Due \$3,900.00 Amount Paid \$400.00 Amount Remaining \$2,600.00

Fig 9: Shows the payment scheduled using Split Tender Method (using various payment methods) for Invoice CS101119-6.

User Information

Payment Made to sujay
Identity Number sujay7
Account Number 1234
Payment Method Type Split Tender
Email Address sujay@y.com
Zip Code

Payment Amount Information

Payment Date 8/23/2012 10:13:13 PM Invoice No CS101119-6
Payment Amount \$ 300.00 Invoice Amount \$1000.00
Convenience Fee Amount \$ 4.95
Total Payment Amount \$ 304.95

Payment Method Selected

Method	Name on Account	Account/Number	Type	Amount	Conv/Service Fee	Total Amount
CreditCard	Sujay Profile	CreditCard-XXXX-4444	VISA	\$ 100.00	\$ 4.95	\$ 104.95
Check	Sujay Profile	Checking-XXXX-4567	Personal	\$ 100.00	\$ 0.00	\$ 100.00
Savings	Sujay Profile	Savings-XXXX-4567		\$ 100.00	\$ 0.00	\$ 100.00

Fig 10: Shows summary of payments made using Split Tender Payment Method for Invoice CS101119-6.

4. CONCLUSION

Generally most of the existing systems make use of split payment with two payment modes and in those also most of them use reward/loyalty cards as one of the two payment modes. The system suggested here in will definitely help more merchants to receive payment using more than two payment modes and also to overcome the handicap of using only one type of payment processor at a time like Master/Visa/Amex or Discovery. On the other hand this will make the life of the customers easy and will allow them to make payment in a most flexible way that is made possible by this suggestion. This will definitely increase volume and frequency of transactions as customers are encouraged to do in most flexible way they want to and which in turn will benefit Merchants to achieve more volume and growth.

5. REFERENCES

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