Payment Gateway Information and Workflows

The Payment Gateway feature allows value to be transferred from an external system (for example PayPal) to a PaperCut personal account. It has some distinct differences from other external funding options and this document explains how it works, what the differences are and what solutions you can provide end users when using a Payment Gateway.

For an overview of other external options please review "Recharging Balances" at http://www.papercut.com/tour/balance-recharge/.

Please also bear the following points in mind:

- Features in specific payment gateways will vary depending on the features that are supported by the external system, the choices made when the gateway was implemented and the way that the payment gateway systems are configured on site.
- When using the on demand transfer, because the connection between the two systems is "real-time", it should be low latency and very reliable. A connection delay or failure will appear to "lock" PaperCut.
- Each PaperCut Application server can have only zero or one working on demand payment gateway, however multiple manual transfer gateways may be installed if needed.
- There are alternatives to using a Payment Gateway implementation. Refer to section 3.1 on page 6.

1 Balance Transfer using payment gateways

The concept of a payment gateway involves moving value between two different systems, viz. PaperCut and the third party or external funds service. The transfer can occur in two different ways

1. **Manual Transfer**: When the user logs into the PaperCut user interface they may see an option to add credit to their account. They select the amount to transfer. This is referred to as **manual transfer**. After the user has selected the "Add Credit" button (see screen shot) the process is taken over by the web server of the external funds service. Once the user has successfully completed the transaction a service specific "handshake" occurs that prompts PaperCut to credit the user's personal account and the user is returned to the PaperCut web end user interface. This type of interface is the simplest to implement.
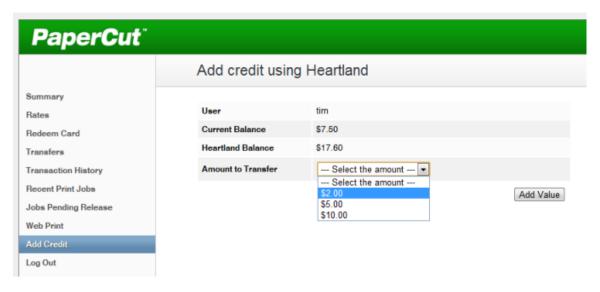
Figure 1 An Example. May vary between different systems

2. **On Demand Transfer**: When the user's account is about to be debited (for instance when doing a copy) and there are insufficient funds in their account PaperCut requests a transfer of value from the external service without user intervention. This is referred to as **on demand transfer**. This type of interface represents a greater level of implementation complexity. On demand transfer also provides a greater variety of differences between different services, depending on the capabilities offered by the service and the implementation decisions made by PaperCut.

External fund services come in two flavors:
1. Online Payment Gateways: payment providers such as PayPal, Authorize.Net, RBS WorldPay and CyberSource. The solution allows users to make immediate payments from credit cards and bank accounts directly from their desktop using the external payment system. There is no need for PaperCut to be PCI[1] certified.
   Notes:
   a. This only supports manual transfer because the user must initiate and authorise each transaction.
   b. The authentication and authorisation is handled by the third party system, e.g. PayPal
2. Campus Card Payments and similar services: such as Blackboard, CBORD and PayEx. These systems support the concept of pre-stored or pre-authorised value which allows PaperCut to transfer value without user intervention at the time a job is being charged. Again no PCI certification is required as this is handled by the external system. These services usually support manual transfer as well.

   Services providing on-demand payment transfer must provide APIs to:
   - Allow PaperCut to query the user's available external value
   - Allow PaperCut to deduct external value

All payment providers must have a mechanism for mapping a PaperCut user account to their payment provider account. For instance, PayPal requires the users email address, which PaperCut already knows. Other systems, such as PayEx, require an external account number. Obtaining external account information is covered in the section "Determine How PaperCut Will Find External Account Identity"

2 Example workflows

2.1 Manual Transfer
1. User logs into the PaperCut user web interface to review their account. (This interface allows the user to see their job history, request refunds, release print jobs etc.)
2. User selects the Add Credit menu option
3. User is prompted for an amount to transfer
4. User is redirected to the external payment system for authentication and approval
5. The user is redirected back to PaperCut and their account is updated (if the transaction is successful)
6. The user releases a print job or uses the copying feature as normal.

2.2 On Demand Transfer

2.2.1 User printing with On Demand Transfer
1. User prints a document from a workstation.
2. PaperCut processes the job as normal to determine if the user has enough credit to print.

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[1] http://en.wikipedia.org/wiki/Payment_Card_Industry_Data_Security_Standard

3. If the user has insufficient balance and on demand transfer is supported then
    a. A balance enquiry is made to the external system to see how much value is available
    b. If the balance enquiry is successful then PaperCut then sends the job to the printer and deducts the cost from the user's internal balance.
    c. Value is transferred from the external fund source to the user's account as needed. Depending on the gateway configuration the amount transferred will be either:
        i. The preconfigured minimum transfer amount, or more if needed.
        ii. The exact amount to keep the users account balance at zero after the job completes.
4. The user collects their job.

2.2.2 User copying with On Demand Transfer

1. User authenticates at an MFD and selects the copy function.
2. A balance enquiry is made to the external system to see how much value is available (if supported by the external funds system)
3. The users available balance is used to set the zero stop limit (within the limits of the specific MFD platform)
4. PaperCut processes the job as normal and the user collects their job
5. Value is transferred from the external fund source to the user's account as needed. Depending on the gateway configuration the amount transferred will be either:
        i. The preconfigured minimum transfer amount, or more if needed.
        ii. The exact amount to keep the users account balance at zero after the job completes.

3 Considerations for new payment gateways

1. Payment gateways involve deep integration with PaperCut and custom behavior such as redirecting users to external web pages and receiving messages from external servers. Developing payment gateway integration also normally involves restricted access to technical documentation by third parties and a high level of technical complexity and security auditing. For these reasons PaperCut Software normally develops payment gateway software.
2. The features offered by a specific payment depend on the APIs offered by the external system and the requirements of the customer who is requesting the development
3. New payment gateway integrations are usually time consuming and expensive to develop.
4. Your payment system may already support one of our existing payment gateway protocols. See http://www.papercut.com/tour/balance-recharge/online-payment-gateways/ for a list.

3.1 Alternatives to Payment gateway

Before requesting a new payment gateway implementation you should review the possible alternatives below:

- Top up cards (http://www.papercut.com/tour/balance-recharge/top-up-cards/)
- Custom URL in the user web tools page (http://www.papercut.com/products/ng/manual/ch-customization-user-web-pages.html#ch-customization-user-web-pages-nav-links)
- Access from the third party solution to PaperCut user information using the Public Inbound API (http://www.papercut.com/products/ng/manual/apdx-tools-web-services.html)

4 Determine How PaperCut Will Find External Account Identity

The payment gateway, usually when using the on demand transfer, requires a user's external account id to perform a transaction from their external account. This requires a mapping between a user in PaperCut and their external account. There are two ways to achieve this:

1. By importing/storing the external account is in PaperCut. This is generally the easiest method if the external account number is readily available for import into PaperCut. See "Populate External Account Numbers into PaperCut Card/Identity Numbers" below for more detail.
2. By using details about the user that are available to PaperCut to look up an external account id in a database. This is useful when the external account id cannot easily be imported into PaperCut (or a different card/id is in use), but can be easily "looked up". See "Looking Up External Account Ids in a Database" below for more detail.

4.1 Populate External Account Numbers into PaperCut Card/Identity Numbers

This method involves importing the external account id into PaperCut. This is the preferred method, where possible, as it allows PaperCut to quickly and easily identify the external account information needed.

There are a number of ways this can be done, including:

- Importing the account numbers from Active Directory or LDAP. This is generally the simplest method and easiest to maintain, particularly if the account numbers are already stored in AD/LDAP. See the PaperCut user manual section "*Importing Card/Identity numbers from Active Directory or LDAP*" for more details.
- Pointing PaperCut to a database that contains the account numbers and can provide a mapping between the account number and the network username or ID field. This can be useful if there is a student management system or similar that contains the account numbers and usernames. See the user manual section "*Looking up card numbers in an external database*" for more details.
- Batch importing the account numbers from a text file. See the user manual section "*Batch User Card/Identity Update*" for more details.

4.2 Looking Up External Account Ids in a Database

Note: Not supported by all payment gateways.
This method involves using some information about a user that is available to PaperCut (i.e. user name or id) to look up a external account in a database. For example given a list of

external account ids and network usernames, PaperCut knows the network username so it can look up the external account id.

Configuration for database lookups can be found in the gateway specific configuration file at [app-path]/server/lib-ext/, under the section titled "*External Account Id Lookup Settings*". The configuration file provides further information and examples. For assistance please contact support.

5 Handling Multiple Personal PaperCut Accounts

Please review the documentation at http://www.papercut.com/products/ng/manual/ch-multi-personal-accounts.html before reading this section. In particular you will probably want to understand how account priorities are used to control which accounts are used to pay for jobs.

PaperCut supports multiple personal accounts (*note* this is **not** the same as shared accounts) and this feature can be used in conjunction with a payment gateway. For example users may have one personal account called "Free Quota" to store the free printing quota provided to students each term, and a second account called "Campus Account" to store the balance provided via the payment gateway.

The payment gateway feature supports multiple personal accounts in the following manner:

- If users have more than one personal account the first account (created when the system is installed) is the default account.
- When using a payment gateway balances are normally shared using the default account, however this can be changed as follows:
  a. Enable multiple accounts as documented at
     http://www.papercut.com/products/ng/manual/ch-multi-personal-accounts-config.html#ch-multi-personal-accounts-config-priorities

Note that these settings apply to all users in PaperCut. An example of a more complex scenario (based on scenario 2.2 above) might be:

1. PaperCut users all have three accounts. Free Quota (default), Campus Account (using Payment gateway) and Cash
2. All users are charged first from Free Quota, then Campus Account, then Cash last as defined by the PaperCut administrator
3. Users can review all their PaperCut balances from the web interface
4. When I use PaperCut, as a user, I don't want to pay so using my free quota is what I want
5. After my free quota is used up I use Campus Account pay for jobs (see section On Demand Transfer
6. User printing above)
7. If my Free Quota account and Campus Account are depleted, but I have some cash in my pocket, I can use a pay station provided on the campus.

These are not the only combinations. For instance it is possible to also use Pre-paid top up cards. See http://www.papercut.com/tour/balance-recharge/top-up-cards/ for an overview