CashBox® Programming Guide Preface

About CashBox .......................................................... ii
About ChargeGuard ................................................. iii

Chapter 1  CashBox Client Library Setup ............................... 1-1

1.1 CashBox API ....................................................... 1-2

1.2 Support for Development ........................................ 1-3
  1.2.1 Installing and Configuring the CashBox Library ........ 1-3
    PHP ........................................................................ 1-3
    Perl ....................................................................... 1-4
    Configuring the Perl API Client .............................. 1-4
    Specifying the First Parameter in Perl .................. 1-5
    Java ...................................................................... 1-5
    .NET With C# ......................................................... 1-6
  1.2.2 Setting Up Authentication Parameters .................... 1-6
    In Perl .................................................................... 1-7
    In PHP ................................................................. 1-7
    In Java ................................................................. 1-7
    In VB ..................................................................... 1-8
    In C# ..................................................................... 1-8
  1.2.3 Configuring the SOAP Timeout for Client Libraries .... 1-8
    In PHP ................................................................. 1-9
    In Java ................................................................. 1-9
    In ASP, VB, and C++ .......................................... 1-9
    In C# ................................................................. 1-9
  1.2.4 Checking an Object Method’s Return Value ............. 1-9
  1.2.5 Working with Sparse Response Descriptions .......... 1-11
  1.2.6 Setting UNIX Timestamps in VB ......................... 1-11
  1.2.7 Date and Timestamp Format ................................ 1-12
  1.2.8 Assigning Unique Identifiers for Objects ............... 1-12
  1.2.9 Merchant Identifiers .......................................... 1-12
  1.2.10 Ensuring the Correct Character Encoding .............. 1-13

1.3 Working with CashBox WSDL Files .............................. 1-13
  1.3.1 Specifying the SOAP Address ............................ 1-14
  1.3.2 Performing the Prerequisite Steps ..................... 1-14

1.4 Tips for Developing SOAP Clients ............................ 1-15

Chapter 2  Working with Accounts ................................. 2-1

2.1 Creating Customer Accounts .................................... 2-2
2.2 Setting Up Account Payment Methods ...................... 2-3
2.3 Accessing Existing Customer Accounts ...................... 2-6
2.4 Creating Account Hierarchies .................................. 2-7
2.5 Presenting the Reason for Credit (to the customer) ............... 2-9

Chapter 3 Working with Products .................................... 3-1
3.1 Creating Products .................................................. 3-2
3.2 Creating Bundled Products ........................................ 3-4
3.3 Accessing Existing Products ...................................... 3-5

Chapter 4 Working with Billing Plans .................................. 4-1
4.1 Creating Billing Plans .............................................. 4-2
  4.1.1 Creating a Billing Plan with an early cancellation fee ....... 4-5

Chapter 5 Working with AutoBills ...................................... 5-1
5.1 Creating AutoBills .................................................. 5-2
  5.1.1 Creating an AutoBill with Multiple Products .............. 5-5
  5.1.2 Creating an AutoBill with Seasonal Billing .............. 5-6
  5.1.3 Creating or Modifying AutoBills with Pre-Authorization .. 5-6
  5.1.4 Creating AutoBills with deferred start ................. 5-7
  5.1.5 Updating and Validating AutoBill Objects ............. 5-8
  5.1.6 Verifying AVS and CVN for Recurring Billing .......... 5-9
5.2 Modifying AutoBills .............................................. 5-11
  5.2.1 Prorating Modification-Based Price Changes .......... 5-12
  5.2.2 Changing Products for an AutoBill ...................... 5-12
  5.2.3 Changing the Billing Plan for an AutoBill ............ 5-14
  5.2.4 Changing both Products and Billing Plan in a Single Call 5-15
  5.2.5 Viewing AutoBill Changes .................................. 5-16
  5.2.6 Continuous Billing during Retry Period ............ 5-17
  5.2.7 Advance and Arrears Billing Option for AutoBills ... 5-18
5.3 Canceling AutoBills ............................................. 5-19
  5.3.1 Canceling AutoBills with Reason Codes ............. 5-19
  5.3.2 Creating Custom-Defined Merchant Cancel Reason Codes 5-21
  5.3.3 Canceling AutoBills on Billing Day .................... 5-21
  5.3.4 Canceling AutoBills with unknown start date .......... 5-21
5.4 Importing AutoBills from other Billing Systems to CashBox .... 5-22
  5.4.1 Key Migrate Parameters ................................. 5-23
  5.4.2 Migrating an AutoBill During a Billing Cycle ........ 5-23
  5.4.3 Migrating an AutoBill During a Free Trial Period ..... 5-28
5.5 Using EDD and UK DD for Recurring Billing ................... 5-30
  5.5.1 Understanding Mandates for Recurring Billing with EDD . 5-33
  5.5.2 Understanding Mandates for Recurring Billing with UK DD 5-34
5.6 Using PayPal for Recurring Billing .......................... 5-35

Chapter 6   Working with One-Time Transactions .................. 6-1

6.1 Setting Up Real-Time Billing for One-Time Purchases .......... 6-2
  6.1.1 Monitoring Transaction Status .......................... 6-2

6.2 Using Credit Cards for One-Time Transactions .................. 6-3
  6.2.1 Verifying AVS and CVN for One-Time Transactions ........ 6-5
  6.2.2 Calling the auth and capture Methods Separately .......... 6-8

6.3 Using Carrier Billing for One-Time Transactions ............... 6-10
  6.3.1 BOKU Static Pricing Transactions ........................ 6-11
  6.3.2 BOKU Dynamic Pricing Transactions ..................... 6-12
  6.3.3 Using CashBox to query BOKU .......................... 6-13

6.4 Using Boleto Bancario for One-Time Transactions ............. 6-15

6.5 Using ECP for One-Time Transactions .......................... 6-16
  6.5.1 Creating Outbound Payment Transactions with ECP ........ 6-17

6.6 Using EDD and UK DD for One-Time Transactions .............. 6-19
  6.6.1 Understanding Mandates for Real-Time Billing with EDD . 6-21
  6.6.2 Understanding Mandates for Real-Time Billing with UK DD 6-23

6.7 Using PayPal for One-Time Transactions ........................ 6-24

6.8 Recording a Payment Manually .................................. 6-26

6.9 Importing Transactions from other Billing Systems to CashBox 6-28

6.10 Refunding Customers ........................................... 6-29

Chapter 7   Working with Entitlements .............................. 7-1

7.1 Creating Entitlements ........................................... 7-2

7.2 Entitlement Status .............................................. 7-3

7.3 Caching Entitlements ............................................ 7-3

7.4 Monitoring Entitlement Status .................................. 7-4

Chapter 8   Working with Rate Plans ................................ 8-1

8.1 Recording Rated Units .......................................... 8-2

8.2 Deducting Rated Units .......................................... 8-4

8.3 Reversing (Billed) Rated Unit Events .......................... 8-4

8.4 Fetching and Reporting Rated Units ........................... 8-5
  8.4.1 Fetching a Summary (Total) of Unbilled Rated Unit Events 8-5
  8.4.2 Fetching Billed or Unbilled Rated Unit Events ............ 8-7

8.5 Understanding License Based Quantities ........................ 8-9
Chapter 9  Working with Customer Notifications . . . . . . . . . . 9-1

9.1 Setting the Preferred Language ........................................ 9-2
9.2 Working with Billing Events ............................................. 9-2
  9.2.1 CashBox Billing Events ............................................. 9-2
  9.2.2 Billing Event Settings ............................................... 9-5
  9.2.3 Parent-Child Account Billing Notifications ..................... 9-6
  9.2.4 Creating Billing Notification Templates ......................... 9-7
  Billing Event Template Tags ............................................ 9-7
9.3 Working with Invoices .................................................. 9-11
  Dunning Notices .......................................................... 9-11
  9.3.1 CashBox Invoicing Events ........................................ 9-12
  9.3.2 Creating Invoice Templates ...................................... 9-12
  Default Invoice Template .............................................. 9-13
  Invoice Template Tags .................................................. 9-14

Chapter 10  Working with Tokens .......................................... 10-1

10.1 Understanding CashBox Token Objects ............................... 10-2
10.2 Understanding Token Activities ...................................... 10-3
10.3 Defining New Token Types ............................................. 10-7
10.4 Incrementing Token Balances .......................................... 10-7
  10.4.1 Purchasing Tokens ................................................ 10-8
  10.4.2 Granting Tokens to Accounts ................................... 10-10
10.5 Decrementing Token Balances ......................................... 10-11
  10.5.1 Transacting Purchases in Tokens ................................ 10-12
  10.5.2 Token Transactions in Real Time ............................... 10-13
10.6 Handling Recurring Billing with Tokens ............................. 10-15
10.7 Refunding Transactions in Tokens .................................... 10-18
10.8 The CashBox Token Processor ....................................... 10-19

Chapter 11  Working with Campaigns ..................................... 11-1

11.1 Creating an AutoBill with a Campaign discount .................... 11-2
11.2 Adding a Campaign Code to an AutoBill ............................. 11-3
  11.2.1 Applying a Campaign Code to an existing AutoBill .......... 11-3
  11.2.2 Applying a Campaign Code to a Specific Product on an AutoBill 11-4

Chapter 12  Credit Grants and Gift Cards ............................... 12-1

12.1 Working with Credit .................................................... 12-2
  12.1.1 Redeeming Credit ................................................. 12-2
  12.1.2 Using Credits with an Account ................................. 12-3
CashBox 25.0.0: Programming Guide

Chapter 12 Credit and AutoBill Usage

12.1 Using Credits

12.1.1 Granting Credit to an Account ........................................ 12-4
12.1.2 Revoking Credit from an Account ................................. 12-5
12.1.3 Using Credits for a One-Time Transaction ...................... 12-6
12.1.4 Fetching Account Credit History ................................. 12-8

12.2 Using Credits with an AutoBill ...................................... 12-9
12.2.1 Granting Credit to an AutoBill ..................................... 12-10
12.2.2 Revoking Credit from an AutoBill .............................. 12-11
12.2.3 Fetching AutoBill Credit Transactions ......................... 12-12
12.2.4 Fetching AutoBill Credit History ................................. 12-13

12.3 Working with Gift Cards .............................................. 12-14
12.3.1 Understanding the Attributes of the GiftCard Object .... 12-14
12.3.2 Determining Redemption Credit Amount ...................... 12-14
12.3.3 Redeeming a Gift Card ............................................. 12-16
12.3.4 Reversing a Gift Card Redemption ............................. 12-18

Chapter 13 Hosted Order Automation with Hosted Fields ........... 13-1

13.1 HOA Features .......................................................... 13-2
13.2 HOA with Hosted Fields Process Flow ........................... 13-3
13.2.1 User Experience Flow ............................................ 13-3
13.2.2 HOA Server Work Flow .......................................... 13-4

13.3 Working with HOA with Hosted Fields .......................... 13-7
13.3.1 HOA Naming Schema ............................................. 13-7
   Naming schema for parameter values ............................... 13-8
   Naming scheme for an object with an array ..................... 13-8
   Naming scheme for name-value arrays ............................ 13-8
13.3.2 HOA Form Post Parameters ..................................... 13-8
   Private Form Values .................................................. 13-9
13.3.3 HOA Method Parameters ......................................... 13-10
13.3.4 HOA Error Checking ............................................. 13-10
13.3.5 WebSession Object .............................................. 13-10
13.3.6 Creating Order Forms for HOA ................................ 13-14
13.3.7 Creating Success or Failure Pages for HOA ................... 13-15

13.4 Implementing HOA with Hosted Fields .......................... 13-17
13.4.1 Setting up Accounts ............................................. 13-17
13.4.2 Setting up HOA .................................................... 13-18
13.4.3 Setting Up Hosted Fields ...................................... 13-21
   Example: Initializing Hosted Fields .............................. 13-22
13.4.4 Hosted Fields options .......................................... 13-24
13.4.5 Setting Up Custom Fields ...................................... 13-28
   Custom Validation .................................................. 13-28
13.4.6 Understanding onVindiciaFieldEvent ......................... 13-29
13.4.7 Using Hosted Fields with Ajax onSubmitCompleteEvent 13-30
13.4.8 onSubmitEvent: Merchant Form Validation ................. 13-31
15.4.6 Event Class: Adjustments .............................. 15-8
15.4.7 Event Class: Invoices ................................. 15-8

Chapter 16 Common ChargeGuard Programming Tasks ....... 16-1
16.1 Integrating Data into ChargeGuard .......................... 16-2
16.2 Integration of Chargeback Data Back into Your System ...... 16-3
  16.2.1 Use Payment Processor Data to Alter Account Status ... 16-3
  16.2.2 Use CashBox Data to Alter Account Status .................. 16-3
  16.2.3 Use the CashBox API to Update Account Status. ............ 16-4
16.3 Data Reporting to Vindicia .................................. 16-5
  16.3.1 Initial Load of Historic Data ............................ 16-5
  16.3.2 Key ChargeGuard Objects .............................. 16-6
  16.3.3 Reporting Transaction Data to Vindicia ..................... 16-7
    Reporting Real-Time Transactions for Fraud Screening .......... 16-7
    Reporting Activity Information ............................. 16-9
    Reporting Refund Information ............................... 16-11
16.4 Retrieving Chargeback Updates ............................... 16-12

Chapter 17 Working with Name-Value Pairs ......................... 17-1

Appendix A Custom Billing Statement Identifier Requirements . A-1
  A.1 Billing Statement Identifier .............................. A-2
  A.2 MCC-Associated Merchant Name ............................. A-2
  A.3 Default Customer Service Phone Number .................... A-3
    Overriding the Default Customer Service Phone Number ....... A-3
  A.4 Billing Description ................................. A-4

Appendix B Handling “Tax Service Not Available” Scenarios ... B-1
CashBox® Programming Guide Preface

CashBox is an on-demand solution for recurring and one-time billing, available for integration with your application through an object-oriented application programming interface (API), based on the Simple Object Application Protocol (SOAP). This manual, the CashBox Programming Guide, leads you through the process of integrating your application with the CashBox and ChargeGuard services offered by Vindicia.

Vindicia’s CashBox API allows you to both integrate with CashBox, and take advantage of Vindicia’s ChargeGuard protection services.
About CashBox

CashBox delivers an on-demand billing solution for both subscription and one-time payment offerings that maximizes online revenue through managed customer retention and extended customer life cycles. The CashBox API enables you to seamlessly integrate Vindicia’s services into your online applications.

CashBox Workflow

Using the CashBox API, you can create sophisticated and automatic billing services for your products, and pass credit-card, electronic-check, PayPal, and other payment method transactions to CashBox for processing. CashBox also ensures security and compliance with rules and regulations, and supports token or virtual-currency purchases, such as frequent flyer miles, usage minutes, and incentive points.

Relationship between the CashBox API and Merchant Website

API calls are automatically converted to Secure Sockets Layer (SSL)-based Simple Object Access Protocol (SOAP) calls to Vindicia’s servers for processing and record-keeping. CashBox returns the transaction results as SOAP calls, and translates the results into return values for processing in your application.
About ChargeGuard

Fraudulent chargebacks present a unique and different problem because they distract you from your core business, limit marketing initiatives, and drain your customer-service resources. For online merchants, systematically challenging friendly-fraud chargebacks (see www.vindicia.com/products/fraud_management/chargeback_management.html) is an important component for building online revenue. Often, credit-card networks end up protecting fraudsters as you lose revenue and incur higher transaction and operational costs.

True and Friendly Fraud Process

As a subset of CashBox, ChargeGuard delivers an overall approach to managing chargebacks by becoming your dispute agent in gaining recognition of legitimate transactions. In essence, ChargeGuard minimizes chargeback-related revenue loss by securely leveraging fraud risk screening capabilities to prevent chargebacks of completed transactions. If chargebacks occur, ChargeGuard help you to successfully dispute them.
Chargeback Dispute Process

Vindicia first assesses the information reported by your customer and by you. If the chargeback is legitimate, Vindicia leaves it as is. However, if it appears to be fraudulent, Vindicia disputes it on your behalf.

Gathering as much information as possible about the original transaction, the customer, and the customer’s previous and current use activity history, can make a significant difference in the success of chargeback challenges. ChargeGuard classifies, collects, and assembles four types of data: transaction data, customer usage data, chargeback data, and chargeback fighting status.

ChargeGuard Data Types

CashBox automatically sends transaction and customer use data to Vindicia. The CashBox API also allows you to retrieve chargebacks and their latest status from the Vindicia servers.
Fraud Risk Screening

The Vindicia fraud risk screening features are integrated into ChargeGuard and CashBox. Fraud risk screening analyzes and scores risk factors for online transactions in real time, so that you can process customer orders more efficiently with little or no manual intervention. Risk screening helps reduce fraud risk with minimal intervention from your organization, and minimizes false positives (incorrectly rejected valid transactions).

Vindicia's risk screening system has the added benefit of cross-referencing data across a worldwide network of merchants. When a user issues a chargeback or commits fraud at one of Vindicia’s merchant sites, that information feeds back into the risk screening system for all merchants. Because Vindicia’s risk screening solution is informed by a database of chargebacks processed across the Vindicia merchant network, the system becomes more predictive everyday in identifying potentially fraudulent transactions.

Fraud risk screening offers the following key features:

- **IP Geolocation control**, which enables you to pinpoint your customer's physical location, and removes some of the anonymity offered by the Internet. The locator can highlight, for example, the distance between the billing address and the location where the order was placed to help determine transaction risk, especially as it applies to specific countries.

- **Proxy detection**, which determines whether an IP address is an anonymous or open proxy. Both types of proxies are commonly used to mask the original IP address, thus bypassing IP geolocation controls.

- **Validation of Bank Identification Number (BIN)**, which checks the first six digits of the credit-card number for information on the issuing bank. This feature verifies whether the country of the billing address matches that of the issuing bank.

- **Analysis of email addresses**, which determines whether the customer's email address is from a free email provider, and if that email address has been associated with high-risk or fraudulent transactions.

- **Creation of true-probability profiles**, which validates the risk screen against the body of chargebacks that Vindicia processes across its database to help you determine whether to accept or reject the transaction.

- **A broad database that houses data on businesses that subscribe to the Vindicia service**, which enables them to indirectly collaborate and share non-personally identifiable information through Vindicia for mutual protection. This network effect significantly contributes to the detection of fraudulent orders and probable chargebacks.
1 CashBox Client Library Setup

The CashBox API is composed of objects accessed through a SOAP interface. Integrate with the Vindicia service by making SOAP calls supported by the objects. The CashBox client library allows you to send SOAP requests to Vindicia without writing code at the SOAP level, because the library wraps around the SOAP objects. Typically, each SOAP object directly translates into a corresponding language-specific object.

This chapter introduces the CashBox API objects and describes the procedure to configure the CashBox client library.
1.1 CashBox API

The following table lists and summarizes the CashBox API objects.

<table>
<thead>
<tr>
<th>CashBox API Object</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account</td>
<td>Encapsulates a customer account.</td>
</tr>
<tr>
<td>Activity</td>
<td>Records a nontransaction (nonpurchase) activity on your site.</td>
</tr>
<tr>
<td>Address</td>
<td>Records a customer's address.</td>
</tr>
<tr>
<td>AutoBill</td>
<td>Describes the terms of a customer’s relationship to a product or service and a Billing Plan.</td>
</tr>
<tr>
<td>BillingPlan</td>
<td>Describes a billing plan which defines how charges are made over time.</td>
</tr>
<tr>
<td>Campaign</td>
<td>Describes the parameters of a sales Campaign.</td>
</tr>
<tr>
<td>Chargeback</td>
<td>Details the chargeback information for a customer account. (Works in conjunction with ChargeGuard.)</td>
</tr>
<tr>
<td>Entitlement</td>
<td>Details the status of a customer’s current entitlement to your product or service.</td>
</tr>
<tr>
<td>GiftCard</td>
<td>Encapsulates details of a gift card redeemed or to be redeemed through CashBox.</td>
</tr>
<tr>
<td>NameValuePair</td>
<td>Referenced by several CashBox objects, the NameValuePair object is used to hold attributes not otherwise supported in the object.</td>
</tr>
<tr>
<td>PaymentMethod</td>
<td>Details a customer’s payment method, such as Credit Card, PayPal, or Direct Debit.</td>
</tr>
<tr>
<td>PaymentProvider</td>
<td>Serves as a wrapper to contain static information required by a payment provider for payment processing.</td>
</tr>
<tr>
<td>Product</td>
<td>Describes a product or service that you offer.</td>
</tr>
<tr>
<td>RatePlan</td>
<td>Defines the logic by which the pricing structure for Rated Products will be determined.</td>
</tr>
<tr>
<td>Refund</td>
<td>Describes a refund on a transaction or account.</td>
</tr>
<tr>
<td>SeasonSet</td>
<td>Defines a group of time intervals, which may be used with Billing Plans to define both Billing Cycles, and Entitlement grants.</td>
</tr>
<tr>
<td>Token</td>
<td>Describes a customer account’s non-currency balance, such as virtual currency, frequent flier miles, downloads, or storage space.</td>
</tr>
<tr>
<td>Transaction</td>
<td>Handles the transactions, generated through CashBox, that relate to a customer account. (With ChargeGuard integration, be certain to report transactions to Vindicia.)</td>
</tr>
<tr>
<td>WebSession</td>
<td>Tracks your Web order form’s submission activity in the context of the Hosted Order Automation (HOA) capacity.</td>
</tr>
</tbody>
</table>
The CashBox API Guide describes the objects in detail. These objects include data members, and methods that operate on the data members. Write to the CashBox API with PHP, Perl, Java, .NET with C#, or C++ by using the CashBox client libraries. You may also implement a native library for other environments with the CashBox Web Services Description Language (WSDL) files.

**Note**  
Because Vindicia supports multiple programming languages, the descriptions and examples of the CashBox objects, data members, and methods are in generic pseudo-code. Translate this pseudo-code to your programming language of choice.

1.2 Support for Development

Before using CashBox, collect your customer requests, package the data, send it to Vindicia through the CashBox API, and receive, store, and report the return data from CashBox for your needs, as appropriate. The API, a library or package for PHP, Visual Basic (VB), C++, Perl, Java, and .NET with C#, makes it simple and secure for you to hand off data to CashBox for processing.

Be sure to also read the CashBox Portal User’s Guide. Because most of the data created and processed by the CashBox API is displayed on the CashBox Portal, the Portal may be useful for debugging during your development process. The CashBox Portal also allows you to create most CashBox objects, and may be used in conjunction with the API throughout your deployment and maintenance cycle.

1.2.1 Installing and Configuring the CashBox Library

Vindicia provides libraries specific to several development environments. To build applications that employ CashBox, first set up the library files, as described in the following subsections.

**PHP**

The CashBox client library for PHP contains a ZIP file with several PHP files in the directory Vindicia/Soap. Two of those files, Vindicia.php and Const.php, are included in your source code.

The PHP client libraries have been reworked so that the various Vindicia object classes are now in a separate namespace. For example, what was previously called AutoBill is now called Vindicia\Soap\AutoBill.

The old-style PHP client libraries, which do not use the namespaces, are still available for SOAP versions through 20.0.0 at:

https://secure.vindicia.com/docs/client_library/

The new PHP client libraries, with the namespaces, are available from the same page—below the other PHP libraries, in a separate section. They are available only for SOAP versions 19.0.0 and 20.0.0. If you are interested in having libraries that use the
Vindicia\Soap namespace made for other SOAP versions, contact Vindicia Client Technical Support.

For any SOAP versions beyond release 20.0.0, we will only issue PHP libraries that use the Vindicia\Soap namespace.

**Install the PHP client library:**

1. Extract the zip archive, and install it into the proper location for operating system and PHP engine and distribution.

2. Type:
   ```
   require_once('Vindicia/Soap/Vindicia.php');
   require_once('Vindicia/Soap/const.php');
   ```

**Note:** You must add these `require_once` statements to every PHP source file which references the CashBox API in any way.

3. Double check that you have downloaded the correct version for your site, and that the extraction of the archive was completed successfully.

**Perl**

**Install the Perl client library on Mac OS X:**

1. Install the modules required by the Perl API client. Type:
   ```
   sudo perl -MCPAN -e 'install Crypt::SSLeay'
   sudo perl -MCPAN -e 'install SOAP::Lite'
   ```

2. Install the API client. Obtain a current copy and place it in a directory. Navigate to that directory in a terminal, and type:
   ```
   sudo perl Makefile.PL
   sudo make
   sudo make install
   ```

   The Perl client is now installed on your Mac. The default location is `/Library/Perl/perl-version`, with Vindicia.pm and all the other modules in the Vindicia directory.

3. During development, import the Perl module into your source files. Type:
   ```
   use Vindicia;
   use Vindicia::Soap::Vindicia;
   ```

**Configuring the Perl API Client**

The installation process above creates the file `/etc/vindicia_conf.xml`, a configuration file in XML format. Note that the path name assumes a Mac setup. Path names on Windows vary according to the configuration.
1. Edit the following fields in vindicia_conf.xml:
   - VIN_SOAP_Server: The server's host name. For example, the name of the Prodest development server is soap.prodtest.sj.vindicia.com.
   - VIN_SOAP_Version: The version of CashBox you will call, for example, 4.2.
   - VIN_Server: This value must be 0, which means that this is a Vindicia Perl client, not a server.
   - VIN_Client_Timeout_Usec: The client timeout in milliseconds. For example, for 250 seconds, set the value to 250000.

2. Create a temporary directory on your computer for the client, and then specify the directory’s full path as the value for the following fields:

<table>
<thead>
<tr>
<th>VIN_Base_Dir</th>
<th>VIN_Soap_Cache_Dir</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIN_Var_Dir</td>
<td>VIN_Client_Var_Dir</td>
</tr>
<tr>
<td>VIN_Tmp_Dir</td>
<td>VIN_Log_Cache</td>
</tr>
<tr>
<td>VIN_Lock_Dir</td>
<td></td>
</tr>
</tbody>
</table>

Specifying the First Parameter in Perl

Certain methods in Perl take a first parameter that is not specified in other languages, because the first parameter is the invoking object, such as in the `fetchCreditHistory` method. For example:

In PHP (and similarly in Java and C#):

```php
ab = AutoBillFactory::getObject();
ab->fetchCreditHistory($timestamp, $end_timestamp, $page, $page_size);
```

In Perl:

```perl
ab = Vindicia::Soap::AutoBill->new(...);
ab->fetchCreditHistory($ab, $timestamp, $end_timestamp, $page, $page_size);
```

In Perl, the first parameter is the `AutoBill` object, but in other languages it is provided using the invoking parameter. This is true with any method where the first parameter is an object of the class in question.

Java

The CashBox client library for Java is in the Java archive file `vindicia.jar`, which bundles the CashBox API and the underlying Apache Axis library for sending and receiving SOAP calls. The release contains two files: `vindicia_java_client_version.zip` and `vindicia_java_client_version.docs.zip`. 

© 2019 Vindicia, Inc. Table of Contents CashBox Client Library Setup 1 - 5
To set up the Java client library, unzip vindicia_java_client_version.zip and add vindicia.jar to your project's classpath. Then, import the Vindicia classes to your source file. For example, for CashBox 4.2:

```java
import com.vindicia.client.ClassName;
import com.vindicia.soap.v4.2.Vindicia.ClassName;
```

If you will be running the Vindicia Java client library on a machine which can access a URL (such as a SOAP end point) outside of your company's firewall only through a proxy server, please configure the Java client library to identify the proxy server as follows:

```java
System.setProperty("https.proxyHost", "web-proxy.mycompany.com");
// Use the address of your company's proxy server
System.setProperty("https.proxyPort", "8080");
// Use the HTTPS port supported by your proxy server
```

### Caution

Some class names in the packages are identical. The class in the com.vindicia.client package is usually a child of a class with an identical class name in the com.vindicia.soap.Vindicia package. Vindicia recommends that you import classes with fully qualified package names, and identify the types similarly in your Java code.

**.NET With C#**

The CashBox client library for .NET is in the DLL file Vindicia.dll, which bundles the CashBox API and the underlying SOAP stubs.

To set up the .NET client library, add a reference to the Vindicia.dll file in your project. Then, import the Vindicia namespace to your source file:

```csharp
using Vindicia;
```

### 1.2.2 Setting Up Authentication Parameters

The API calls that you make to the Vindicia servers use SOAP over SSL, which encrypts the data that travels between your servers and Vindicia’s, and renders the data tamper-proof en route. To ensure that the calls originate from a legitimate source, CashBox requires that each call include authentication. The Authentication object contains a SOAP user name and password, which are provided to you by Vindicia Client Services, and which vary between the production and test environments.

If you generate API calls directly through the CashBox WSDL files without using any client libraries, you must include the Authentication object in your calls to Vindicia. By using a Vindicia client library, however, you need not do so. The client library enables you to globally configure the authentication parameters (the SOAP user name and password), automatically construct the Authentication object, and pass it in with your calls. Some libraries, such as Java and PHP, also enable you to specify authentication parameters during the process of constructing a target object on which to make calls.
The following subsections describe how authentication parameters operate in the client libraries. The concepts are illustrated through the construction of the commonly used Transaction object.

**In Perl**

**Create a Transaction in a Perl program:**

Set your Vindicia user name and password variables:

```perl
$login = "MyVindiciaLogin";
$password = "MyVindiciaPassword";
```

Create a new Transaction:

```perl
my $tx = Vindicia::Soap::Transaction->
   new(auth_login => $login, auth_password => $password);
```

where `MyVindiciaLogin` and `MyVindiciaPassword` are the SOAP user name and password, respectively, assigned to you by Vindicia.

**In PHP**

In the PHP library, edit the Const.php file in the Vindicia/Soap directory to change the values of the global constants that contain the Vindicia SOAP login and password. Change the values of the following constants:

```php
define("VIN_SOAP_CLIENT_USER", "your username here");
define("VIN_SOAP_CLIENT_PASSWORD", "your password here");
```

Then, you can instantiate an object, such as `Transaction`, as follows:

```php
$txn = new Transaction();
```

**In Java**

**Create a Transaction in Java:**

```java
// Create a new transaction
String username = "MyVindiciaLogin";
String password = "MyVindiciaPassword";
com.vindicia.client.Transaction transaction =
   new com.vindicia.client.Transaction(username, password);
```

where `MyVindiciaLogin` and `MyVindiciaPassword` are the SOAP user name and password, respectively, assigned to you by Vindicia.

You may also globally set the SOAP user name and password for making CashBox API calls in the Java library. Define the constants in the `com.vindicia.client.ClientConstants` class as follows:
com.vindicia.client.ClientConstants.SOAP_LOGIN = "my_soap_user_name";
com.vindicia.client.ClientConstants.SOAP_PASSWORD = "my_soap_password";

If you set the SOAP user name and password globally, use object constructors that do not take those values as their parameters.

In VB

In VB, you must create an object and allocate space for it before sending the authentication information.

1. To create a new Transaction object, type:
   
   ```
   Create a new transaction
   Dim transaction As New VindiciaCOM.CTransaction()
   ```

2. After creating the Transaction, initialize your authentication data and call the SetAuthenticationInfo method for the Transaction object. Type:
   
   ```
   Dim username = "MyVindiciaLogin"
   Dim password = "MyVindiciaPassword"
   transaction.SetAuthenticationInfo(username, password)
   ```
   
   where MyVindiciaLogin and MyVindiciaPassword are the SOAP user name and password, respectively, assigned to you by Vindicia.

In C#

In C#, the Vindicia namespace includes an object called Environment, which enables you to set the SOAP endpoint server and authentication. For example:

```csharp
string login = "MyVindiciaLogin";
string password = "MyVindiciaPassword";

// This method allows you to change the server you connect to
Vindicia.Environment.SetEndpoint("soap.prodtest.sj.vindicia.com");

// This method allows you to set your auth info once
Vindicia.Environment.SetAuth(login, password);
```

where MyVindiciaLogin and MyVindiciaPassword are the SOAP user name and SOAP password, respectively, assigned to you by Vindicia.

### 1.2.3 Configuring the SOAP Timeout for Client Libraries

The method calls in your client library result in SOAP calls to the CashBox Web service hosted on Vindicia servers. You can configure the method calls to wait for a response from the server for no longer than a fixed, maximum amount of time. Each client library contains a global setting for the timeout value.
The optimal value of the timeout depends on the amount of data you are fetching from CashBox in a single call, and other factors, such as server load and network latencies. Calls that are not designed well often result in timeouts. For example, a single Transaction.fetchDeltaSince() call might fetch many results. To avoid data overload, set the paging parameters to page through the set when making the call. If you are experiencing frequent timeouts, examine the nature of the call you are making and determine if you can reduce the size of the result set returned by the call. If not, raise the timeout value for your client library.

In PHP

In the PHP library, edit the Const.php file in the Vindicia/Soap directory to change the value of the global constant VIN_SOAP_TIMEOUT. This value is in seconds and is set to 60 by default. To change the value, type:

```php
define("VIN_SOAP_TIMEOUT", "30");```

In Java

In Java, set the global SOAP timeout for CashBox API calls in the Java library. The setting is in the com.vindicia.client.ClientConstants class with a default value of 2,500 milliseconds. To change this value, type:

```java
com.vindicia.client.ClientConstants.DEFAULT_TIMEOUT = 6000;
// in millisecs```

In ASP, VB, and C++

The VindiciaCOM.dll file for ASP, VB, and C++ contains the VindiciaCOM object. That object supports the method SetTimeout(), for which you can specify the desired global SOAP timeout in milliseconds. The default is 2,500 milliseconds.

In C# 

in C#, set the SOAP timeout globally (in milliseconds) using the SetTimeout method to the Vindicia.Environment class. Local timeouts may be set individually, when you instantiate the object in the C# client.

```c#
Vindicia.Environment.SetTimeOut(30000);
// in millisecs```

1.2.4 Checking an Object Method’s Return Value

All CashBox object methods include a Return data structure which indicates the success or failure of the method call. Return can contain three data members: returnCode,
returnString, and soapid. For details, see The Return Object in the CashBox API Guide.

Note: The examples in this guide do not contain error-handling. Your production applications, especially those that involve financial transactions, should always include robust error-checking and handling.

For Java, the SOAP call’s Return object is represented by the com.vindicia.client.VindiciaReturn object in the Java CashBox client API.

For Java calls that are not expected to return a meaningful value (that is, if the call is expected to return a void value), the method usually returns a VindiciaReturn object instead of void. Examine the VindiciaReturn object for the returnCode, returnString, and soapid values.

For calls that are expected to return a meaningful value, the VindiciaReturn object can be a static member LAST_RETURN of the class of the object on which you made the call. For example, com.vindicia.client.AutoBill.fetchByEmail() returns an array of com.vindicia.client.AutoBill objects, that match the specified email address. If com.vindicia.client.AutoBill.fetchByEmail() does not return the expected values, check the VindiciaReturn object associated with the call. You can find the object in AutoBill.LAST_RETURN.

(The com.vindicia.client.AutoBill.cancel() call forms an exception to this rule, in that it returns a VindiciaReturn object.)

When a SOAP call returns multiple meaningful values (for example, AutoBill.update() returns the next billing amount, its currency, and the date in addition to the standard VindiciaReturn object), those values and the VindiciaReturn object are lumped into a single object that is returned by the corresponding Java method.

For instance, the com.vindicia.client.AutoBill.update() method returns a com.vindicia.client.AutoBillingReturn object, which lumps together all the return values of the underlying SOAP call.
1.2.5 Working with Sparse Response Descriptions

The Sparse Response Description (SRD) parameter enables the calling system to constrain a method call to return only components you specify. This gives you greater control over returned content, and improves response time within the Vindicia platform by reducing the processing needed for the call.

An SRD is a SOAP string (which must be a JSON object), in which you specify the elements you want returned.

The following example uses the `Transaction.fetchByAccount()` method, where `transactions` is the name of the returned data element.

```
{"transactions": [
  "VID", "merchantTransactionId", "amount", "currency", "timestamp",
  {"transactionItems": ["sku", "name", "price", "quantity", "taxType"]},
  "statusLog"
]}
```

With this SRD, any transaction object returned will contain just the `VID`, `merchantTransactionId`, `amount`, `currency`, and `timestamp`, and two complex sub-items: `transactionItems` and `statusLog`. The `transactionItems` will be limited to `sku`, `name`, `price`, `quantity`, and `taxType`, and `statusLog` will be complete.

Note that some fields are required, either practically or by the WSDL, and will be returned regardless of the SRD. A `Transaction` object, for example, will always return the `VID` and `merchantTransactionId`. A `TransactionItem` object will always return `name`, `price`, `quantity`, and `itemType`.

A null SRD element will return the complete response.

1.2.6 Setting UNIX Timestamps in VB

Many CashBox objects and methods require a timestamp. By default, VB uses a built-in Microsoft date technology that produces different timestamp data than the timestamp that CashBox expects. To generate a timestamp from a VB date, add a VB function to your CashBox application, as follows:

```
Function UnixDate (ByVal theDate)
    UnixDate = DateDiff("s", "01/01/1970 00:00:00", theDate)
End Function
```

To set a timestamp for a `TransactionDetail` object named `detail`:

```
Dim timestamp = UnixDate(Now())
detail.SetTimestamp(timestamp)
```
1.2.7 Date and Timestamp Format

When a parameter to a method is a date or a timestamp, Vindicia expects them in the standard ISO8601 format:

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Format</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>dates</td>
<td>YYYY-MM-DD</td>
<td>2010-10-23</td>
</tr>
<tr>
<td>timestamp</td>
<td>YYYY-MM-DDTHH:MM:SS(+</td>
<td>-)HH:MM</td>
</tr>
</tbody>
</table>

(Note the T between the date and the time.)

**Note:** If you omit the timezone offset, it will default to Pacific Time (-7:00 or -8:00).

1.2.8 Assigning Unique Identifiers for Objects

Most top-level objects must have unique identifiers. You can directly manipulate objects, such as *AutoBill* or *Account* objects. You can load the object, usually with a *fetchBy* method; and save it, usually with an *update* method. Most objects of this kind have two unique identifiers: one assigned by you and the other by Vindicia. The naming convention for the IDs that you assign is in the form of `merchantClassId`, for example, `merchantAccountId` correspond to the unique identifiers for the objects in your database, such as database IDs, email addresses, or invoice numbers, with which you track the items in question.

When you create an object in the CashBox database, Vindicia assigns the object a globally unique Vindicia identifier, called a VID, which you can access through the object's *VID* attribute. If you do not specify a VID when you call the *update()* method for an object, Vindicia generates a new VID or loads the existing one and returns it.

**Caution** Do *not* specify your own VID values when creating objects.

Vindicia best practices recommend that, when creating objects with *update()* calls, clients generate their own set of object identifiers to populate the corresponding `merchantClassId` values. Note that the use of the forward slash character (/) is not allowed in merchant-defined identifiers. See Merchant Identifiers for more information.

1.2.9 Merchant Identifiers

All CashBox Objects have a VID (a Vindicia Globally Unique Identifier), which is generated by the system, and a merchant-defined identifier, which is generated or provided by the merchant system. In the newly supported REST API, Merchant Identifiers containing the forward slash (/) character will no longer be allowed. You must remove any forward slash characters from your merchant identifiers before you can use the REST API. Meanwhile, you can continue to use the forward slash in SOAP versions prior to release 23.0.0, but you must eliminate all instances of the forward slash before you can upgrade. As policy going forward, the "/" character will be prohibited from use within any Merchant Identifiers, across API versions.
1.2.10 Ensuring the Correct Character Encoding

CashBox supports the UTF-8 encoded character set. When you construct CashBox objects, especially with data input by your customers (such as the data on a Web form), ensure that the strings are UTF-8 encoded.

Note: Most programming languages contain a built-in function that enables you to convert strings into UTF-8 encoded strings. In PHP, for example, that function is `utf8_encode()`.

1.3 Working with CashBox WSDL Files

If a CashBox API client library is not available for your programming language, you can integrate with CashBox by making SOAP calls directly to Vindicia’s Web services.

Because of the prevalence of Web services with SOAP as a protocol of choice for integration of disparate systems, most programming languages have built-in support for developing SOAP client-server code. A third-party plug-in or library might also be available for your language of choice. For example, Python programmers can build SOAP client-server code with the SOAPpy library. Programming a SOAP client in the language of your choice usually requires access to a Web Services Description Language (WSDL) file that describes the Web service for which you wish to create a client.

Vindicia Web services consist of a set of objects and the SOAP calls that they support (CashBox SOAP API), with the calls described in a set of WSDL files. These WSDL files support document-literal SOAP calls, as defined in the World Wide Web Consortium (W3C) standards. Each WSDL file corresponds to a logical object commonly used in billing solutions. Objects (complex types) shared across all WSDL files are defined in the `Vindicia.xsd` file that every WSDL file includes in its definition.

Each WSDL file describes a set of calls supported by the logical object. For example, the `Account.wsdl` file describes the calls with which you can perform activities on a customer account (an `Account` object) in CashBox. Make an `update` call to create or update an `Account` object; or a `fetchByMerchantAccountId()` call to retrieve an `Account` object by the unique ID assigned by you when you created the object.

Note: If you are using CashBox WSDL files to make SOAP calls, ensure that you are heeding the input parameter order specified in the `CashBox API Guide`.

Each WSDL file defines only one SOAP port bound to the object-specific interface (a set of methods). For example, `Transaction.wsdl` defines a port called `TransactionPort`, which supports only the SOAP calls that relate to the `Transaction` object.
The ports defined in each of the WSDL files are associated with the same SOAP address (endpoint). That address is a script on Vindicia servers that receives all SOAP calls and routes them to object-specific code for further processing, depending on which objects the calls are for. For example, for CashBox 4.2:

```
<service name="Transaction">
  <port binding="tns:TransactionBinding" name="TransactionPort">
    soap:address
    location="https://soap.vindicia.com/v4.2/soap.pl" />
  </port>
</service>
```

Each WSDL file imports the Vindicia.xsd schema file, which defines the data structure of all top-level and helper objects. Your client code must be able to access this schema file.

1.3.1 Specifying the SOAP Address

By default, the SOAP address points to Vindicia’s production servers. Before going live with CashBox, test your integration code in a Vindicia sandbox server. If your language-specific implementation of a SOAP client does not override the SOAP address specified by the WSDL file, you can download the WSDL files from Vindicia, save them locally, and update the SOAP address to reflect the sandbox and CashBox SOAP API version you will use.

For example, if you are working with CashBox SOAP API version 4.2 and want to call in to CashBox on Vindicia’s Prodtest sandbox, update the service attribute in your local WSDL file as follows:

```
<service name="Transaction">
  <port binding="tns:TransactionBinding" name="TransactionPort">
    soap:address
    location="https://soap.prodtest.sj.vindicia.com/v4.2/soap.pl" />
  </port>
</service>
```

1.3.2 Performing the Prerequisite Steps

Before developing client code with the CashBox WSDL files:

1. Download the WSDL files and the schema file from the Vindicia servers.

| Note | Depending on your integration needs, you might not need all the WSDL files. Feel free to consult with Vindicia Client Services to decide which ones you need. See the CashBox API Guide for the objects and the methods supported by the WSDL files. |

For CashBox API production releases, download from the following sites:

- **WSDL file:** https://soap.vindicia.com/version/object.wsdl, for example, https://soap.vindicia.com/4.2/PaymentMethod.wsdl
- **Schema file:** https://soap.vindicia.com/version/Vindicia.xsd
1.4 Tips for Developing SOAP Clients

Remember:

- In most SOAP libraries, you can set a timeout value for the SOAP calls that you make from the client to the server. Ensure that the value is globally configurable. You may wish to change the value to fine-tune it, depending on the amount of data you will be sending or receiving from the Vindicia servers.

- Every SOAP call you make to CashBox requires that you pass an `Authentication` object, which contains the SOAP login and password assigned to you by Vindicia. Make those credentials globally configurable. When you switch to production, you must log in with credentials that differ from those used in testing against Vindicia’s sandboxes.

- You might also want to make the Vindicia server, to which your client code points globally, configurable. This can simplify the process of switching from testing to production.

- Log all calls made with the CashBox client library. At a minimum, log the following:
  - Timestamps
  - Classes and methods
  - The Vindicia `Return` data structure (all three fields)
  - SOAP envelopes that are sent to and received from Vindicia servers may be used to debug data-related errors. Most SOAP libraries allow you to add an option to log these envelopes.
2 Working with Accounts

The **Account** in CashBox represents your customer, and contains all the data necessary to provide them services, communicate with them, and charge them for one-time or recurring purchases.

The Account object encapsulates the customer’s account data, including billing address, shipping address, preferred payment method, and contact preferences. Create an Account when a customer visits your online store and registers with you.

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See [Merchant Identifiers](#) for more information.

This chapter describes creating customer Accounts; creating Account Payment Methods; accessing existing Customer Accounts; and creating Account hierarchies.
2.1 Creating Customer Accounts

When a new customer visits your site to purchase a product or service, establish an account for that customer and store the related information in a database in your system. You can also create a record of customer information in CashBox to facilitate the financial transactions you later pass to CashBox for processing.

To establish a new customer account, create an Account object, populate it with data, and store that data in the CashBox database using the Account object's update method. Note that the authentication information resides in the Account object, and that you must add the Account object information as a first step in a new call.

```php
// Create a new Account object
$account = new Account();

// Provide basic account information: a Customer name, and
// a unique Customer ID
$account->setName('Somebody Q. Customer');
$account->setMerchantAccountId('IN9430-8421');

// To create address information, create an address object
$address = new Address();
$address->setAddr1('123 Main Street');
$address->setAddr2('Apt. 4');
$address->setCity('San Carlos');
$address->setDistrict('CA');
$address->setPostalCode('94070');
$address->setCountry('US');
$address->setPhone('123-456-7890');

// Associate the Address object with the account
$account->setShippingAddress($address);

// To set information about the customer's email contact info
$account->setEmailAddress('John.Doe@gmail.com');
$account->setEmailTypePreference('html');
$account->setWarnBeforeAutoBilling(true);

// Okay, basic information is entered, so save the account
$response = $account->update();

if($response['returnCode'] == 200) {
    // You can save the VID (Vindicia ID) for later use
    $returnedAccount = $response['data']->account;
    $accountVid = $returnedAccount->getVID();
}
```

When you create an Account object, CashBox assigns it a globally unique Vindicia identifier (VID). As the preceding example illustrates, your application can capture the VID for later use.

The Account object also includes a data member called merchantAccountId, which enables you to assign your own identifier for the account, such as a database login, user name, or email address. Be certain to specify a unique value for this field when creating an Account.

For more information, see Section 1: The Account Object in the CashBox API Guide.
2.2 Setting Up Account Payment Methods

The Account object can store multiple payment methods, defined by PaymentMethod objects. CashBox supports the following payment method types:

- **Merchant Recorded**: can be used to manually enter payments made by cash, check, or other payment method, and accepted from your customers outside the CashBox system.

- **Credit cards**: Credit cards can be used for standard purchases, including subscriptions.

- **Electronic Check Payment (ECP) through Automated Clearing House (ACH)**: ECP can be used for recurring or onetime transactions. You can also use ECP to pay your vendors or affiliates in real-time transactions.

- **European Direct Debit (EDD)**: This payment method is similar to ECP in the United States in that it is a direct debit from a banking account. (Einzugsermachtigungsverfahren (ELV), the German version of EDD, requires that a customer complete a mandate to authorize the merchant to debit the customer’s bank account, and is the primary payment method in use for online transactions in Germany.) CashBox supports EDD in Germany, Austria, and the Netherlands through Chase Paymentech as the payment processor.

- **United Kingdom Direct Debit (UK DD)**: This payment method is similar to EDD in that it is a direct debit from a bank account, and requires the customer to complete a mandate to authorize the merchant to debit the customer’s bank account. UK DD uses the British pound (GBP) currency.

- **Boleto Bancário**: This payment method, primarily used in Brazil, requires that the customer first provide you with a fiscal number. The payment processor then creates a payment slip with that number and other customer details. Finally, the customer presents the payment slip to the bank to complete the transaction.

For real-time transactions, the payment processor sends the merchant a URL to a website that provides instructions for payment processing, which the merchant must present to the customer. (The instructions usually involve having the customer print the instructions and a payment slip, and present them to their bank.) Your customer must complete the steps listed on the website before the transaction can proceed. When complete, the bank transfers the money to the payment processor, which captures the transaction and notifies CashBox. On the CashBox side, the transaction remains pending until the payment is captured or the transaction expires.

For recurring billing (a subscription, requiring an AutoBill object), the customer receives an email during every billing period in which a payment is due, which contains the URL to the website and payment processing instructions. The corresponding transaction is generated and processed by CashBox in coordination with the payment processor.

- **PayPal**: CashBox supports real-time transactions through PayPal Express Checkout. CashBox also supports PayPal reference transactions for AutoBill-based recurring billing through e-wallet, whereby PayPal maintains the customer’s payment information, such as the credit card number, checking account number, and bank routing number.
When making a purchase on your site, the customer is redirected to PayPal’s login page to complete the payment information then, after success or failure, redirected back to your site to continue the process. For recurring bills with reference transactions, the customer needs to visit the PayPal site only once at startup. The subsequent rebilling transactions require no action on the customer’s part.

- **Token:** This is a Vindicia-specific payment method that measures usage or metering, and enables you to support complex billing models that involve tracking token units in addition to fixed-price billing cycles. You define the units, such as minutes, downloads, incentive points, virtual currency, and storage. You also define token types, and manage your customers’ balances by granting or decrementing tokens with CashBox objects (Product, BillingPlan, and AutoBill) on the CashBox Portal or with the CashBox API.

The tokens that you grant a customer are associated with a customer account, each token type having a separate balance. For example, a customer account can have separate balances for downloads, storage, and logins, which are displayed as payment methods on the customer’s account page.

---

**Note:** CashBox support for payment methods varies from payment processor to payment processor. Contact Vindicia Client Services for more information.

- **External Token:** To support external tokens as a payment method, set the externalToken field of the PaymentMethod object to the token value and set Type to the payment method that is tokenized (for example, CreditCard). For supported processors, when an externalToken is specified, the underlying payment method type-specific object can be left without the identifier/account number (for example, for credit cards). Specify what is known, but Account Number, Expiration, and CVN are not needed.

**Define a Payment Method for an existing Account:**

```php
$paymentMethod1 = new PaymentMethod();
$paymentMethod1->setAccountHolderName("John Doe");

// To create billing address information, create an address object
$address = new Address();
$address->setAddr1('123 Main Street');
$address->setAddr2('Apt. 4');
$address->setCity('San Carlos');
$address->setDistrict('CA');
$address->setPostalCode('94070');
$address->setCountry('US');
$address->setPhone('123-456-7890');

$paymentMethod1->setBillingAddress($address);
// depending on the type specified below, you must populate the
// PaymentMethod object with correct sub-object (e.g. CreditCard)
// containing details of the payment method
$paymentMethod1->setType('CreditCard');
```
$card = new CreditCard();
$card->setAccount('4444222211113333');
$card->setExpirationDate('xxxxxx'); // Use YYYYMM format

$paymentMethod1->setCreditCard($card);

// Sort order specifies the position (preference)
// this payment method will occupy (have) in the list of
// payment methods associated with an account. When a payment
// method is not explicitly specified in an AutoBill object,
// the first payment method in the array that is active
// will be used to schedule a recurring billing transaction
$paymentMethod1->setSortOrder(1);
$paymentMethod1->setActive('true');

// Second payment method
$paymentMethod2 = new PaymentMethod();
$paymentMethod2->setAccountHolderName("John P Doe");
$paymentMethod2->setBillingAddress($address);
$paymentMethod2->setType('CreditCard');

$card2 = new CreditCard();
$card2->setAccount('5555444411112222');
$card2->setExpirationDate('xxxxxx'); // Use YYYYMM format for date

$paymentMethod2->setSortOrder(0);
$paymentMethod2->setActive('true');

// create a payment method array
$paymentMethods = array($paymentMethod1, $paymentMethod2);

// set the payment methods in the account and create the
// account using the update call
$account->setPaymentMethods($paymentMethods);
...


2.3 Accessing Existing Customer Accounts

After creating a customer account, it must be accessed each time the customer is involved in a transaction.

The following table lists the methods available to access the Account object.

Table 2-1 Access Methods for Account Object

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fetchByEmail</td>
<td>Returns the Account object with the specified email address.</td>
</tr>
<tr>
<td>fetchByMerchantAccountId</td>
<td>Returns the Account object with the specified merchantAccountId.</td>
</tr>
<tr>
<td>fetchByPaymentMethod</td>
<td>Returns all the Account objects with the specified payment method.</td>
</tr>
<tr>
<td>fetchByVid</td>
<td>Returns the Account object with the specified VID.</td>
</tr>
<tr>
<td>fetchByWebSessionVid</td>
<td>Returns the Account object with the specified WebSession VID.</td>
</tr>
<tr>
<td>fetchCreatedSince</td>
<td>Returns Account objects based on creation date.</td>
</tr>
</tbody>
</table>

The following example demonstrates all three methods. In production code, call only one method at a time.

```
$customerID = '1234-5678-9000';
$accountVid = 'MyCustomerVindiciaId'; // for illustration purposes only!

// Create an account object
$account = new Account();

// now load a customer account into the account object
// this example illustrates all three methods back-to-back
// but in your code you'll use only one of these methods at a time

$response = $account->fetchByMerchantAccountId($customerID);
$response = $account->fetchByVid($accountVid);
// fetchByEmail returns an array of accounts with matching email
// So in that case $response will contain an array
$response = $account->fetchByEmail('somebody@yahoo.com');

if($response['returnCode'] == 200) {
    print "ok\n"; # 200 is HTTP status code for success
}
```

The preceding example checks the return array's returnCode, which corresponds to a standard HTTP status code, to determine if the fetch is successful. A value of 200 indicates success, that is, the Account object that you created earlier now contains the customer record you would like to access.

For more information, see Section 1: The Account Object in the CashBox API Guide.
2.4 Creating Account Hierarchies

CashBox supports two-level account hierarchies for payment and reporting. You may define parent and children accounts. A parent can have multiple children, but a child may have only one parent, and a child may not be a parent to another account.

A parent can pay for its own AutoBills or one-time transactions, or for any of its children's AutoBills or one-time transactions, by including the parent's Payment Method on an AutoBill with the child's Account.

Children may have Payment Methods that differ from their Parent's, and can use either to pay for their AutoBills.

When two accounts are linked or unlinked (as parent and child), an email will be sent to both.

Create an Account hierarchy, by adding credit to the parent’s Account and transferring the credit to the child’s Account:

```php
// Create a new Account object for parent
$parent = new Account();

// Provide basic account information
$parent->setName('Somebody Q. Customer'); // Customer name
$parent->setMerchantAccountId('IN9430-8421'); // Unique customer id

// Create a new Account object for child
$child = new Account();
$child->setName('Somebody Q. Customer Jr.'); // Customer name
$child->setMerchantAccountId('IN9430-8421JR'); // Unique customer id

// Establish a parent->child relationship between $parent and $child
$childrenAdded = $parent->addChildren($parent, array($child))

//Grant credit to the parent
$curAmt = new CurrencyAmount;
$curAmt->setCurrency('USD');
$curAmt->setAmount(100.00);
$cr = new Credit();
$cr->setCurrencyAmounts(array($curAmt));

// Now make the SOAP API call to grant credit to the parent
$response = $parent->grantCredit($cr);
if ($response['returnCode'] == 200) {
    // Credit successfully granted to the account
    $updatedAcct = $response->['account'];
} else {
    // Error while granting credit to the account
    print $response['returnString'] . "\n";
}
```
// Define credits to be transferred from parent to child
$curTranAmt = new CurrencyAmount;
$curTranAmt->setCurrency('USD');
$curTranAmt->setAmount(12.34);

$crTran = new Credit();
$crTran->setCurrencyAmounts(array($curTranAmt));

// Transfer specified credits from parent to child account
$response = $parent->transferCredit($child, $crTran);
if ($response['returnCode'] == 200) {
    // Credit successfully granted to the account
} else {
    // Error while transferring credit between accounts
    print $response['returnString'] . "\n";
}

For more information on methods related to Account hierarchy, see Section 1: The Account Object in the CashBox API Guide.
2.5 Presenting the Reason for Credit (to the customer)

When you grant credit to Accounts and Autobills, the default CashBox behavior is to populate the Transaction Line Item Description (when that credit is later used by the customer) with an arbitrary fixed value, such as AutoBillCreditConversion.

While this might be sufficient in most cases, you can alternatively enable an option that allows you to populate the Transaction Line Item Description field with the text string you entered in the Reason field of the original credit grant—thus linking the credit grant with later consumption of that same credit. When using this option, however, bear in mind that the explanation you enter in the Reason field of the credit grant is potentially customer facing.

To enable this option (use_credit_reason_on_tx_item), contact Vindicia Client Technical Support. Once enabled, the text string you enter in the Reason field will present in the Transaction Line Item Description when your customer uses all or part of that credit.

If you later decide you don't want this functionality, Client Technical Support can disable it and your CashBox implementation will return to the default behavior.

The following example demonstrates how to grant credit to an Account using the Reason field.

```php
// to grant credit to an account
$acct = new Account();

// account id for an existing customer
$acct->setMerchantAccountId('jdoe101');

$tok = new Token();

// specify id of an existing token type.
// assumption here is that you have already created
// a Token object with this id
$tok->setMerchantTokenId('ANYTIME_PHONE_MINUTES_2010');

$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(100);

$cr = new Credit();
$cr->setTokenAmounts(array($tokAmt));
$cr->setReason("This is why I am granting credits");

// Now make the SOAP API call to grant credit to the acct
$response = $acct->grantCredit($cr);

if ($response['returnCode'] == 200) {
    // Credit successfully granted to the account
    $updatedAcct = $response['data']->account;
}
```
```php
$availableCredits = $updatedAcct->getCredit();
$availableTokens = $availableCredits->getTokenAmounts();

print "Available token credits: \n";
foreach($availableTokens as $tkAmt) {
    print "Token type: " . $tkAmt->getMerchantTokenId() . " ";
    print "Amount: " . $tkAmt->getAmount() . "\n";
}
else {
    // Error while granting credit to the account
    print $response['returnString'] . "\n";
}
```
3 Working with Products

Product objects encapsulate information on your products or services. The Product object contains product information, including the product's name, description, and price. It may be a specific piece of merchandise, a one-time event, a service, or a subscription.

Product objects may be pre-defined, for standard merchandise or subscription plans, or created on the fly, for specialty items, such as event tickets, or limited availability objects.

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.
3.1 Creating Products

Use `Product::update` to create a Product and populate it with data.

```php
// Create a new product
$product = new Product();

// Identify the product by your unique identifier, etc.
$product->setmerchantProductId('12345'); //SKU, Database ID, etc

// This becomes transaction line item description if the
// product is used for an autobill, so this must be set
// to some meaningful string
$product->setDescription('Online subscription with video access');

$product->setPreNotifyDays(7);
$product->setStatus('Active');
$product->setDefaultBillingPlan($billing_plan);
  //From a previous update or fetch
$product->merchantEntitlementIds[0] =
  (new MerchantEntitlementId
   id => 'Video Only',
   description => 'Video access'));

$response = $product->update(DuplicateBehavior::SucceedIgnore);

if($response['returnCode'] == 200) {
  print "ok\n";
  $prodVid = $product->getVID();
  // capture the product VID for later use
}
```

When you create a `Product` object, CashBox assigns it a globally unique Vindicia identifier (VID). As the preceding example illustrates, your application can capture the VID for later use.

The `Product` object also includes a data member called `merchantProductId`, which allows you to assign your own identifier, such as the stock-keeping unit (SKU), for the product. The `merchantProductId` must be unique for each `Product` object you define.

Like `BillingPlan` objects, `Product` objects are stable objects that are usually created at the start of a paid service by business analysts or people in business roles. The CashBox Portal allows you to create and manipulate `Product` objects through a user interface. See the `CashBox User Guide` for more information.

---

**Note**

Do not make changes to an active `Product` object once subscriptions are activated in the system (that is, once the related `Account`, `AutoBill`, and `BillingPlan` objects that reference a particular `Product` object are active). Create a new `Product` object instead.
The Product object supports several information-only attributes, such as `endOfLifeTimestamp` and `status`. These attributes may be used to sort or categorize your products.

Product objects can grant any number of token types. When a real-time or recurring transaction is made for a product that grants tokens, CashBox grants those tokens, and associates them with the Account object in question.

For more information, see Section 13: The Product Object in the CashBox API Guide. For information on how the Product object affects entitlements, see Section 7.1: Creating Entitlements.
3.2 Creating Bundled Products

Bundling Products allows you to offer special packages, in which multiple Products are included as a single item on the AutoBill. The price for a bundled Product is defined by the top-level Product, but this price may be overridden by the Billing Plan or AutoBill, if desired.

Create a bundled Product.

```php
$top_product = new Product();
$top_product->setMerchantProductId('top-1');
$top_product->update();

$bundled1 = new Product();
$bundled1->setMerchantProductId('sub-1');
$bundled1->update();

$bundled2 = new Product();
$bundled2->setMerchantProductId('sub-2');
$bundled2->update();

// of course, other attributes can be set on the above products
$top_product->bundledProducts(array($bundled1, $bundled2));

$response = $top_product->update();
if ($response['returnCode'] == 200) {
    $ret_prod = $response['data']->product;
    print "got product ", $ret_prod->merchantProductId(), "\n";
    $bundledProds = $ret_prod->bundledProducts();

    if ($bundledProds != null) {
        foreach ($bundledProds as $bp) {
            print $bp->merchantProductId(), " is bundled\n";
        }
    }
}
```

Note: The price for a Bundled Product is defined by the top-level Product. This allows you to create groups of Products that may be purchased for one set price.
3.3 Accessing Existing Products

After creating a `Product` object, access it each time a customer purchases or subscribes to it.

The following table shows the methods of access to the `Product` object.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fetchAll</td>
<td>Returns all the <code>Product</code> objects.</td>
</tr>
<tr>
<td>fetchByAccount</td>
<td>Returns one or more <code>Product</code> objects whose <code>Account</code> object matches the input.</td>
</tr>
<tr>
<td>fetchByMerchantEntitlementId</td>
<td>Returns all the <code>Product</code> objects whose entitlement ID assigned by you matches the input.</td>
</tr>
<tr>
<td>fetchByMerchantProductId</td>
<td>Returns an <code>Account</code> object with the specified merchantAccountId.</td>
</tr>
<tr>
<td>fetchByVid</td>
<td>Returns an <code>Account</code> object with the specified VID.</td>
</tr>
</tbody>
</table>

The following example calls two methods. In production, call only one method at a time.

```php
$sku = '12345';
$productVid = 'MyProductVindiciaId'; // for illustration purposes only!

// Create a product object
$product = new Product();

// now load an existing product into the Product object
// this example illustrates both methods back-to-back
// but in your code you'll use only one of these methods at a time
$response = $product->fetchByMerchantProductId($sku);
$response = $product->fetchByVid($productVid);

if($response['returnCode'] == 200) {
    print "ok\n"; # 200 is HTTP status code for success
}
```

The preceding example checks the return array's `returnCode` to determine if the fetch succeeded. A value of 200 indicates success; that is, the `Product` object created earlier now contains the product record you would like to access.

For more information, see Section 13: The Product Object in the CashBox API Guide.
4 Working with Billing Plans

Billing Plans define the rate and frequency of subscription charges by means of Billing Periods, which include the Billing Plan’s subset of cycles of varying frequency, duration, and price. For example, a Billing Plan might be made up of an initial Billing Period that bills your customer $29.95 on the 5th of each month for three months, and a second Billing Period, that bills your customer $199.95 on the 5th day of every 6th month (bills twice per year), indefinitely.

The BillingPlan object encapsulates all Billing Plan information, including the current status of the Billing Plan, the number of Billing Periods contained within it, and any Entitlements that might be associated directly with the Billing Plan.

Note: Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.
4.1 Creating Billing Plans

The BillingPlan object describes the amount and schedule for recurring charges. Product objects describe the products or services that you sell. Both objects can include a Price.

Note: An AutoBill object includes a BillingPlan, and an array of AutoBillItems. An AutoBillItem includes a Product, and the number of cycles the Product is to be included on the AutoBill.

For more information, see the AutoBillItem Subobject in the CashBox API Guide.

For example, a business that sells access to online magazines—which cover different topics and are supported by different websites, but offer a standard subscription plan—might want to create a single BillingPlan that offers a one-month free trial, followed by a recurring bill of US$19.95 or C$22.40 per year.

Note: Although multiple Billing Plans can be created dynamically, as shown in the following example, our best practice recommendation is to create stable BillingPlan objects that can be used when individual customers subscribe.

The CashBox Portal allows you to create and manipulate BillingPlan objects through a user interface. See the CashBox User Guide for details.

Create a Billing Plan with a one-month free trial, followed by a recurring bill of US$19.95 or C$22.40 per year:

```php
// Create a new BillingPlan
$bp = new BillingPlan();

$bp->setMerchantBillingPlanId('1MF1995Y');
$bp->setDescription('1 Free Month followed by $19.95(USD), $22.40(CAD) per year');
$bp->periods[0]=(new BillingPlanPeriod(
    type => 'Month',
    quantity => 1,
    cycles => 1, //Just once
    prices => [new BillingPlanPrices('amount' => 0, 'currency' => 'USD'),
               new BillingPlanPrices('amount' => 0, 'currency' => 'CAD')]);
$bp->periods[1]=(new BillingPlanPeriod(
    type => 'Year',
    quantity => 1,
    cycles => 0, //Repeat infinitely
```
The `BillingPlan` object supports several information-only attributes, such as `endOfLifeTimestamp` and `status`. These attributes can be used to sort or categorize your customers. For example, you can fetch all `BillingPlan` objects, and display only those objects for active customers, or for customers whose end-of-life time stamp has not yet passed.

For details on how the `BillingPlan` object affects entitlements, see Section 7.1: Creating Entitlements.

Billing Plans can also be used to grant Seasonal Entitlements, using the `SeasonSet` object. For example, Create a 4-installment seasonal Billing Plan for the next 3 summers. The initial purchase must result in 2 free weeks, but subsequent years should not include a free period. (This is controlled using "skipInitialFreeWhenRepeating."
Create a Billing Plan with an attached Season Set:

// To create this BillingPlan, you must first create the SeasonSet.

$ss = new SeasonSet;
$ss->merchantSeasonSetId("Summer");

$s2014 = new Season;
$s2014->description("Summer 2014");
$s2014->startDate("2014-05-15");
$s2014->endDate("2014-10-10");

$s2015 = new Season;
$s2015->description("Summer 2015");
$s2015->startDate("2015-05-12");
$s2015->endDate("2015-10-11");

$s2016 = new Season;
$s2016->description("Summer 2016");
$s2016->startDate("2016-05-19");
$s2016->endDate("2016-10-08");

$s2014->seasons([ $s2014, $s2015, $s2016 ]); $ss_factory->update($ss);

// Check the return code from update.

$bp = new BillingPlan;
$bp->merchantBillingPlanId("summer4installment");
$bp->description("Summer Installment Plan");
$bp->seasonSet($ss);
$bp->repeatEvery("1 Season");
$bp->timesToRun("unlimited");
$bp->skipInitialFreeWhenRepeating(1);

// Note that, although the code says to run this every 1 Season
// for an unlimited number of times, there are only 3 seasons
// in the SeasonSet. This is OK as long as you (later) add more seasons.
// (They must be added before the time we would bill for them;
// in this example they would have to be added by spring 2017.)

$bp_free = new BillingPlanPeriod;
$bp_free->free(1);
$bp_free->cycles(1);
$bp_free->quantity(2);
$bp_free->type("Week");

$bp_monthly = new BillingPlanPeriod;
$bp_monthly->free(0);
$bp_monthly->cycles(4);
$bp_monthly->quantity(1);
$bp_monthly->type("Month");

$bp->periods([ $bp_free, $bp_monthly ]); $bp_factory->update($bp);

// Check the return code from update.
4.1.1 Creating a Billing Plan with an early cancellation fee

You can create a billing plan that offers a special value but requires a minimum commitment, with an option to charge a fee if the customer cancels the subscription before the commitment is fulfilled. The commitment period is the number of billing cycles required before the customer can cancel the subscription free of charge. You can waive fees, prorate them or collect them in full.

When creating the BillingPlan, set the minimumCommitment to the number of billing cycles the customer must complete without incurring a cancellation fee, and set the cancelFees amount and currency type. Note however that since most subscriptions are paid at the beginning of each cycle, a three-month billing plan, starting on January 1 and canceled on March 3, will not trigger a penalty fee, as the payment for the third month of the commitment period will already have been paid on March 1.

**Note:** Beginning in release 25.0 you can no longer set the minimumCommitment in the AutoBill.

When canceling a subscription during the commitment period, set a cancelFeePolicy to specify whether to prorate the fee, or to refund the full amount or waive the fee altogether (the default). Be sure also to set disentitle to True to stop entitlements, and set settle to True to have CashBox calculate a settlement. And since the subscription is still within the commitment period, you must set force to True to have the penalty fee calculated as defined in the cancelFeePolicy field.

To have CashBox return just the calculated settlement amount, set amountOnly to True in AutoBill.settlementQuote. When set to false (the default), full Transaction and Refund settlement details are generated.

Create a Billing Plan with a minimum commitment

In the following example, a billing plan specifies two billing periods. One billing period is monthly with one cycle and is free; the other billing period is yearly and has 12 one-month cycles, two currencies, and is open ended (cycles => 0).

The subscription requires a minimum commitment of two cycles (the first free, the second billed), and comes with an early cancellation fee that will be applied if the subscription is canceled before the second payment is billed.

**Billing plan w/ early cancel fee:**

```php
// Create a new BillingPlan
$bp = new BillingPlan();
$bp->setMerchantBillingPlanId('1MF1995Y');
$bp->setDescription('1 Free Month followed by $19.95(USD), $22.40(CAD) per year');

$bp->periods[0]=
    new BillingPlanPeriod(
        type => 'Month',
        quantity => 1,
        cycles => 1, //Just once
```
prices => [ 
    new BillingPlanPrices(
        'amount' => 0,
        'currency' => 'USD'
    ),
    new BillingPlanPrices(
        'amount' => 0,
        'currency' => 'CAD'
    )
],

$bp->periods[1]= (new BillingPlanPeriod(
    type => 'Year',
    quantity => 1,
    cycles => 0, //Repeat infinitely
    prices => [
        new BillingPlanPrices(
            'amount' => 19.95,
            'currency' => 'USD'
        ),
        new BillingPlanPrices(
            'amount' => 22.40,
            'currency' => 'CAD'
        )
    ]
),

// Early Cancel Fee will be applicable for 2 billing cycles.  
// 1, the free month period  
// 2, the yearly period  
$bp->minimumCommitment(2);

$bp->cancelFees[0]= (new BillingPlanCancelFee(
    'amount' => 4.45,
    'currency' => 'CAN'
)),

$bp->cancelFees[1]= (new BillingPlanCancelFee(
    'amount' => 3.95,
    'currency' => 'USD'
)),

$bp->merchantEntitlementIds[0] = (new MerchantEntitlementId (id => 'Standard',
    description => 'Standard subscription access'));

$response = $bp->update();
if($response['returnCode'] == 200) {
    print "ok\n";
    $bpVid = $bp->getVID();
//capture the billing plan VID for later use
}
5 Working with AutoBills

The AutoBill enables you to manage a customer subscription to a Product. The AutoBill combines a customer Account, a Product, and a Billing Plan to describe the subscription. An AutoBill automates billing notifications and recurring billing over the life of the subscription by generating and submitting Transactions to payment processors.

The AutoBill object defines the relationship of a customer Account to a Product and a BillingPlan. It includes information on the currency to be used for payment processing, the date the AutoBill becomes active, the day on which billing is to occur, and whether automated billing notifications are sent.

| Note:                      | Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information. |
## 5.1 Creating AutoBills

The CashBox API makes it easy to set up recurring billing. You construct an `AutoBill` object and set its attributes to define the behavior of the recurring bill. An `AutoBill` contains three main components: the `Account`, `Product`, and `BillingPlan`.

CashBox automatically generates recurring transactions according to the definition in the `AutoBill` object, and processes them with your payment processor.

### Create a Product:

```php
$sku = '12345';

// Create a Product object:
$product = new Product();

$product->setMerchantProductId($sku);

// Describe (name) the product. This description will appear with the transaction item for each recurring bill.
$product->setDescription("Virtual world game");

// You can define entitlements on products and billing plans.
// Entitlements provided by a product will be available to all AutoBills using this product, no matter which Billing Plan they use.
$product->merchantEntitlementIds[0] =
    (new MerchantEntitlementId (
        id => 'VW Game',
        description => 'Game subscription'));

// Now create the product:
$response = $product->update(DuplicateBehavior::SucceedIgnore);

if($response['returnCode'] == 200) {
    print "ok\n";
}
Establish recurring billing and specify an initial commitment period

This example shows how to set up recurring billing with an initial commitment period, and discusses risk screening, and what to do in the event of a payment method authorization failure, and validating for future payment

Note that, as of release 25.0.0, you must set the `minimumCommitment` in the `BillingPlan`. See Creating a Billing Plan with an early cancellation fee for an example of setting a minimum commitment period with a penalty fee for canceling early.

```php
$autobill = new AutoBill();

// Subscribe an existing customer to an existing product with a
// default billing plan specified.
$autobill->setAccount($account);
$item = new AutoBillItem();
$item->setIndex(0);
$item->setProduct($product); // set the Product in the AutoBillItem
$autobill->setItems(array($item));

// Create a new BillingPlan.
$bp = new BillingPlan();

$bp->setMerchantBillingPlanId('1MF1995Y');
$bp->setDescription('Basic monthly billed subscription plan');

// The billing plan offers gold level access
$bp->merchantEntitlementIds[0] = (new MerchantEntitlementId (
    id => 'Gold',
    description => 'Games with gold level access'));

// ... Other billing plan definition code would go here

// Create a BillingPeriod object
$period = new BillingPlanPeriod();
// zero specifies an infinite number of rebilling periods
$period->count = 0;
// number of period types that comprise a single unit
$period->quantity = 1; // if you want to bill once per month
$period->type = 'Month';

// Associate the Billing Plan Period with the Billing Plan
$bp->periods[0] = $period;

// Now create the BillingPlan
$response = $bp->update();
if($response['return']->returnCode == 200) {
    print "ok\n";
}

// Set the BillingPlan for the AutoBill
$autobill->setBillingPlan($bp)
```
// If subscribed to the Vindicia risk screening service, you can
// specify the minimum chargeback probability (0-100)
// that you will tolerate. At creation time of the AutoBill,
// CashBox will generate and score a transaction with the
// payment method specified for the AutoBill and billing address
// on the account, and IP address on the AutoBill.
// If the risk score returned is less than the minimum
// chargeback probability specified here, the AutoBill will be
// created. Otherwise it will fail.
// The evaluated score and messages explaining the score
// are available in the return parameters 'score' and 'scoreCodes'

$minChargebackProbability = 50;

// The duplicate behavior parameter is not in use.
// Its value does not currently affect the behavior of the
// AutoBill->update() call. In general, remember that
// the update() call will update an existing object if an
// AutoBill object with VID or merchantAutoBillId in the
// input object already exists. If such an object does not
// already exist in the CashBox database, a new one will be created.
// The immediateAuthFailurePolicy instructs CashBox what to do
// in the event of an authorization failure.
// Choose one of the following options:
// doNotSaveAutoBill: (Default) deletes the AutoBill without saving it.
// putAutoBillInRetryCycle: Creates AutoBill and retries the authorization.
// putAutoBillInRetryCycleIfPaymentMethodIsValid (recommended)
// Creates AutoBill and retries if CashBox has evidence that authorization
// will succeed.

$immediateAuthFailurePolicy = 'putAutoBillInRetryCycleIfPaymentMethodIsValid';

// When creating an AutoBill, specify whether the
// payment method associated with the AutoBill should be validated.
// If set to true, this flag instructs CashBox to pre-auth
// the payment method. The type of validation and whether validation
// is performed depends on the payment method used.

$validateForFuturePaymentMethod = 'true';

// Call update to update or create the AutoBill in CashBox

$response = $autobill->update($immediateAuthFailurePolicy,
    $validateForFuturePaymentMethod, $minChargebackProbability);

if($response['returnCode'] == 200) {
    print "ok\n";
}
5.1.1 Creating an AutoBill with Multiple Products

CashBox allows you to include multiple line items on an AutoBill, which can include multiple recurring Products, and one-time, non-recurring, Charges.

---

**Note:** You can add Products and Charges to, or removed them from, the AutoBill at any time using the AutoBill.modify call. If you add or remove a product or charge in the middle of a billing cycle, you can set a flag to have CashBox determine the prorated amount to charge, or refund, based on the point in the billing cycle at which you made the change, and the billing date of the AutoBill.

---

You add Products to an AutoBill using the AutoBillItem object. An AutoBillItem includes a Product, the number of cycles the Product is to be included in on the AutoBill, and an amount (price).

In previous releases of CashBox, for products sold in multiples you had to add each product as a separate AutoBillItem. You can still do that. Alternatively, you can now use the Quantity field to indicate how many of that individual item are being purchased. For recurring items (pre-paid), the quantity value will be multiplied by the individual item product price to determine the total recurring charge. For license-based items (rated, pre-paid products), the quantity value will be used with the appropriate Rate Plan tier structure to determine the charge. For usage-based items (rated, post-paid products), do not use the quantity field.

For more information, see the AutoBillItem Subobject in the *CashBox API Guide*.

**Create an AutoBill with two products:**

```php
$autobill = new AutoBill();
$autobill->setMerchantAutoBillId('ab-1');

$product1 = new Product();
$product1->setMerchantProductId('prod-AAA');

$product2 = new Product();
$product2->setMerchantProductId('prod-BBB');

$item1 = new AutoBillItem();
$item1->setIndex(0);
$item1->setAmount(4.50);
$item1->setCurrency('USD');
$item1->setCycles(null);
$item1->setProduct($product1);

$item2 = new AutoBillItem();
$item2->setIndex(1);
$item2->setAmount(7.95);
$item2->setCurrency('USD');
$item2->setCycles(null);
$item2->setProduct($product1);

$autobill->setItems( [$item1, $item2] );
```
$autobill_factory = new AutoBill();
$response = $autobill_factory->update(
    $autobill, // $autobill is of type Vindicia::Soap::AutoBill
    'Fail',    // $duplicateBehavior is of type
               // Vindicia::Soap::DuplicateBehavior
    true, //$validatePaymentMethod is of type xsd:boolean
    100,       // $minChargebackProbability is of type xsd:int
    false,     // $ignoreAvsPolicy is of type xsd:boolean
    false,     // $ignoreCvnPolicy is of type xsd:boolean
    null,      // $campaignCode is of type xsd:string
    false,     // $dryrun is of type xsd:boolean
);

// check $response
$response = $autobill->addCharge(
    'prod-bac', // product Id for this charge 'fee for swapping tiles',
    null, // will get tax class from Product
    1.50,
    'USD',
    null, // not a token
    1    // just once
);

// check $response

5.1.2 Creating an AutoBill with Seasonal Billing

For AutoBills you wish to bill and entitle customers based on specific dates of the year rather than continually, create Seasonal Billing Plans. To create a Seasonal Billing Plan, first create a Season Set (Manage > Season Sets). Each Season Set is defined by its name, start date, and end date. Place that Season Set on a Billing Plan, and the AutoBill will bill and entitle according to the Season Set dates, and any additional configurations in the Billing Plan. These additional configurations include whether billing and entitlement starts at the Season start date or some days before.

Additionally, you can set up AutoBillItems to start when they are added to the AutoBill, or in a certain number of Seasons. For example, if you want to make a midseason offer that rolls into the next full season, add one AutoBillItem for the midseason product starting immediately, and add another AutoBillItem for the next full season offer, starting next season.

For details about setting up Seasonal Billing, contact Vindicia client services.

5.1.3 Creating or Modifying AutoBills with Pre-Authorization

CashBox provides the ability to separately pre-authorize a payment method, using Transaction.auth(), and then later pass the authorized transaction to AutoBill.update() or AutoBill.modify() for capture. This is useful if you have a workflow fulfillment process that you need to complete before the subscription is finalized, but you do not want to start fulfillment unless you can validate the customer’s ability to pay for the subscription. This feature enables you to verify and reserve full funds in advance,
then create or modify a subscription at some arbitrary later date without having to cancel the prior authorized or submit a new one. You simple perform a `Transaction.auth()` for an amount sufficient to cover the subscription, then, when you are ready to create or update the subscription, input the transaction ID of the auth. CashBox ensures that the authorized amount is equal to or greater than the immediate charge. If it is, that authorization is provided with the transaction capture request for the first AutoBill transaction, and no new auth is performed.

For `AutoBill.update()`, the flow is as follows, authorizing $30.00 for an AutoBill charge of $25.00:

```perl
#--update
$tx = Transaction->new()->auth( 30.00 );
$ab = AutoBill->new( 25.00 );
$ab->update( $tx );  #use the pre existing auth’d Tx to charge
```

For `AutoBill.modify()`, the flow is as follows, again authorizing $30.00 for an AutoBill charge of $25.00:

```perl
#--modify
$tx = Transaction->new()->auth( 30.00 );
$ab = AutoBill->new( 25.00 )->update();
$ab->modify( 30.00, $tx );  #use the pre existing auth’d Tx to charge, modify left with $5, authed_tx has $25 and can be used to charge.
```

### 5.1.4 Creating AutoBills with deferred start

CashBox allows you to create AutoBill subscriptions that start in the future. Such AutoBills are created with status: Pending Activation and can have a known or unknown start date. If you know the start date, set the `startTimestamp` field in `AutoBill.update()` to the date you want entitlement and billing to begin. If you do not know the exact date you want billing to begin, leave the `startTimestamp` field empty and set the `unknownStart` flag to True. In either case, you can also validate a credit card payment method at the time of creation by setting the `validateForFuturePayment` flag to True. These AutoBills will be created and validated with an auth and put in status: Pending Activation.

AutoBills with an unknown start date created in this way can be activated at any time by an `AutoBill.Activation()` call. 

```
$rc = $autobill->activate
```

This is the only method certified to start billing an AutoBill with an unknown start date. The method sets the `startTimestamp` to `today` and begins billing. If the AutoBill is not activated within two years it is automatically canceled. See Canceling AutoBills with unknown start date to cancel the AutoBill during the Pending Activation state.
5.1.5 Updating and Validating AutoBill Objects

To ensure that a customer has entered a valid Payment Method, before accepting it for use to pay AutoBills, turn on payment method validation by setting the `validateForFuturePayment` (AutoBill.update) or `validate` (PaymentMethod.update) flag to `true`.

- If the billing is scheduled for today, CashBox authorizes the full amount immediately. In the event of a failure, CashBox responds according to the `immediateAuthFailurePolicy`. The `immediateAuthFailurePolicy` options are as follows:
  - `doNotSaveAutoBill`: (Default) deletes the AutoBill without saving it.
  - `putAutoBillInRetryCycle`: Creates AutoBill and retries the authorization.
  - `putAutoBillInRetryCycleIfPaymentIsInvalid` (recommended)
- If the billing is scheduled for a future date, the `validateForFuturePayment` flag is then used to determine whether we should do a minimal authorization ($0/$1) immediately.

However, if you have already validated the payment method (for example, if you are importing and creating AutoBill objects from previously successful transactions, or if you have successfully performed a real-time transaction before creating the AutoBill object), consider turning validation off, to reduce the number of calls you make to the processor.

---

**Note:** (CVN is Vindicia’s generic term for credit-card security code, usually located on the back of the card. Some credit-card companies refer to it as the CVV, CVV2, CVC2, CCID, among other things.)

---

Validation generates and sends to the payment processor one of three types of transactions:

- **$0 Authorization:** Assuming that the payment processor supports $0 authorization, if the creation of an AutoBill object does not result in an immediate billing, as in the case of a free trial period, or if the AutoBill does not start immediately, CashBox creates a real-time validation with a zero amount, and sends it to the payment processor.

- **$1 Authorization:** If the payment processor does not support $0 authorization, and if the creation of an AutoBill object does not result in an immediate billing, or if the AutoBill object does not start immediately, CashBox creates a real-time transaction with a 1.00 amount and sets the currency to the customer’s currency (for example, US$1.00 if USD, or €1.00 if EUR is the currency associated with the Account object) and sends it to the payment processor. CashBox authorizes this transaction instantly with your payment processor, but does not mark the transaction for capture, so the customer is not charged for it.

- **Authorization for the full amount of the first billing cycle:** Using a configuration setting, you can enable CashBox to perform a real-time AuthCapture operation for the full amount of the initial billing cycle. This operation occurs only if the AutoBill object is set to start immediately, that is, it does not offer any initial free trial period or is not scheduled to start today. Instead of performing a validation (for $0 or $1) and then an AuthCapture operation for the full amount due later, CashBox simply performs AuthCapture, saving you the cost of the validation.

If payment authorization fails on the attempted validation method, CashBox may not create the AutoBill object (if that was the option to `immediateAuthFailurePolicy` you chose), in which case you might request a different payment from the customer.
CashBox also validates other payment methods, such as ECP, if they are supported by the payment processor. For example, with Chase Paymentech, CashBox validates ECP-based payment methods by running initial checks on the related bank routing numbers and account numbers. Part of this check verifies whether the routing number belongs to a known bank, and if the account number is blacklisted in the Chase Paymentech database.

For more information, see the TransactionStatus Subobject in the CashBox API Guide, and Section 4.1: AutoBill Data Members in the CashBox API Guide.

### 5.1.6 Verifying AVS and CVN for Recurring Billing

Using AVS (Address Verification System) verification requires that the PaymentMethod object that represents the credit card contain a billing address. Using CVN (Card Verification Number) verification requires that the PaymentMethod object contain the security code from the back of the card. Pass the security code from the credit-card owner to CashBox using a name–value pair on the PaymentMethod object. In this pair, set the name to CVN (the CashBox generic name for all security codes) and the value to the security code.

**Note** PCI regulations prohibit storing a credit card’s CVN security code beyond the limited time frame for verification. Do not store the CVN security code in your system. Vindicia retains it only for as long as it is needed for authorization, and then discards it.

Authorization data from your payment processor for the transaction is located in the transactionStatus field (see Section 18: The Transaction Object in the CashBox API Guide, for more information) returned by the AutoBill.update() call. Ensure that your code examines this field.

- If the credit card is approved, the TransactionStatus object’s status attribute is set to Authorized; if not, it is set to Cancelled.
- CashBox interprets the AVS response code from your payment processor, which can vary from processor to processor, and sets vinAVS to one of the values specified in the AVSMatchType enumeration (see the AVSMatchType Subobject in the CashBox API Guide).

The values of AVS response codes interpreted by CashBox from your payment processor are in simple English: Match, Partial Match, No Match, No Opinion, Not Supported, and Issuer Error. To retrieve the actual response code, look up the TransactionStatusCreditCard object inside the TransactionStatus object (creditCardStatus attribute). The CreditCardStatus object contains an attribute called avsCode, which contains the return code received from your payment processor.

- The values of CVN response codes interpreted by CashBox from your payment processor are in simple English: Match, Not Processed, Not Supported, Not Present, Invalid, and No Response. To examine the CVN response code, use the cvnCode attribute of the TransactionStatusCreditCard object inside the TransactionStatus object (creditCardStatus attribute). cvnCode contains the response from your payment processor for the security code you sent with the payment method.
Refer to the documentation from your payment processor for the translation of the return codes; they vary from processor to processor.

```php
// Create a payment method
$pymth = new PaymentMethod();
$pymth->setAccountHolderName("John Doe");

// To create billing address information, create an address object
$address = new Address();
$address->setAddr1('123 Main Street');
$address->setAddr2('Apt. 4');
$address->setCity('San Carlos');

// populate other address attributes here

// Billing address on payment method is required to
// implement address verification
$pymth->setBillingAddress($address);

$pymth->setType('CreditCard');

$card = new CreditCard();
$card->setAccount('4444222211113333');
$card->setExpirationDate('xxxxxx'); // Use YYYYMM format for date

$pymth->setCreditCard($card);

$nv = new NameValuePair();
$nv->setName("CVN");
$nv->setValue("123");

// this is the card security code provided by customer

// set the card security code inside the payment method
$pymth->setNameValues(array($nv));

$account = new Account();

// populate other account attributes here

$account->setPaymentMethods(array($pymth));

$avb = new AutoBill();
$avb->setAccount($account);

$minChargebackProbability = 50;
$immediateAuthFailurePolicy = 'doNotSaveAutoBill';
$validateForFuturePayment = true;
// Choose one of the following immediateAuthFailurePolicy options:
// doNotSaveAutoBill: (Default) deletes the AutoBill without saving it.
// putAutoBillInRetryCycle: Creates AutoBill and retries the authorization.
// putAutoBillInRetryCycleIfPaymentMethodIsValid (recommended)

// Now call update to create the autobill on CashBox servers
$response = $avb->update($immediateAuthFailurePolicy, $validateForFuturePayment, $minChargebackProbability);
```
 CashBox 25.0.0: Programming Guide

5.2 Modifying AutoBills

`AutoBill.modify` may be used to edit, add, remove, or exchange a Product on the existing AutoBill, or to replace the existing Billing Plan with a new Billing Plan.

`AutoBill.modify` is designed to:

- Work with AutoBills that have any number of AutoBill Items.
- Allow the addition, removal or replacement of any AutoBill Items, in a single call.
- Work with Campaigns.
- Retain historic AutoBill data (such as payment history and Product choice evolution) while making changes to existing AutoBills.
- Generate a prorated net charge or refund for the combined modification activity. This charge or refund will appear through the API and GUI with other Transactions from this AutoBill.
- Modify the quantity with or without proration—if, in the middle of a billing cycle you change the quantity of an item, you can choose whether or not to prorate.
- Keep the AutoBill in its original state if any aspect of the call, including the modification charge or refund, fails.

---

**Note:** AutoBills containing Rated Products may not be modified.
The `AutoBill.modify` call allows you to change the existing Products or Billing Plan for an AutoBill, without losing the history of the subscription.

Do not use the `AutoBill.modify` call to change anything other than the Products or Billing Plan for an AutoBill.

### 5.2.1 Prorating Modification-Based Price Changes

When making the `modify` call, you must specify an effective date, which can be the next billing date, or the current date. If you elect to set the `billProratedPeriod` input variable to `true`, CashBox will calculate any prorated charges or refunds as of the effective date. (The net charge or refund is calculated based on the difference between your customer’s current AutoBill charge, and the modified AutoBill’s charge, as of the effective date.)

If you want the change to take effect immediately, specify an effective date of `TODAY`, and issue a pro-rated charge for the partial Billing Period that your customer will have entitlement to the new Products.

For example, if a customer is billed on the first of every month, and on the 7th day of a 30-day month the customer changes from a $10/month product to a $15/month product, the month’s charges will be calculated as follows:

\[
\text{(new plan cost} - \text{old plan cost)} \times \frac{\text{number of days on new plan}}{\text{number of days in period}} = \frac{\$15 - \$10}{24} \times \frac{24}{30} = \$4
\]

| Note: | AutoBills containing license based rated products can be changed at any time, with the same proration options as rated products. |

$4$ is the cost of the change today, and will be charged to the customer immediately. (Set the `billProratedPeriod` flag of the `AutoBill.modify` method to `false` to skip this charge, if desired). If you are performing a downgrade, the cost will be negative, and will be immediately refunded.

The customer’s next bill would then be on the first of the next month for $15.

Using the `AutoBill.modify` call to change the customer’s Billing Plan will always reset the billing date to `today`. Any surcharges or refunds will be calculated appropriately.

| Note: | Use the `dryrun` input parameter for the `AutoBill.modify` call to return any charges or credits that would be levied as a result of the change, without modifying the AutoBill. This allows you to show your customers a preview of changes to their subscription, without saving the change. |

### 5.2.2 Changing Products for an AutoBill

The following example demonstrates how to use the `AutoBill.modify` call to change Products on an AutoBill, replacing an existing Product with a new Product, to which a Campaign discount has been applied.
$abill = new AutoBill();
$abill->setMerchantAutoBillId('vin_test_abill1391561675069');
   // This is ID of the AutoBill you want to modify.

$productRemoved = new Product();  // Product we want to remove.
$productRemoved->setMerchantProductIds('regular-avataxed-product');
   // Identify the Product by its ID. There is no need to fetch it.

$itemRemoved = new AutoBillItem();
$itemRemoved->setProduct($productRemoved);

$productAdded = new Product(); // Product we want to add.
$productAdded->setMerchantProductIds('avataxed-ott-product');
   // Identify the Product by its ID. There is no need to fetch it.

$itemAdded = new AutoBillItem();
$itemAdded->setProduct($productAdded);
$itemAdded->setMerchantAutoBillItemIds('item-987654');  // Unique item ID.
$itemAdded->setCampaignCode('OTT');
   // To apply a promo to the Product being added.

$modification = new AutoBillItemModification();
$modification->setRemoveAutoBillItem($itemRemoved);
$modification->setAddAutoBillItem($itemAdded);

$modifications = [ $modification ];

$abmr = $abill->modify(
   true,  // bill prorated period
   'today', // make the change effective today
   null,    // not changing the billing plan
   $modifications,
   false    // no dry run
);

if ($abmr->getReturnCode == 200) {  
   // We got a 200 response code back
   // The modification may result a net refund or net charge
   // to the customer.
   $refunds = $abmr->getRefunds();
   $tx = $abmr->getTransaction();
   if ($refunds != null && $refunds->length > 0 ) {
      // Modification resulted into net refund
      // In most cases there should be only one refund
      $the_refund = $refunds[0];
      print('Total refund amount due to modification: ' .
         $the_refund->getAmount() .
         '. See break down below: ');

      // To give the customer a break down of how we reached
      // the refund amount, we must parse the $0 transaction
      // that accompanies this.
      if ($tx != null ) {
         printTxDetails($tx);
      }
   } else {
Changing the Billing Plan for an AutoBill

The following example demonstrates how to use the AutoBill.modify call to change the Billing Plan on an AutoBill, replacing the existing with a new Billing Plan.

Note that changing the Billing Plan for an AutoBill does not cancel or recalculate the minimum commitment period set on the AutoBill.

```php
$abill = new AutoBill();
$abill->setMerchantAutoBillId('TEST-AB-2');
    // this is ID of the AutoBill you want to modify

$newBp = new BillingPlan();
$newBp->setMerchantBillingPlanId('monthly');
    // The ID of the Billing Plan you want change the AutoBill to.

$abmr = $abill->modify(
    true,    // bill prorated period
    'today', // make the change effective immediately
    $newBp,  // changing the billing plan
    null,    // no product modifications
    false    // no dry run
);

if ($abmr->getReturnCode() == 200) {
    // We got a 200 response code back
    // The modification may result a net refund or net charge to the customer
    $refunds = $abmr->getRefunds();
    $tx = $abmr->getTransaction();
    if ($refunds != null and $refunds->length > 0 ) {
        // Modification resulted in a net refund.
        // In most cases there should be only one refund.
        $the_refund = $refunds[0];
        print('Total refund amount due to modification: ' .
            $the_refund->getAmount() . '.
            ' .
            $the_refund->getAmount() . '.
            See break down below: ');
    
    // To give the customer a break down of how we reached the refund
    // amount, we must parse the $0 transaction that accompanies this.
    if ($tx != null ) {
        printTxDetails($tx);
    }
}
else {
    // Refund is null, so there must be net cost to the customer
    if ($tx != null ) {
        print('Total charge processed during modification: $' .
            $tx->getAmount() . '.
            ' .
            $tx->getAmount() . '.
            See break down below: ');
        printTxDetails($tx);
    }
}
```

5.2.3 Changing the Billing Plan for an AutoBill
5.2.4 Changing both Products and Billing Plan in a Single Call

The following example demonstrates how to use the `AutoBill.modify` call to change both the Products and the Billing Plan for an AutoBill simultaneously.

```php
$abill = new AutoBill();
$abill->setMerchantAutoBillId('vin_test_abill1391560836975');
    // This is ID of the AutoBill you want to modify.

$productRemoved = new Product();  // Product we want to remove.
$productRemoved->setMerchantProductId('monthlySub');
    // Simply identify the Product by its ID. No need to fetch it.

$itemRemoved = new AutoBillItem();
$itemRemoved->setProduct($productRemoved);

$productAdded = new Product(); // Product we want to add
$productAdded->setMerchantProductId('AnnualSubProduct');
    // Simply identify the Product by its ID. No need to fetch it.

$itemAdded = new AutoBillItem();
$itemAdded->setProduct($productAdded);
$itemAdded->setMerchantAutoBillItemId('item-425304');  // Unique item ID.
$itemAdded->setCampaignCode('ANNUALPROMO');
    // To apply a Promo to the Product being added.

$modification = new AutoBillItemModification();
$modification->setRemoveAutoBillItem($itemRemoved);
$modification->setAddAutoBillItem($itemAdded);

    // We want to change to the annual plan.

$newPlan = new BillingPlan();
$newPlan->setMerchantBillingPlanId('annual-plan-2');

$modifications = [ $modification ];

$abmr = abill.modify(
    true,  // Bill prorated period.
    'today', // Make the change effective today.
    $newPlan, // Not changing the Billing Plan.
    $modifications,
    false  // No dry run.
);```
if ($abmr->getReturnCode() == 200) {
    // We got a 200 response code back.
    // The modification may result in a net refund or
    // net charge to the customer.
    $refunds = $abmr->getRefunds();
    $tx = $abmr->getTransaction();
    if ($refunds != null && $refunds->length > 0) {
        // Modification resulted into net refund
        // In most cases there should be only one refund
        $the_refund = $refunds[0];
        print('Total refund amount due to modification: ');
        . refunds[0]->getAmount();
        . ' . See break down below: ');
        if ($tx != null) {
            printTxDetails($tx);
        }
    } else {
        // Refund is null, so there must be net cost to the customer.
        if ($tx != null) {
            print('Total charge processed during modification: $');
            . $tx->getAmount();
            . ' - see break down below');
            printTxDetails($tx);
        }
    }
}

5.2.5 Viewing AutoBill Changes

You can use the fetchBillingItemHistory method to view all changes to an
AutoBill, including the date and time the changes took effect, and the AutoBill as it
appears after the changes were made. fetchBillingItemHistory returns changes to
the AutoBill Billing Plan as well as to AutoBill Items.

The following Perl code example demonstrates how to use the
fetchBillingItemHistory method to view changes to an AutoBill. (For sample code in
other programming languages, contact Vindicia Client Services.)

#!/usr/bin/perl
use strict;
use Vindicia::Conf client => 1;
use Vindicia::Soap version => '10.0';
use Vindicia::Soap::Vindicia;
my %login_params = (auth_login => 'soap_username', auth_password =>
'soap_password');
my $autobill_soap_factory = Vindicia::Soap::AutoBill->new(%login_params);
foreach my $arg (@ARGV) {
    my $autobill = Vindicia::Soap::AutoBill->new(VID => $arg);
    my $rc = $autobill_soap_factory->fetchBillingItemHistory($autobill);
if ($rc->{return}->{returnCode} == 200) {
    my $history_log = $rc->{autoBillItemHistory};
    for (my $j = 0; $j < scalar(@$history_log); $j++) {
        my $history_item = $history_log->[$j];
        print STDOUT join(qq{	},
        $history_item->actionDate,
        $history_item->action,
        $history_item->autoBillItem->merchantAutoBillItemId,
        (q{effective } . $history_item->effectiveDate),
        ),
        qq{
        });
    }
    else {
        print STDOUT qq{AutoBill:
        \:fetchBillingItemHistory for AutoBill with ID $arg failed.\n};
    }
}

5.2.6 Continuous Billing during Retry Period

For subscriptions (AutoBills) with a Merchant Accepted Payment (MAP) payment method, you can continue generating invoices and accruing balance throughout the retry period. Unless restricted by InvoiceLifeCycle Decision Rules, invoices can be generated and posted according to the schedule regardless of the payment status of prior invoices.

Continuous Billing during Retry is also available, as a global configuration option, for non MAP payment methods on AutoBills. When enabled, at the scheduled billing date the new invoice will be posted and the associated balance will accrue against the subscription’s Accounts Receivable balance according to the schedule, regardless of the payment collection status of prior invoices. Each scheduled billing will pursue retry using the existing capabilities, but CashBox will ensure that the oldest unpaid invoice is always pursued first—preventing a situation where a later period is paid and entitled with an earlier period still in question.

To take full advantage of this feature, the grace period should be greater than the billing cycle. For example, if the billing cycle is monthly, set the grace period to two months, or to however months you want. If the grace period is not longer than the billing cycle, this option will have no meaningful effect.

Use this option only after careful consideration. For more information, and to enable this global configuration option, contact Vindicia Client Support.

The behavior of invoice-paid (MAP) AutoBills is not affected by enabling this option for non MAP payment methods.
If you later decide to disable this option, prior (default) behavior will resume—for non-MAP paid AutoBills, future invoices will not be generated or leave the Open status until the unpaid prior invoice is settled.

5.2.7 Advance and Arrears Billing Option for AutoBills

CashBox provides the ability to specify a regular billing in advance of, or after, the scheduled Service Period start date. This feature allows you to maintain the service dates according to the Billing Plan, but to bill for those periods on days of the month that are more compatible with your internal billing or accounting cycles.

The `AutoBill.update()` and `AutoBill.migrate()` SOAP API methods (in releases 19.0 and higher) support this feature with two Data Members that govern this behavior for individual AutoBills:

- **specifiedBillingDay**: an integer (1-31) specifying the day of the month on which to bill (values 29-31 automatically work as the last day of the month for calendar months that do not have 29, 30, or 31 days). Providing no value or null in this parameter instructs CashBox to bill on the service period start date (the default).
- **billingRule**: an enumerated string value (Advance or Arrears), informing CashBox in which direction from the scheduled billing date to select the specified billing date. If no specified_billing_day is provided, this parameter is ignored.

If, on June 1, 2016, you created a new subscription (AutoBill) with a `startTimestamp` of 2016-06-01, on a monthly billing plan, CashBox would create a subscription that bills on the first of each month. If you wanted instead to bill in advance for this subscription on the 25th of each month, you would create it as shown in the following example.

```php
// bill on the 25th of each month for a service that started on the first of the month
$specified_billing_day = 25;
$billingRule = 'Advance';
$autobill->specifiedBillingDay($specified_billing_day);
$autobill->billingOffset($billingOffset);
```

This would cause CashBox to bill immediately for the June service period—to bring it up to date—and to bill again on June 25th for the July service period. The Service Period for July and all subsequent months of the subscription would run from the 1st to the 31st, or to the end of the month for months with fewer than 31 days.

Billing and Retry schedules are governed by the specified_billing_day. Service Periods, Entitlement and the grace period are all calculated based on the Service Period dates. You establish these parameters at creation, using `autobill.update()`, and can modify them later, also using `autobill.update()`—you cannot change them using `autobill.modify()`. 
5.3 Canceling AutoBills

To stop recurring billing, you cancel the corresponding AutoBill object. You can do this by retrieving the object and calling `cancel` on it, as shown in this example.

```bash
$rc = $autobill->cancel($autobill, $disentitleFlag, $forceFlag, $settleFlag, $sendCancelNoticeFlag);
```

Alternately, you can stop all auto billing on the account.

```bash
$rc = $account->stopAutoBilling($account, undef, $disentitleFlag, $forceFlag);
```

Both methods allow you to select whether to disentitle the customer immediately, or allow entitlements to continue to the end of the billing period. See the `AutoBill.cancel` and `Account.stopAutoBilling` methods in the CashBox API Reference Guide for details.

When you make these calls, CashBox notifies the customer of the cancellation. For a discussion of billing, see Section 9.2: Working with Billing Events.

Also, CashBox allows you to automatically cancel an AutoBill when a customer charges back an AutoBill transaction. To take advantage of this feature, contact Vindicia Client Services.

5.3.1 Canceling AutoBills with Reason Codes

CashBox provides a mechanism to store and track the reason an AutoBill is put into a final or terminal state. Cancel reasons are codes mapped to text descriptions. You can apply one code to each AutoBill. CashBox supports three kinds of cancel reasons:

- **CashBox Reserved Codes**—codes (0 through 99)—currently only 0 through 5 are used—predefined by Vindicia and used by CashBox to cancel or terminate a subscription
- **Predefined Merchant Codes**—commonly used codes (100 through 999)—currently only 100 through 107 are used—predefined by Vindicia that you can apply to AutoBills you cancel
- **Custom-Defined Merchant Codes**—codes (1000 and above) that you can define and submit in advance, and use when you cancel AutoBills. Custom cancel reason codes you define can be an alphanumeric string of up to 16 characters—for example: 1001 or N500 or End_Refund. The description can be a string of up to 255 characters.

The following table lists CashBox Reserved Codes, Predefined Merchant Codes, and the numerical ranges reserved by Vindicia for future use, and for Custom-Defined Merchant Codes you create.

<table>
<thead>
<tr>
<th>ReasonCode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Vindicia: Administrative Action.</td>
</tr>
<tr>
<td>1</td>
<td>CasBox: Unspecified.</td>
</tr>
<tr>
<td>2</td>
<td>CashBox: AutoBill Ended.</td>
</tr>
</tbody>
</table>
System-generated AutoBill cancellations are automatically assigned an applicable CashBox Reserved Code. When you cancel an AutoBill with the `AutoBill.cancel` method, you can apply one of the Predefined Merchant Codes, or a Custom-Defined Merchant Code you have created (see Creating Custom-Defined Merchant Cancel Reason Codes) to set the reason for the cancellation when it is submitted.

The following example shows how to call the `cancel` method to explicitly cancel an AutoBill and apply a cancel reason code. The cancel reason code in this example could be one of the CashBox Reserved Codes or a Custom-Defined Merchant Code you have created.

```
$reasonCode = "103"; // unhappy user
$rc = $autobill->cancel($autobill, $disentitleFlag, $forceFlag, $settleFlag, $sendCancelNoticeFlag, $reasonCode);
```
5.3.2 Creating Custom-Defined Merchant Cancel Reason Codes

If none of the Predefined Merchant Codes meets your needs, you can create your own Custom-Defined Merchant Codes and store them for later use when you cancel AutoBills. Cancel reasons include a code (an alphanumeric string of up to 16 characters) and a description (a string of up to 255 characters). The following example shows how to use an AutoBill object to submit a new cancelReason object for later use. Note that this example creates a custom reason code, but does not assign it to the object or cancel an AutoBill.

```perl
$autobill = AutoBill->new(
    auth_login => $userid,
    auth_password => $password
);
$code = "NH5001";
$desc = "Customer went to a competitor";

$cancelReasonObj = CancelReason->new(
    reason_code => $code,
    description => $desc
);
$rc = $autobill->updateCancelReason($cancelReasonObj);
if ($rc->{return}->returnCode == 200)
{
    print "Cancel Reason code $code ready for use.";
}
```

5.3.3 Canceling AutoBills on Billing Day

If you cancel an AutoBill object on the billing day, the CashBox process that generates the related transactions begins immediately, and bills your customer. If you have set up cancellation and success notifications, your customer could also, for a short period of time, receive a cancellation notice followed by a success notification.

The AutoBill.cancel() call returns a success code of 200 when the call succeeds. Vindicia recommends that you also call Transaction.fetchByAutoBill() to check the transaction status.

5.3.4 Canceling AutoBills with unknown start date

AutoBills created with an unknownStart date can remain in the Pending Activation state for up to two years. Use the AutoBill.cancel() call to cancel the AutoBill and be sure to set the flags disentitle and settle to True. If these flags are not set the AutoBill will move to status Pending Cancel and the Transaction will persist with status New. (See Creating AutoBills with deferred start.)
5.4 Importing AutoBills from other Billing Systems to CashBox

The CashBox `AutoBill.migrate`, `Transaction.migrate`, and `Refund.report` calls allow you to import existing subscription and Transaction information from your billing system to CashBox. The `AutoBill.migrate` call will create new AutoBills which reflect the imported information.

`AutoBill` and `Transaction.migrate` allow you to:

- Bring a subscriber into the CashBox system, while preserving their pre-CashBox history.
- Refund transactions using CashBox, even if the transaction was not originally from CashBox, eliminating the need for you to maintain multiple billing systems.
- Perform all customer service functionality (including modify) on existing subscribers before CashBox has billed them, eliminating the need to maintain two customer service flows.

After migration, these Transactions and AutoBills will be processed and treated as if they had originated with CashBox, allowing you to use this method to:

- import existing customers in good standing.
- import customers who were in good standing, but whose most recent billing cycle was unsuccessful
- import historic billing information for your customers, offering you a continuous record of their subscriptions.

Use `AutoBill.migrate` to migrate existing active subscriptions from your billing system to CashBox. The `AutoBill` and `MigrationTransactions` provided in this call will be used to replicate your system's billing history, and future subscription behavior (to the maximum extent possible) in CashBox. Once migrated to CashBox, you may perform operations on the AutoBill (such as modify, cancel, and update) and expect behaviors that replicate that of an AutoBill created in CashBox. `MigrationTransactions` included in the `AutoBill.migrate` request will result in the creation of Transactions that can be operated on as if they had originated in CashBox (including refund and fetch calls).

CashBox supports the following transaction status types on `MigrationTransactions` included in an `AutoBill.migrate` call:

- Captured
- Cancelled
- Refunded
- Settled
- Void
5.4.1 Key Migrate Parameters

Be certain to include a MigrationTransaction reflecting the most-recent subscription billing attempt in your first migrate call for a given AutoBill. This MigrationTransaction, and the nextPeriodStartDate will be used to reconstruct the billing schedule for the AutoBill. Supplemental calls to AutoBill.migrate may be made to back-fill historical data for a given AutoBill.

| Note: | Subsequent calls to AutoBill.modify will not result in modifications to the AutoBill (only the MigrationTransactions will be processed to create historic Transaction information). Also note that Vindicia allows only one recurring Transaction to be provided for each billing period in a subscription's billing history. |

5.4.2 Migrating an AutoBill During a Billing Cycle

This example demonstrates how to migrate an AutoBill that has completed two monthly billing cycles on a pre-existing billing system. The AutoBill is migrated to CashBox before its third billing date.

// Construct the AutoBill to be migrated
$migrBill = new AutoBill();

// The subscription was originally started on the existing system on Dec. 27, 2013.
$migrBill->setStartTimestamp('2013-12-27');

// Set a unique subscription ID. If the subscription existing in your current system has an ID.
migrBill.setMerchantAutoBillId('SampleMigratedAutoBill-950681');

// Specify the Billing Plan the migrated AutoBill will be on. // Make sure the Billing Plan used below preexists in CashBox.
$billPlanId = 'migrMonthly';
$bp = new BillingPlan();
$bp->setMerchantBillingPlanId($billPlanId);
$migrBill->setBillingPlan($bp);

// Specify the Product the migrated AutoBill will be using. // Make sure the Product used below is created in CashBox in advance

// Now, fetch the Product to get more info about the Product. // That info can be used to fill in the migration transactions. // Exception handling code for the fetch call is omitted for brevity. // This step is optional. The necessary product information can also be retrieved from your local store.
$product_factory = new Product();
$vrc = $product_factory->fetchByMerchantProductId('monthlySub');
$prod = $vrc->product(); // assuming here that the return is 200

$item = new AutoBillItem();
$item->setProduct($prod);
// The item was added the same day the AutoBill started, so you must specify the start date explicitly.

$migrBill->setItems([ $item ]); // This sample creates a new customer Account // and a new PaymentMethod for every run. // For actual migration, the Account used here, and its associated // PaymentMethod, is expected to be already present in CashBox.
$account_factory = new Account();
$vrc = $account_factory->fetchByMerchantAccountId('user_207408');
$acct = $vrc->account(); // assuming that the return is 200

$migrBill->setAccount($acct);

$paymentProcessor = 'Litle';
// Your merchant account must already have an active // routing set to process transactions at Litle.
$paymentProcessorMerchantId = '9104658';

// Construct the Transaction for the first Billing Cycle to migrate.
$mt0 = new MigrationTransaction();
$mt0->setMerchantTransactionId('MIGR-SAMPL-0-196114'); // each transaction should have unique ID
$mt0->setAutoBillCycle(0);
$mt0->setAutoBillCycle(0);
$mt0->setBillingPlanCycle(0);
$mt0->setMerchantBillingPlanId(billPlanId);
$mt0->setRetryNumber(0);
$mt0->setPaymentMethod(acct.getPaymentMethods()[0]);
$mt0->setAccount(acct);
$mt0->setSalesTaxAddress(acct.getPaymentMethods()[0].getBillingAddress());
$mt0->setPaymentProcessor(paymentProcessor);
$mt0->setPaymentProcessorTransactionId('Litle-' . curTime);
$mt0->setDivisionNumber(paymentProcessorMerchantId);

$mt0->setBillingDate('2013-12-27');
$mt0->setCurrency('USD');

$txTotal = 0.0; // This must match the total of the items, so we will add to this total as we construct line items.
$mTxItem00 = new MigrationTransactionItem();
$mTxItem00->
  setItemType(com.vindicia.soap.v5_0.Vindicia.MigrationTransactionItemType
      .RecurringCharge);
$mTxItem00->setSku(prod.getMerchantProductId());
$mTxItem00->setName(prod.getDescriptions()[0].getDescription()
    . ' - includes discounts (if any)');
$discount = 0.15; // Customer got 15% discount for this transaction.
$price_array = $prod->getPrices();
$the_price = $price_array[0];
$productPrice = $prod->getAmount();
$discountedProductPrice = $productPrice - $productPrice * $discount;
$mTxItem00->setPrice($discountedProductPrice);
$txTotal = $txTotal + $discountedProductPrice;
$mTxItem00->setTaxClassification('DC010500');
  // This should be the Avalara tax code associated with this product
$mTxItem00->setServicePeriodStartDate('2013-12-27');
$mTxItem00->setServicePeriodEndDate('2014-01-26');

$mTxTaxItem000 = new MigrationTaxItem();
$mTxTaxItem000->setAmount(7.50);
$mTxTaxItem000->setJurisdiction('STATE_06');
$mTxTaxItem000->setName('CALIFORNIA STATE SALES TAX');

  // Let's add the tax to our transaction total.
  $txTotal = $txTotal + 7.50;
$mTxTaxItem001 = new MigrationTaxItem();
$mTxTaxItem001->setAmount(1.00);
$mTxTaxItem001->setJurisdiction('COUNTY_085');
$mTxTaxItem001->setName('SANTA CLARA COUNTY SALES TAX');

  // Let's add the tax to our transaction total.
  $txTotal = $txTotal + 1.00;

$mTxItem00->setMigrationTaxItems([ $mTxTaxItem000, $mTxTaxItem001 ]);$mt0->setMigrationTransactionItems([ $mTxItem00 ]);  // Let's set the transaction total.
$mt0->setAmount($txTotal);  // Total tx amt should be same as.

  // Report this transaction in 'captured' status so it can be refunded.
$status00 = new TransactionStatus();
$status00->setStatus('Captured');
$status00->setPaymentMethodType('CreditCard');
$status00->setTimestamp('2013-12-27 01:30:40');
$ccStatus00 = new TransactionStatusCreditCard();
$ccStatus00->setAuthCode('000');
$status00->setCreditCardStatus($ccStatus00);
$mt0->setStatusLog([ $status00 ]);
// Construct the Transaction for the second billing cycle to migrate.

$mt1 = new MigrationTransaction();
$mt1->setMerchantTransactionId('MIGR-SAMPL-1-' . curTime);
$mt1->setAutoBillCycle(1);
$mt1->
    ->setType(com.vindicia.soap.v5_0.Vindicia.MigrationTransactionType.Recurring);
$mt1->setBillingPlanCycle(1);
$mt1->setMerchantBillingPlanId(billPlanId);
$mt1->setRetryNumber(0);
$mt1->setPaymentMethod(acct.getPaymentMethods()[0]);
$mt1->setAccount(acct);
$mt1->setSalesTaxAddress(acct.getPaymentMethods()[0].getBillingAddress());
$mt1->setPaymentProcessor(paymentProcessor);
$mt1->setPaymentProcessorTransactionId('Litle-' . curTime);
$mt1->setDivisionNumber(paymentProcessorMerchantId);
$mt1->setCurrency('USD');
$mt1->setBillingDate('2014-01-27');

$txTotal = 0.0; // This must match the total of the items.

$mTxItem10 = new MigrationTransactionItem();
$mTxItem10->setItemName('RecurringCharge');
$mTxItem10->setSku($prod->getMerchantProductId());
$discount = 0.1;
    // This product got a 10% discount.
    // Specify a price that includes a discount.
$description_array = $prod->getDescriptions();
$the_description = $description_array[0];
$mTxItem10->setName($the_description->getDescription()
    . ' - includes discounts (if any)');
$price_array = $prod->getPrices();
$the_price = $price_array[0];
$productPrice = $the_price->getAmount();
$discountedProductPrice = $productPrice - $productPrice * $discount;
$mTxItem10->setPrice($discountedProductPrice);
$txTotal = $txTotal + $discountedProductPrice;

$mTxItem10->setTaxClassification('DC010500');
$mTxItem10->setServicePeriodStartDate('2014-01-27');
$mTxItem10->setServicePeriodEndDate('2014-02-26');
    // Let's use same period as the Billing Period end.
    // Construct tax line items applicable to the above product line item.
$mTxItem100 = new MigrationTaxItem();
$mTxItem100->setAmount(7.50);
$mTxItem100->setJurisdiction('STATE_06');
$mTxItem100->setName('CALIFORNIA STATE SALES TAX');
$txTotal = $txTotal + 7.50;

$mTxItem101 = new MigrationTaxItem();
$mTxItem101->setAmount(1.00);
$mTxItem101->setJurisdiction('COUNTY_085');
$mTxItem101->setName('SANTA CLARA COUNTY SALES TAX');
$txTotal = $txTotal + 1.00;
$mTxItem10->setMigrationTaxItems( [ $mTxTaxItem100, $mTxTaxItem101 ] );
$m1->setMigrationTransactionItems( [ $mTxItem10 ] );
$m1->setAmount($txTotal);

// Report this transaction in 'captured' status so it can be refunded.
$status10 = new TransactionStatus();
$status10->setStatus('Captured');
$status10->setPaymentMethodType('CreditCard');
$status10->setTimestamp('2014-01-27 02:36:57');
$ccstatus10 = new TransactionStatusCreditCard();
$ccstatus10->setAuthCode('000');
$status10->setCreditCardStatus($ccstatus10);

$status10->setTimestamp('2014-01-27 02:36:57');
$status10->setStatus('Captured');
$status10->setPaymentMethodType('CreditCard');
$status10->setTimestamp('2014-01-27 02:36:57');
$ccstatus10 = new TransactionStatusCreditCard();
$ccstatus10->setAuthCode('000');
$status10->setCreditCardStatus($ccstatus10);

$m1->setStatusLog([ $status10 ]); // Now construct an array of the Transactions to be migrated.
$migrTxs = [ $m0, $m1 ];

// Next billing for the AutoBill should happen a
// month from the last billing (2nd transaction in the
// migrated transaction array above) i.e. on Dec. 27, 2013.

// Now make the CashBox SOAP API call to migrate the
// AutoBill along with the Transactions constructed above.
$vr = $migrBill->migrate('2014-01-27', $migrTxs);
if ($vr->getReturnCode() != 200) {
    print('Migrate call failed - return code ');
    print($vr->getReturnCode());
    print(' and return string ');
    print($vr->getReturnString());
    print('Soap id ' . $vr->getSoapId());
} else {
    print('Migration successful. Created autobill id ');
    print($migrBill->getMerchantAutoBillId());
    print(' in CashBox. Its VID: ');
    print($migrBill->getVID());
    print(' This autobill is for customer Account ID ');
    print($migrBill->getAccount()->getMerchantAccountId());
}
5.4.3 Migrating an AutoBill During a Free Trial Period

This example demonstrates how to migrate an AutoBill that is currently within a one-month free trial period. Once migrated, CashBox will begin billing when this trial period has completed.

```php
$migrBill = new AutoBill();

// The subscription was originally started,
// in the existing system, on Jan. 25, 2014.
$migrBill->setStartTimestamp('2014-01-25');

// Set unique subscription ID.
$migrBill->setMerchantAutoBillId('SampleMigratedAutoBill-ABC123');

// Specify the Billing Plan the migrated AutoBill will be on.
// Make sure the Billing Plan used below is created in CashBox in advance.
// This is a monthly Billing Plan with first cycle marked FREE.
$bp = new BillingPlan();
$bp->setMerchantBillingPlanId('first-free-monthly');
$migrBill->setBillingPlan($bp);

// Specify the Product the migrated AutoBill will be using.
// Make sure the Product used below is created in CashBox in advance.

// First, fetch the Product to get more info about the Product,
// which can be used to fill into the migration transactions.
$product_factory = new Product();
$vr = $product_factory->fetchByMerchantProductId('monthlySub');

// assuming here that the return is 200
$prod = $vr->getProduct();  // The product that the fetch returned.

$item = new AutoBillItem();
$item->setProduct($prod);
$migrBill->items[0] = $item;

// For actual migration the Account used here with its associated
// PaymentMethod is expected to preexist in CashBox.
$account_factory = new Account();
$vrc = $account_factory->fetchByMerchantAccountId('user_xyz123');
$acct = $vrc->account();  // Assuming that the return is 200.
$migrBill->setAccount($acct);

// **************************************************
// Construct the "Free" Transaction for the first billing cycle to migrate.
$mT0 = new MigrationTransaction();
$mT0->setMerchantTransactionId('MIGR-SAMPL-0-987654');
   // Each transaction should have a unique ID.
$mT0->setAutoBillCycle(0);
$mT0->setType('Recurring');
$mT0->setBillingPlanCycle(0);
$mT0->setMerchantBillingPlanId($bp->getMerchantBillingPlanId);
$mT0->setRetryNumber(0);
$pm_array = $acct->getPaymentMethods();
$target_pm = $pm_array[0];
$mT0->setPaymentMethod($target_pm);
$mT0->setAccount($acct);
$mT0->setSalesTaxAddress($target_pm->getBillingAddress());
$mT0->setBillingDate('2014-01-25');
$mT0->setCurrency('USD');
$mT0->setAmount(0.0);
   // This amount must be 0 to make this transaction FREE.
$mTxItem00 = new MigrationTransactionItem();
$mTxItem00->setItemtype('RecurringCharge');
$mTxItem00->setSku('FREE');
$mTxItem00->setName('Free Cycle');
$mTxItem00->setPrice(0.0);
$mTxItem00->setServicePeriodStartDate('2014-01-25');
$mTxItem00->setServicePeriodEndDate('2014-02-24');
$mT0->setMigrationTransactionItems([$mTxItem00]);

// Report this transaction in "captured" status.
$status00 = new TransactionStatus();
$status00->setStatus('Captured');
$status00->setPaymentMethodType('CreditCard');
$status00->setTimestamp('2014-01-25 01:30:40');
$mT0->setStatusLog([$status00]);

// Now construct the array of Transactions to be migrated.
$migrTxs = [$mT0];

// The next billing for the AutoBill should happen a month from the last billing (2nd transaction in the migrated transaction array above) i.e. on Dec. 27, 2013.
// Now, make the CashBox SOAP API call to migrate the AutoBill along with the transactions constructed above.
$vr = $migrBill->migrate('2014-01-25', $migrTxs);
To implement AutoBill-based recurring billing for European Direct Debit (EDD) or United Kingdom Direct Debit (UK DD), construct and populate a PaymentMethod object and set it on the paymentMethod attribute of the AutoBill object and specify Direct Debit as the paymentMethodType (value = DirectDebit). If you do not specify a paymentMethod attribute, CashBox uses the first payment method in the sort order on the associated Account object.

The following example constructs an EDD-based PaymentMethod object, and sets it as the payment method for an AutoBill object. The example then creates the AutoBill object on the Vindicia server by calling update() on AutoBill with payment method validation turned on. (Note that this example shows a recurring transaction with a full rebill amount.)

To construct a UK DD-based PaymentMethod object, substitute the appropriate country code and currency type. Because EDD and UK DD are both direct debit payment methods, routing is determined by country code and currency type. With country code GB and currency GBP, the payment will route to UK DD. With one of the European country codes and the euro or a local currency, payment will route to EDD.
// Create a payment method object to make the call
$edd_pm = new PaymentMethod();

$edd_pm->setType('DirectDebit');

$dd = new DirectDebit();
$dd->setAccount('8888888888');
$dd->setBankSortCode('12345678');
$dd->setCountryCode('DE');

$edd_pm->setDirectDebit($dd);

$bill_addr = new Address();
$bill_addr->setName('Lutz Haff');
$bill_addr->setAddr1('Leonrodstrasse 57');
$bill_addr->setCity('Munchen');
$bill_addr->setPostalCode('D-80636');
$bill_addr->setCountry('DE');

$edd_pm->setBillingAddress($bill_addr);
$edd_pm->setAccountHolderName('Lutz Haff');
$edd_pm->setCustomerSpecifiedType('EDD');
$edd_pm->setMerchantPaymentMethodId('pmid-edd-342123');

// Create a payment method object to make the call
$autobill = new AutoBill();

$autobill->setPaymentMethod($edd_pm);

// Populate other AutoBill attributes here...

// Create the autobill while validating the payment method
$autobill->setCurrency('EUR');

// If you are enabling mandate storage for this AutoBill,
// as discussed later in this document, include the
// IP address from which the customer purchased this subscription.
// In some countries, the IP address is part of the
// signature on the mandate.
$autobill->setSourceIp('198.209.56.17');

$validate = true;
$fraudScore = 100; // do not want to do risk screening

$response =
    $autobill->update('SucceedIgnore', $validate, $fraudScore);

if(!$response['data']->refunds['returnCode'] == 200
    && $response['created'] ){
    print "AutoBill created with VID " .
         $response['data']->autobill->getVID() . "\n";
}
Once the `AutoBill` object is in place, the recurring EDD or UK DD-based transactions it generates determine its status and the entitlements it grants to the associated `Account` object, as follows:

1. CashBox validates (the payment method for) a recurring transaction before submitting it to the payment processor for capture. (For more information, see the `AutoBill.validate` method in the `CashBox API Guide`.)
   - If the validation fails, CashBox sets the `AutoBill` status to **Hard Error**. This rarely happens if you validate the EDD or UK DD payment method when creating an `AutoBill` object or when updating its payment method.
   - If the transaction passes the validation, CashBox submits it to the payment processor. The processor checks the account number and bank routing number for the EDD or UK DD payment method against a negative file. If the transaction passes, CashBox considers the transaction **Authorized**, and the funds withdrawal process begins. CashBox sets the `AutoBill` status to **Good Standing** (or retains that status), and `AutoBill` grants (or continues to grant) the customer entitlements.

2. During the funds deposit process:
   - If the processor receives a **decline** return code (a soft error due to insufficient funds, for example), the retry process starts. The payment processor triggers this process according to the retry schedule defined by the merchant. A retry does not affect the `AutoBill` status, which remains **Good Standing**. The rebill transaction moves to the `DepositRetryPending` status, which is internal to CashBox. The customer continues to have the entitlements granted by the `AutoBill` object.
   - If the processor receives a **reject** return code, (a hard error because, for example, the customer bank account has been closed), and you have not provided a retry schedule to the processor, the rebill transaction fails. CashBox sets the transaction status to **Cancelled** and the corresponding `AutoBill` status to **Hard Error**.
   - If CashBox receives **no response** from the processor for four banking days, CashBox sets the Transaction status to **Captured**. The `AutoBill` object retains its **Good Standing** status until the beginning of the next billing period, and the customer’s entitlements remain valid until the next billing date.
5.5.1 Understanding Mandates for Recurring Billing with EDD

Mandates are written agreements from your customers that authorize you to withdraw funds from their bank accounts. Although you can create AutoBills without mandates in CashBox, Vindicia recommends that you store mandates, because it is required by law in most countries that support EDD.

To enable mandate storage for an AutoBill paid through UK DD or EDD:

1. Upload the HTML template of the mandate’s general text to Vindicia. Each template must specify the country to which the template applies (see the valid values for countryCode in the DirectDebit Subobject in the CashBox API Guide), the language the template is in (specify the ISO code for the language), and the template’s version number. Contact Vindicia Client Services to upload your mandate template.

The HTML mandate template contains placeholder tuples (tags), listed in the document European Direct Debit for CashBox in The Netherlands, Germany, and Austria: An Overview. When creating an instance of the mandate from the template for a subscription, CashBox replaces those tuples with the values from the corresponding AutoBill object, then stores the mandate instance with that AutoBill object in the Vindicia database.

2. Inform CashBox that you intend to store the mandate for a subscription by including special flags in the form of name–value pairs in the AutoBill object before calling update() to create the object. Table 5-2 lists the flags.

Table 5-2 AutoBill Object Flags for Mandates

<table>
<thead>
<tr>
<th>Name of Flag</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>vin:MandateFlag</td>
<td>A value of 1 indicates that you would like to store the mandate for the associated AutoBill object.</td>
</tr>
</tbody>
</table>
| vin:MandateVersion          | Specifies the mandate instance to be used for the associated AutoBill object.  
                               | Note: If you do not specify this field, CashBox uses the most recently added template for the customer’s preferred language and country. |
| vin:MandateBankName         | Specifies the name of the customer’s bank used for the mandate. (Required only in the Netherlands.) |

3. Include the source IP address from which the customer made this purchase in the AutoBill object. Some countries consider the IP address, coupled with the timestamp for the AutoBill’s creation, to be a valid replacement for the customer’s signature on the mandate.

CashBox accepts transactions without IP addresses, to allow for cases in which a paper mandate is kept on file, precluding the requirement for an IP address.

4. Add the name–value pairs to the code.
Enable mandate storage for an existing AutoBill:

(This example expands on the previous.)

```php
... 
$autobill->setPaymentMethod($edd_pm);

// Set flags in the autobill to enable mandate storage
// You must have uploaded a mandate template of version 1.0
// to Vindicia servers prior to this.

$nv1 = new NameValuePair();
$nv1->setName('vin:MandateFlag');
$nv1->setValue('1');

$nv2 = new NameValuePair();
$nv1->setName('vin:MandateVersion');
$nv1->setValue('1.0');

$nv3 = new NameValuePair();
$nv1->setName('vin:MandateBankName');
$nv1->setValue('Deutsche Bank');

// nameValues attribute is available in Vindicia's AutoBill
// object from API version 3.4 onwards
$autobill->setNameValues(array($nv1, $nv2, $nv3));

// update the AutoBill as shown in the previous example
```

Multiple mandate templates may be uploaded for different languages. When creating a mandate instance to store with an AutoBill, CashBox uses the template that matches the preferredLanguage attribute of the AutoBill object associated with the transaction.

---

**Note:** If you do not specify a value for preferredLanguage, CashBox defines the language for the mandate using the country specified in the EDD or UK DD payment method.

---

Use the CashBox Portal to view and retrieve mandates. If you have enabled an AutoBill for mandate storage, a link to view the mandate is displayed on the AutoBill Detail page on the Portal. Click that link to display the PDF document for the mandate.

### 5.5.2 Understanding Mandates for Recurring Billing with UK DD

For United Kingdom Direct Debit (UK DD), there is no need to pass the mandate to CashBox. The passing of the mandate is achieved directly through your integration with Go Cardless, the direct debit provider for UK DD. Go Cardless stores that data along with its current status, which you can manipulate in the mandate subobject.
5.6 Using PayPal for Recurring Billing

To set up AutoBill-based recurring billing with PayPal, you must be preapproved by PayPal to conduct reference transactions. Contact Vindicia Client Services for more information.

Note: Not all merchants will be authorized to obtain the referenceId from PayPal. Work with your PayPal representative to obtain the right to use this process.

If the PaymentMethod exists and contains a ReferenceID for PayPal, CashBox uses that PaymentMethod. If the PaymentMethod does not exist, or does not contain a ReferenceID for PayPal, CashBox returns a URL in the authStatus field. The consumer can be redirected to the URL to make a payment.

Set up recurring billing in an AutoBill:

1. Set the following for the PayPal payment method (PaymentMethod object and its payPal attribute) on AutoBill, or on the Account object if the settings are not specified on AutoBill:
   a. Set emailAddress to the subscriber’s email address.
   b. Set returnUrl to an existing URL on your site to which the customer will be redirected after a successful authentication with PayPal.
   c. Set cancelUrl to an existing URL on your site to which the customer will be redirected after a failed authentication, that is, if PayPal does not authorize the payment information.

2. Call update() to create the AutoBill object, and return a TransactionStatus object. The TransactionStatus object must contain a URL in the redirectUrl field, to which the customer will be redirected to complete the PayPal payment process. Without completion of this step, recurring billing will not begin.

Retrieve the redirectUrl:

$minChargebackProbability = 90;
$duplicateBehavior = 'Fail';

// Call update to update or create the autobill on Vindicia servers

$response = $autobill->update($duplicateBehavior,
    $validatePaymentMethod, $minChargebackProbability);

if($response['returnCode'] == 200) {
    printLog "AutoBill created 
"
    $txnStatus = $response['data']->refundsauthStatus;
    $redirectUrl = $txnStatus->payPalStatus->redirectUrl
    print "Visit " . $redirectUrl . 
    " to complete payment at PayPal site"
}

While waiting for the customer to complete payment at PayPal, the AutoBill object will have status: PendingCustomerAction. The object is dormant and will not perform any billing.
At the PayPal site, the customer logs in and agrees to the contract for recurring billing. When the process is complete, the customer clicks a button that takes them to your success page (returnUrl) or failure page (cancelUrl). From the success page, make the finalizePayPalAuth() call to inform CashBox of successful authorization of the PayPal-based payment method. After receiving the successful authorization, the status of the AutoBill object changes to New, indicating that the subscription has started and that the AutoBill will start billing the customer according to the specified dates.

**Finalize the PayPal payment method authorization:**

```php
$soap_caller = new AutoBill();

// obtain id of the PayPal validation transaction
// from the redirect URL. It is the value associated with name
// 'vindicia_vid'
$payPalTxId = ... ;

// if calling from return URL which is reached when the PayPal
// transaction is successfully authorized you should set the
// success input parameter to true

$success = true;
$response =
    $soap_caller->finalizePayPalAuth($payPalTxId, $success);

if($response['data']->refunds['returnCode'] == 200) {
    printLog "PayPal validation transaction successful";
    printLog "- subscription started";
}
```

For every subsequent transaction performed by the AutoBill object, no action will be required from the customer. PayPal will notify the customer when the transaction is complete. That notification is in addition to any communication issued by your organization through the CashBox email notification system.

For more information, see the *Using CashBox with PayPal* white paper, available from Vindicia Client Services.
6 Working with One-Time Transactions

CashBox Billing Events occur when an AutoBill generated event passes through your payment processor. A Billing Event might be a recurring or one-time transaction, a manually accepted and entered payment, a credit check (for credit cards), a bank withdrawal (EDD), or a customer refund.

One-Time Transactions may be generated for a single item purchase, or for the first in a series of recurring billings. Note that some payment methods, supported by CashBox, do not allow recurring transactions, and allow only one-time transactions.

While AutoBill payments are also processed as CashBox Transactions, this chapter deals specifically with the Transaction object, with an emphasis on one-time purchases. For more information on recurring billing, see Chapter 5: Working with AutoBills.

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.

CashBox allows you to issue email notifications when these events occur. For more information, see Chapter 9: Working with Customer Notifications.
6.1 Setting Up Real-Time Billing for One-Time Purchases

CashBox supports real-time billing for one-time purchases. In this case, you must explicitly create a Transaction and send it to CashBox for processing. CashBox performs part of this processing synchronously and returns the results to you. For example, for a credit card-based transaction, the payment processor immediately authorizes it and CashBox returns the results.

The Transaction object supports multiple API calls for real-time billing. You may set Transaction attributes to specify details including line items, prices, total amount, and payment method.

---

**Note:** PaymentMethod: MerchantAcceptedPayment may not be used for one-time payments.

---

6.1.1 Monitoring Transaction Status

For all payment methods, the status of the transactions initiated through an authCapture() call changes at several points after the call returns. The immediate status returned by the call is simply the initial status that indicates the success or failure of the transaction.

The Transaction object supports multiple ID fetch calls to enable you to retrieve transactions from CashBox. To monitor the latest status of a Transaction object after the authCapture() call is complete, call one of the object’s fetch methods, such as fetchByMerchantTransactionId. Other calls retrieve transactions in batches. If you are maintaining a local database of transactions, use a batch call to stay in sync with the transaction statuses in CashBox.
6.2 Using Credit Cards for One-Time Transactions

Create, populate, authorize, and capture a Transaction with payment method type: CreditCard:

```php
$tx = new Transaction();
$tx->setAmount('9.90');
$tx->setCurrency('USD');

// Merchant transaction id must be unique for each new
// transaction you wish Vindicia to process. If you use an id
// that has been used before, the authCapture() call will
// simply update the corresponding
// existing transaction with new data
$tx->setMerchantTransactionId('txid-123456');

$tx->setTimestamp('2006-09-11T22:34:32.265Z');
$tx->setSourceIp('34.67.89.234');
$tx->setSourcePhoneNumber('650-874-6784');

// Reference an existing account
$account = new Account();
$account->setMerchantAccountId('9876-5432');
$tx->setAccount($account);

// Different shipping address from Account?
$shippingAddress = new Address();
$shippingAddress->setName('Jane Doe');
$shippingAddress->setAddr1('44 Elm St.');
$shippingAddress->setAddr2('Apt 55');
$shippingAddress->setAddr3('');
$shippingAddress->setCity('San Mateo');
$shippingAddress->setDistrict('CA');
$shippingAddress->setPostalCode('94403');
$shippingAddress->setCountry('US');
$shippingAddress->setPhone('650-555-3444');
$shippingAddress->setFax('650-555-3445');

$tx->setShippingAddress($shippingAddress);

// The line items of the transaction
$tx_item = new TransactionItem();
$tx_item->setSku('sku-1234');
$tx_item->setName('Widget');
$tx_item->setPrice('3.30');
$tx_item->setQuantity('3');
$tx->setTransactionItems(array($tx_item));

$paymentMethod = new PaymentMethod();
$paymentMethod->setBillingAddress($address);
$paymentMethod->setType('CreditCard');
```
$card = new CreditCard();
$card->setAccount('4444222211113333');
$card->setExpirationDate('xxxxx'); // Use YYYYMM format for date
$paymentMethod->setCreditCard($card);

$tx->setSourcePaymentMethod($paymentMethod);

// CashBox can send an email notification to the customer
// associated with this transaction, if an email template
// for this is uploaded to the CashBox database

$sendEmailNotification=false;

$response = $tx->authCapture($sendEmailNotification);

if($response['returnCode']==200) {
    // The transaction statuses can be found in statusLog attribute
    // of the Transaction object. This is an array of
    // TransactionStatus objects. The first entry in this array
    // is the latest status of the transaction
    if($tx->statusLog[0]->status=='Authorized') {
        print "Captured\n";
    }
    else if($tx->statusLog[0]->status=='Cancelled') {
        // The transaction did not go through
        print "Declined. Reason code received from payment processor: ";
        print $tx->statusLog[0]->status->creditCardStatus->authCode . "\n";
    }
}

With the CreditCard payment method, the Transaction status after an
authCapture() call is Authorized. The payment processor has authorized the
transaction, and CashBox has marked it for capture with the payment processor. After
capture, the status changes to Captured. Although this change usually takes less than 24
hours, in most cases you can assume that if Authorized is returned as the status,
CashBox will capture the transaction.
6.2.1 Verifying AVS and CVN for One-Time Transactions

To verify security codes for real-time billing, set the name–value pair for the PaymentMethod object. See Section 5.1.6: Verifying AVS and CVN for Recurring Billing for details.

The authCapture() method authorizes a transaction and marks it for capture by a CashBox back-end batch process. auth() also authorizes a transaction and returns the authorization results, including the results from address and security-code verifications, but does not mark the transaction for automatic capture. To capture the transaction using auth(), you must call capture() before the authorization period expires. (The authorization period varies by payment processor, but is typically three days for real-time transactions, and seven days for recurring transactions.)

If you have shippable merchandise or want an additional risk review process before deciding whether to capture a transaction, make two separate SOAP calls. (When calling authCapture() to immediately mark a transaction for capture, the capture operation might occur before you have a chance to call cancel().)

Payment processors recommend authorizing a transaction when the order is placed, and capturing it only after you have shipped the merchandise. To do this, make a live auth() call when a customer places an order. After the product is authorized or shipped, use a capture() call in batch mode to process an array of transactions at the end of a day, or more frequently, depending on the volume of your transactions.

The authCapture() call may save time if your one-time transactions are for relatively small amounts and do not require physical shipments. However, Vindicia recommends that you screen transactions for fraud risk with the score call before calling authCapture.

To verify address and security codes, retrieve AVS and CVN code responses, then examine the TransactionStatus object in the Transaction. Look at the most recent entry in the statusLog array of the Transaction object, located in the first position in the array.

If you specify a minChargebackProbability of less than 100 when calling auth(), CashBox evaluates the risk score for the transaction, and includes the results in the return parameters score and scoreCodes (codes and corresponding messages that explain the score). If the score evaluates higher than minChargebackProbability, no authorization with the payment processor is performed, saving you the cost of authorizing a transaction with the payment processor if it is determined to be potentially fraudulent.

---

Note: To ignore the fraud score, set minChargebackProbability to 100.
Verify for real-time billing:

```php
$tx = new Transaction();
$tx->setAmount('9.90');
$tx->setCurrency('USD');
$tx->setMerchantTransactionId('txid-123456');

$paymentMethod = new PaymentMethod();
$paymentMethod->setBillingAddress($address);
$paymentMethod->setType('CreditCard');

$card = new CreditCard();
$card->setAccount('4444222211113333');
$card->setExpirationDate('xxxxxx'); // Use YYYYMM format for date
$paymentMethod->setCreditCard($card);

$nv = new NameValuePair();
$nv->setName("CVN");
$nv->setValue("123"); // card security code provided by customer

// set the card security code inside the payment method
$paymentMethod->setNameValues(array($nv));
$tx->setSourcePaymentMethod($paymentMethod);

// set other transaction attributes here
$sendEmailNotification=false;
$minChargebackProbability = 100; // not doing risk screening
$response = $tx->auth($minChargebackProbability, $sendEmailNotification);

if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        print "Card approved.
Checking address and security code responses \n";
        $txnStatus = $tx->statusLog[0];
        // latest transaction status

        if ($txnStatus->vinAVS == "FullMatch"
            || $txnStatus->vinAVS == "PartialMatch")
        {
            print " Address verified \n";
        }
    }
    else {
        $avs = $txnStatus->creditCardStatus->avsCode;
        // work with the AVS response code here. If there is a
        // certain value of the AVS code which is not acceptable,
        // then cancel the transaction

        if ($avs == "xyz") {
            $soapCallerTxn = new Transaction();
            $soapCallerTxn->cancel(array($tx));
            exit();
        }
    }
}
```
// AVS is OK, now check the response to security code
// verification
$cvn = $txnStatus->creditCardStatus->cvnCode;

// work with the AVS response code here. If a certain
// value of the CVN response code is not acceptable, then
// cancel the transaction
if ($cvn == "abc") {
    $soapCallerTxn = new Transaction();
    $soapCallerTxn->cancel(array($tx));
    exit();
}
else if($tx->statusLog[0]->status=='Cancelled') {
    // The transaction did not go through
    print "Declined. Reason code received from payment processor: ";
    print $tx->statusLog[0]->status->creditCardStatus->authCode . "\n";
}
}

Capture multiple authorized Transactions in a batch:

$tx_soap = new Transaction();
$txn1 = new Transaction();
$txn1->setMerchantTransactionId('id1');
    // this is a previously authed transaction
$txn2 = new Transaction();
$txn2->setMerchantTransactionId('id2');
    // this is a previously authed transaction
$response = $tx_soap->capture(array($txn1, $txn2));
if($response['returnCode']==200) {
    // capture success
}
6.2.2 Calling the auth and capture Methods Separately

If a Transaction object's payment method is credit card, you may also set up real-time billing by calling the auth() and capture() methods separately.

To specify a risk score threshold (also known as chargeback probability), call auth(). If the score evaluates to a value higher than the threshold, CashBox does not authorize the transaction. auth() also allows you to examine the responses to the AVS and CVN verifications returned by the payment processor. If the risk score exceeds your allowable value, or if the AVS or CVN return score is not acceptable, do not capture the transaction, and set its status to Cancelled by calling Transaction.cancel().

For more detail on AVS and CVN Return Codes, please work with your Vindicia Client Services representative.

To capture an authorized transaction before the authorization period expires, call capture(). (The authorization period varies by card issuer, but is typically seven days.)

Capture an authorized Transaction:

```php
$tx = new Transaction();

// populate the Transaction object as illustrated above
// for credit card based authCapture call

$sendEmailNotification = false;
$minChargebackProbability = 100; // not doing risk score based rejection
$response = $tx->auth($minChargebackProbability, $sendEmailNotification);

if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        // Check AVS match. vinAVS attribute provides an abstraction
        // for AVS response codes from various payment processors based
        // on CashBox's interpretation. If vinAVS is set to NoOpinion,
        // check $tx->statusLog[0]->status->creditCardStatus->avsCode
        // for the response received from your payment processor

        if ($txnStatus->vinAVS == "FullMatch"
            || $txnStatus->vinAVS == "PartialMatch") {
            print " Address verified \n";
        }
        else {
            $avs = $txnStatus->creditCardStatus->avsCode;
            // work with the AVS response code here. If a return value for
            // the ACS response code is not acceptable,
            // cancel the autobill
            if ($avs == "xyz") {
                $autobill->cancel(true, true)
                // immediate disentitle and forced cancellation
                exit();
            }
        }
    }
}
```
// AVS is OK, now check the response to security code verification
$cvn = $txnStatus->creditCardStatus->cvnCode;
// work with the CVN response code here. If a return value for
// the CVN response code is not acceptable, cancel the autobill
if ($cvn == "abc") {
    $autobill->cancel(true, true)
    // immediate disentitle and forced cancellation
    exit();
} else {
    $soapTxn = new Transaction();
    $txnBatchToCancel = array($tx);
    $soapTxn.cancel($txnBatchToCancel);
}
else if($tx->statusLog[0]->status=='Cancelled') {
    // The transaction did not go through
    print "Declined. Reason code received from payment processor: ";
    print $tx->statusLog[0]->status->creditCardStatus->authCode . "\n";
}

For more information, see Section 18: The Transaction Object in the CashBox API Guide.
6.3 Using Carrier Billing for One-Time Transactions

CashBox supports BOKU as a payment processor for Carrier Billing. Work with your BOKU representative to define your pricing structures, and to configure your account as a sub-merchant to Vindicia.

Before processing BOKU Transactions, you must create one or more services on the BOKU website which define your pricing schedule(s). When constructing these services, the “Forward To After Purchase” and “Forward To After Failed Purchase” attributes for each service must point to URIs at your site. The “Callback Url” must point to Vindicia. (Work with your Vindicia Client Services representative to define this URL.)

BOKU-based real-time transactions use the following payment flow:

1. When a customer clicks the BOKU button on your site, create a Transaction object that specifies CarrierBilling as the payment method, and make a Transaction.authCapture call.

2. When that call returns, examine the status of the returned Transaction object. If the status is not a failure (Cancelled), it will be AuthorizedPending, which means that the Transaction is in the CashBox and BOKU systems, and that it requires further action from the customer for completion.

3. The returned Transaction object will also include a TransactionStatusCarrierBilling subobject, which will include a buyUrl which the customer should be presented (or redirected to) in order to complete the transaction.

   Note: This Transaction includes the BOKU Transaction ID in the nameValues array (name = provider_trx_id), which will prove useful when correlating Transaction data between your site and BOKU/Vindicia.

4. Once the customer has followed the buyUrl, and completes the BOKU payment, they will be redirected to the “Forward To Url After Purchase” URL that you included in your BOKU Service Configuration (or the “Forward To Url After Failed Purchase” URL if the payment attempt fails).

5. You may verify the status of the Transaction by re-retrieving the CashBox Transaction object, and verifying that the status is now Captured. (Note that there may be a delay between the time the payment process completes, and the time that BOKU notifies Vindicia about the status of the payment attempt.) You may also perform a verify-trx-id dataRequest call, which will retrieve the Transaction status information directly from BOKU (see below for details).
6.3.1 BOKU Static Pricing Transactions

To use BOKU's Static Pricing, create a Service ID on the BOKU website before creating a Transaction. use the CashBox `setMerchantServiceIdentifier` call to pass in the corresponding Service ID.

Create a Transaction using BOKU Static Pricing:

```php
$txn = new Transaction;
//Populate this Transaction as shown in previous examples.

$criteria = new Criteria();
$criteria->setCurrency('USD');
$criteria->setCountryCode('US');
$criteria->setStaticPriceIncSalesTax(1.00);
$criteria->setMerchantServiceIdentifier('14246ab82c24e44bf9862406');

$paymentProvider = new PaymentProvider();
$paymentProvider->setName('BOKU');
$criteria->setPaymentProvider($paymentProvider);

$carrierBilling = new CarrierBilling();
$carrierBilling->priceCriteria($criteria);

$paymentMethod = new PaymentMethod();
$paymentMethod->setType('CarrierBilling');
$paymentMethod->setCarrierBilling($carrierBilling);

$txn->setSourcePaymentMethod($paymentMethod);

$response = $txn->authCapture();
if($response['returnCode'] ==200)
{
    if($tx->statusLog[0]->status=='AuthorizedPending')
    {
        print "Successful\n";
        display(print txn->statusLog[0]->status->
        carrierBillingStatus->buyUrl);
    }
}
else if($tx->statusLog[0]->status=='Cancelled')
{
    // The transaction did not go through
}
### 6.3.2 BOKU Dynamic Pricing Transactions

BOKU also allows Dynamic Pricing, which allows you to define a target price, and an allowable deviation from that price.

The following example specifies a target price of USD 10.00, and a desired country of BG (with an allowed dynamic deviation of 50%). Note that the price (10.00) is shown in a floating point format, indicating dollars and cents, rather than the BOKU "fractional amount" format (1000).

#### Create a Transaction using BOKU Dynamic Pricing:

```php
$criteria = new Criteria();
$criteria->setCurrency('USD');
$criteria->setCountryCode('BG');
$criteria->setMerchantServiceIdentifier('14246ab82c24e44bf9862406');
$criteria->setDynamicDeviation(50);
$criteria->setPricePointDeviationPolicy('HiPreferred');
$criteria->setDynamicMatch(11);
$criteria->setDynamicTargetPrice(10.00);
$criteria->setPaymentProvider($paymentProvider);
```

BOKU also allows you to define static service tables, from which you may reference a defined dynamic price using its "row ref."

#### Create a Transaction using a BOKU service table:

```php
$criteria = new Criteria();
$criteria->setMerchantServiceIdentifier('140ba94f2c24e44b5cb85730');
$criteria->setStaticSelectionRowRef(1);
$criteria->setCountryCode('NZ');
$criteria->setPaymentProvider($paymentProvider);
```
6.3.3 Using CashBox to query BOKU

CashBox also provides a "data pipe" which allows users to perform the following queries directly against the BOKU web site:

- price
- service-prices
- lookup
- verify-trx-id

Create a simple BOKU price query:

```php
$provider = new paymentProvider();
$rc = $provider->dataRequest('price',
    [
        NameValuePair->new(name => 'reference-currency',
            value => 'USD'),
        NameValuePair->new(name => 'service-id',
            value => '140ba94f2c24e44b5cb85730')
    ]);

// The return from this call (as well as all data request calls)
// includes two components:
$rc->request  //Contains the Vindicia formatted request sent to BOKU.
$rc->response //Contains BOKU's response
```

Create a BOKU price request using dynamic pricing criteria:

```php
$provider = new paymentProvider();
$rc = $provider->dataRequest('price',
    [
        NameValuePair->new(name => 'reference-currency',
            value => 'USD'),
        NameValuePair->new(name => 'service-id',
            value => '140ba94f2c24e44b5cb85730'),
        NameValuePair->new(name => 'dynamic-price-mode',
            value => 'price'),
        NameValuePair->new(name => 'dynamic-deviation',
            value => 20),
        NameValuePair->new(name => 'dynamic-deviation-policy',
            value => 'hi-preferred'),
        NameValuePair->new(name => 'dynamic-match',
            value => 0),
        NameValuePair->new(name => 'currency',
            value => 'USD'),
        NameValuePair->new(name => 'target',
            value => 1000)
    ]);
```
This request would produce a BOKU query similar to the following:

[BOKU URL]?action=price&service-id=14246ab82c24e44bf9862406
&dynamic-price-mode=price&dynamic-deviation=20
&dynamic-deviation-policy=hi-preferred
&dynamic-match=0&currency=USD&target=1000

Create a BOKU service-prices request:

Service-prices requests allow you to restrict output by (service table) row and country. The following example restricts output to row: 2, and country: New Zealand.

```php
$provider = new paymentProvider();
$rc = $provider->dataRequest('service-prices',
    [
        NameValuePair->new(name  => 'service-id',
            value => '140ba94f2c24e44b5cb85730'),
        NameValuePair->new(name  => 'country',
            value => 'NZ'),
        NameValuePair->new(name  => 'row-ref',
    ]);
```

Create a “lookup” data request to determine the country associated with an IP address:

```php
$provider = new paymentProvider();
$rc = $provider->dataRequest('lookup',
    [
        NameValuePair->new(name  => 'ip-address',
            value => '23.11.248.110')
    ]);
```

Check the status of a BOKU Transaction:

```php
$provider = new paymentProvider();
$rc = $provider->dataRequest('verify-trx-id',
    [
        NameValuePair->new(name  => 'trx-id',
            value => [THE ID ASSIGNED TO THIS TRANSACTION BY BOKU])
    ]);
```
6.4 Using Boleto Bancario for One-Time Transactions

For the payment method Boleto Bancário, the Transaction status after an authCapture() call is Authorized. That means that CashBox has validated the fiscal number and will prepare the transaction for the payment processor. After the payment processor has accepted the fiscal number in the payment method, the transaction status changes to AuthorizedPending. In response, the payment processor returns a URL in the TransactionStatus object.

Send the customer this URL, which points to further instructions from the payment processor for completing the transaction. When the transaction is complete, the payment processor notifies CashBox, which updates the status to Captured or Cancelled, depending on the success or failure of the transaction.

Create a Transaction with Boleto Bancário as the payment method, and set the fiscal number:

```php
$txn = new Transaction();
// populate the transaction as shown in the previous example
// When associating a customer account with this transaction,
// ensure that the account has language preference indicated.
// This will set the language used in the payment instructions
// displayed to the customer
$txn->setAccount($account);

$paymentMethod = new PaymentMethod();
// For Boleto payment make sure country is specified in the address
$paymentMethod->setBillingAddress($address);

$paymentMethod->setType('Boleto');
$blt = new Boleto();
$blt->setFiscalNumber('123456789');
$paymentMethod->setBoleto($blt);

$txn->setSourcePaymentMethod($paymentMethod);
$sendEmailNotification=false;
$response = $txn->authCapture($sendEmailNotification);
if($response['returnCode'] ==200) {
    if($txn->statusLog[0]->status=='AuthorizedPending') {
        print "Successful\n";
        display(print $txn->statusLog[0]->status->boletoStatus->uri);
    } else if($txn->statusLog[0]->status=='Cancelled') {
        // The transaction did not go through
    }
}
```

**Note** For Boleto Bancário, be sure to specify the country in the billing address, and the language preference in the customer account. Those two attributes determine the language for CashBox customer notifications (for payment instructions, for example).
6.5 Using ECP for One-Time Transactions

For the ECP payment method, the status of a transaction after an `authCapture()` call is **Authorized**. The payment processor has performed a real-time validation of the payment information to ensure, for example, that the bank routing number is not blacklisted. CashBox then submits the transaction to the payment processor for further processing (deposit or withdrawal from the specified bank), and changes the status to **AuthorizedPending**, to indicate that processing of the transaction has begun.

Six banking days must elapse before CashBox sets the status to **Captured**. If, during that time, CashBox receives notice (by a reason code) from the payment processor that the transaction failed, CashBox changes the transaction status to **Cancelled**.

If the reason code from the payment processor indicates that there will be an internal retry of the transaction, CashBox changes the transaction status to **RetryPending**. The retry date depends on the retry schedule that the payment processor has previously defined with you according to your division ID. (Be sure to provide Vindicia with your division ID’s retry schedule.)

If CashBox does not receive any decline codes during the six banking days after the retry, CashBox sets the transaction status to **Captured**.

**Create a Transaction with ECP as the payment method:**

```php
$txn = new Transaction();

// populate the transaction as shown in the previous example
$paymentMethod = new PaymentMethod();
$paymentMethod->setBillingAddress($address);
$paymentMethod->setType('ECP');

$ecp = new ECP();

// specify account number where funds will be with withdrawn from
$ecp->setAccount('123456789');

// specify bank routing number
$ecp->setRoutingNumber('3409284043');
$ecp->setAccountType('ConsumerChecking');
$paymentMethod->setECP($ecp);

// If this is an inbound payment (a withdrawal from a
// specified bank account and deposit into the merchant's
// account), set the source payment method in the transaction.
// For paying out (a deposit into a specified bank account and
// withdrawal from the merchant's bank account), set the
// destinationPaymentMethod attribute of the transaction
$tx->setSourcePaymentMethod($paymentMethod);
$tx->setEcpTransactionType('Inbound');

$sendEmailNotification = false;
$response = $tx->authCapture($sendEmailNotification);
```
if($response['returnCode'] ==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        print "Successful\n";
    }
    else if($tx->statusLog[0]->status=='Cancelled') {
        // The transaction did not go through
        print "Declined. Reason code from payment processor: ";
        print $tx->statusLog[0]->status->ecpStatus->authCode . "\n";
    }
}

6.5.1 Creating Outbound Payment Transactions with ECP

The majority of transactions, real-time or recurring, processed by CashBox are inbound, as
they originate with your customers, and are inbound to your bank. For the ECP payment
method, CashBox also supports real-time outbound transactions, where money is withdrawn
from your bank account and deposited into someone else’s account. This may result from
payments to customers, or payments to business partners and vendors.

**Note:** Outbound ECP support is available only to clients currently using Chase Paymentech as their processor.

When creating an outbound ECP Transaction object:

1. Set the destPaymentMethod attribute with an ECP-based PaymentMethod object
   that contains information on the payee’s bank account. Leave the
   sourcePaymentMethod attribute unspecified.

2. Set the ecpTransactionType attribute to the value Outbound.

3. Point the account attribute to an Account object that contains the payee’s
   information.

```php
$txn = new Transaction();
// populate the transaction as shown in the previous example

$paymentMethod = new PaymentMethod();
$paymentMethod->setBillingAddress($address);
$paymentMethod->setType('ECP');
$ecp = new ECP();
// specify the account number where funds will be deposited
// (payee's account)
$ecp->setAccount('123456799');
// specify bank routing number (payee's bank)
$ecp->setRoutingNumber('3409284044');
$ecp->setAccountType('ConsumerChecking');
$paymentMethod->setECP($ecp);
```
// Since this is an outbound payment i.e. a deposit into
// payee's bank account and withdrawal from merchant's bank
// account, set the destPaymentMethod attribute of the transaction

$tx->setDestPaymentMethod($paymentMethod);
$tx->setEcpTransactionType('Outbound');
$sendEmailNotification = false;
$response = $tx->authCapture($sendEmailNotification);

if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        print "Successful\n";
    } else if($tx->statusLog[0]->status=='Cancelled') {
        // The transaction did not go through
        print "Declined. Reason code received from payment processor: ";
        print $tx->statusLog[0]->status->ecpStatus->authCode . "\n";
    }
}

The status changes on outbound transactions are similar to those for ECP inbound transactions. When the status changes to Captured, assume that the outbound payment is complete.
6.6 Using EDD and UK DD for One-Time Transactions

For real-time EDD or UK DD-based billing, construct a one-time Transaction object and call either the auth() or authCapture() method on it. If you call auth(), capture all the authorized transactions by making the batch capture() call later.

If the source payment method of a transaction is of type Direct Debit—the same enumerated paymentMethodType (value = DirectDebit) is used for both forms of Direct Debit—the transaction will process through the following status cycle:

1. CashBox assigns the transaction an immediate status of Authorized, indicating that both CashBox and the payment processor have performed a real-time validation of the payment information, and verified that the bank sort code and account number are not blacklisted. The processor has accepted the transaction, and the deposit process can begin. At this time, no funds are transferred.

2. The payment processor submits the transaction to the payment network for continued processing (withdrawal from the specified bank). The transaction status in CashBox changes to AuthorizedPending, indicating that the deposit process has started.

3. After four banking days have elapsed, CashBox sets the transaction status to Captured. Note that the number of banking days varies between payment processors. During the four European banking days:
   - If CashBox is notified by the payment processor that the transaction failed, that is, received a hard-error reason code from the processor, CashBox changes the transaction status to Cancelled. (For example, if the account specified in the payment method does not exist at the bank in question.)
   - If the payment processor sends CashBox a soft-error reason code that indicates that there will be an internal retry of the transaction (for example, due to insufficient funds), CashBox changes the transaction’s status to DepositRetryPending. The processor determines when to retry the transaction according to the retry schedule defined by you for your division ID registered with the processor. If the processor does not have such a schedule on file, it hard-fails the transaction, and returns a hard-error reason code. In response, CashBox changes the transaction status to Cancelled.

If during the four European banking days subsequent to the retry attempt, CashBox does not receive any hard or soft error codes from the processor, CashBox sets the transaction status to Captured.

Note: Be sure to send Vindicia your retry schedule by division ID.

The following example constructs a one-time Transaction object and calls authCapture() on it to process the transaction. This example also verifies that the processor has accepted the transaction for deposit, by ensuring that the immediate status of the transaction after the call is Authorized.

To construct a one-time Transaction object, substitute the appropriate country code and currency type. Because EDD and UK DD are both direct debit payment methods, routing is determined by country code and currency type. With country code GB and currency GBP, the payment will route to UK DD. With one of the European country codes and the euro or a local currency, payment will route to EDD.
Use EDD for a one-time transaction:

```php
$txn = new Transaction();
// Populate the transaction with other attributes such
// as account, transaction items, and amount.

// Assume that there is an existing Account with
// the merchantAccountId specified. If mandate storage
// is required for this transaction, this
// account must have a preferred language setting on it.
$acct = new Account();
$acct->setMerchantAccountId('lhaff1');
$txn->setAccount($acct);
$txn->setAmount(34.99);
$txn->setCurrency('EUR');
$txn->setMerchantTransactionId('MRCH-3402284');

// If you are enabling mandate storage for this transaction,
// include the IP address from which the purchase was made.
// In some countries the IP address is part
// of the signature on the mandate.
$txn->setSourceIp('198.209.56.17');

$txItem = new TransactionItem();
$txItem->setSku('5492');
$txItem->setName('Online video access');
$txItem->setPrice(34.99);
$txItem->setQuantity(1);
$txn->setItems(array($txItem));

// set EDD as source payment method
$paymentMethod = new PaymentMethod();

// needed for Vindicia's internal validation
$paymentMethod->setDirectDebit($dd);
$paymentMethod->setType('DirectDebit');
$dd = new DirectDebit();

// If this is an inbound payment, i.e. a withdrawal from a
// specified bank account, and a deposit into the
// merchant's account, set the source payment method in the
// transaction.
// Outbound payments (from the merchant's bank account to the
// customer’s), defined by setting the destination
// payment method in the transaction, are not supported.
$tx->setSourcePaymentMethod($paymentMethod);
$sendEmailNotification = false;
$response = $tx->authCapture($sendEmailNotification);
if($response['returnCode']==200) {
  if($tx->statusLog[0]->status=='Authorized') {
    print "Successful\n";
  }
  else if($tx->statusLog[0]->status=='Cancelled') {
    // The transaction did not go through
    print "Declined. Reason code received from payment processor: ";
    print $tx->statusLog[0]->status->directDebitStatus
    ->authCode . "\n";
  }
}

After initial authorization of the real-time transaction, monitor the transaction’s subsequent status changes by either looking it up on the CashBox Portal, or by calling one of the Transaction object’s fetch methods. For details, see Section 18: The Transaction Object in the CashBox API Guide.

### Note
Outbound payment transactions are those in which you have set the destPaymentMethod attribute to pay your customers. EDD does not support outbound transactions.

6.6.1 Understanding Mandates for Real-Time Billing with EDD

Mandates may be used for real-time billing with European Direct Debit (EDD). While recurring billing associates the mandate with an AutoBill object, real-time billing associates a mandate with a Transaction object.

For more information on working with mandates, see Section 5.5.1: Understanding Mandates for Recurring Billing with EDD.

To enable mandate storage for a real-time transaction:

1. Upload the HTML template of the mandate’s general text to the Vindicia servers.
2. Inform CashBox that you intend to store the mandate for a transaction by including special flags in the form of name–value pairs in the Transaction object before calling auth() or authCapture().
The following table lists the flags.

### Table 6-1 Transaction Object Flags

<table>
<thead>
<tr>
<th>Name of Flag</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>vin:MandateFlag</td>
<td>A value of 1 indicates that you would like to store the mandate for the associated Transaction object.</td>
</tr>
<tr>
<td>vin:MandateVersion</td>
<td>Specifies the mandate instance to be used for the associated Transaction object. If you do not specify this field, CashBox uses the most recently added template for the customer's preferred language and country.</td>
</tr>
<tr>
<td>vin:MandateBankName</td>
<td>Specifies the name of the customer's bank used for the mandate. (Required only in the Netherlands.)</td>
</tr>
</tbody>
</table>

3. Include the source IP address from which the customer made this purchase in the Transaction object.

4. Add the name–value pairs to the Transaction object before calling authCapture() on it.

**Enable mandate storage for a transaction:**

```php
$tx->setSourcePaymentMethod($paymentMethod);
// Set flags in the transaction to enable mandate storage
// You must have uploaded a mandate template of version 1.0
// to Vindicia servers prior to this.

_nv1 = new NameValuePair();
_nv1->setName('vin:MandateFlag');
_nv1->setValue('1');

_nv2 = new NameValuePair();
_nv2->setName('vin:MandateVersion');
_nv2->setValue('1.0');

_nv3 = new NameValuePair();
_nv3->setName('vin:MandateBankName');
_nv3->setValue('Deutsche Bank');

$tx->setNameValues(array($nv1, $nv2, $nv3));
// authCapture the transaction as shown in the previous example.
```

When creating a mandate instance to store with a transaction, CashBox uses the template that matches the preferredLanguage attribute of the Account object associated with the transaction.

**Note:** If you do not specify a value for preferredLanguage, CashBox defines the language for the mandate using the country specified in the EDD or UD DD payment method.
Use the CashBox Portal to view and retrieve mandates. If you have enabled a transaction for mandate storage, a link to view the mandate is displayed on the Transaction Detail page. Click that link to display the PDF of the mandate.

6.6.2 Understanding Mandates for Real-Time Billing with UK DD

For United Kingdom Direct Debit (UK DD), there is no need to pass the mandate to CashBox. The passing of the mandate is achieved directly through your integration with Go Cardless, the direct debit provider for UK DD. Go Cardless stores that data along with its current status, which you can manipulate in the mandate subobject.
6.7 Using PayPal for One-Time Transactions

For the PayPal payment method, the status of a transaction after an authCapture() call is AuthorizationPending. The payment flow for PayPal-based real-time transactions proceeds as follows:

1. When a customer clicks the PayPal button on your site, create a Transaction object that specifies PayPal as the payment method, and make a Transaction.authCapture() call.

2. When that call returns, examine the status of the returned Transaction object. If the status is not a failure (Cancelled), it is AuthorizationPending, which means that the transaction is in the CashBox and PayPal systems, and that it requires further action from the customer for completion.

3. PayPal notifies CashBox of the successful creation of the Transaction by issuing a PayPal token, which keeps the transaction valid for the next few hours.

4. The returned Transaction object contains a PayPal-specific status along with a URL, which contains the token information. Redirect the customer to that URL to complete PayPal's payment process.

5. Depending on the customer’s success or failure in completing the payment process, PayPal redirects the customer to a CashBox landing page, along with an indication of whether the payment succeeded or failed. That landing page in turn redirects the customer to a success or failure URL on your site. (Provide CashBox the success and failure URLs as attributes returnUrl and cancelUrl of the PayPal payment method for the transaction.) From this page, make a call to CashBox to finalize the PayPal authorization so that CashBox can update the status of the transaction. This call requires you to pass in the ID of the transaction, which you can find in the redirected URL. It is value-associated with name: vindicia_vid in the redirect URL.

Use PayPal for a one-time transaction:

```
$tx = new Transaction();
// populate the transaction as shown in earlier examples
$paymentMethod = new PaymentMethod();
$paymentMethod->setType('PayPal');
$payPal = new PayPal();
// request a ReferenceId from PayPal
$payPal->setRequestReferenceId('true');
// Set the URL to which the customer will be redirected after
// completing the payment process at PayPal’s site, and
// returning to Vindicia’s landing page.
$payPal->setReturnUrl('http://myshoppingcart.merchant.com');
// specify the bank routing number
$payPal->setCancelUrl('http://tryagain.merchant.com');
$paymentMethod->setPayPal($payPal);
$tx->setSourcePaymentMethod($paymentMethod);
```
$sendEmailNotification = false;
$response = $tx->authCapture($sendEmailNotification);
if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='AuthorizationPending') {
        $payPalUrl = $tx->statusLog[0]->payPalStatus->redirectUrl;
        // send customer to this URL for completion of payment
        // formalities at PayPal's site
    } else if($tx->statusLog[0]->status=='Cancelled') {
        // The transaction was not accepted by PayPal
    }
}

After successfully completing the payment process, the customer is redirected to the return URL in the PayPal-based PaymentMethod object. From this page, finalize the Transaction to update its status in CashBox.

$soap_caller = new Transaction();
// obtain id of the PayPal transaction
// from the redirect URL. It is the value associated with name
// 'vindicia_vid'
$payPalTxId = ... ;

// if calling from return URL which is reached when the PayPal
// transaction is successfully authorized you should set the
// success input parameter to true, from the cancelUrl it should
// be set to false. Let’s assume success here:
$success = true;
$response =
    $soap_caller->finalizePayPalAuth($payPalTxId, $success);
if($response['returnCode'] == 200) {
    printLog "Transaction authorized";
}

CashBox updates the Transaction status to Authorized, which changes to Captured after CashBox has finished processing this and other PayPal transactions in a batch.

Note: If you request that PayPal return a referenceId for the Transaction, its paymentMethod may be used for recurring payments. For more information, see Section 5.6: Using PayPal for Recurring Billing, and the Using CashBox with PayPal white paper, available from Vindicia Client Services.
6.8 Recording a Payment Manually

Entering a payment manually allows a merchant to enter a transaction that occurs outside the CashBox automated process. This may be used to enter cash or check payments made in person to the merchant, goods or services accepted in trade for an outstanding invoice, or any other payment method the merchant allows.

CashBox offers two ways to enter a payment manually through the API: using `Account.makePayment`, and using `AutoBill.makePayment`. (You may also enter a payment through the CashBox Portal.)

A merchant-entered payment is applied to outstanding AutoBills with a PaymentMethod of "Merchant Recorded Payment." Unless otherwise specified by the Merchant, CashBox credits the Account's AutoBills as follows:

- A manually entered payment is applied first to the oldest outstanding AutoBill.
- Any remaining monies are applied to the next oldest AutoBill, until the payment is exhausted, or all AutoBills have been paid.
- Any monies left after all AutoBills have been paid appear as a credit to the account.

Use the `makePayment` method on the `AutoBill` object to apply a payment directly to an outstanding AutoBill. To make a payment to the oldest open invoice, use `Account.makePayment` instead.

If a payment fails at the financial institution, or if you wish to reverse a payment for other reasons, use `reversePayment` on the corresponding object to reverse a payment entered using `makePayment`.

Record a payment manually:

```php
$autobill = new AutoBill();
$autobill->setMerchantAutoBillId($abID);       // for some $abID

$pm = new PaymentMethod();
$pm->setType('MerchantAcceptedPayment');
$pm->setMerchantPaymentMethodId('macc cash '. $time);

$macc = new MerchantAcceptedPayment();
$macc->setAmount(4.50);
$macc->setCurrency('USD');
$macc->setTimestamp($now);
$macc->setPaymentId('macc cash ' . $time);
$macc->setNote('cold hard cash');

$pm->setMerchantAcceptedPayment($macc);

$pm->update(  
    true,       // validate  
    0,          // chargeback probability  
    false,      // replace on all AutoBills  
    null,       // ip  
    null,       // AVS  
    null        // CVN
    );
```
$response = $autobill->makePayment(
    $pm,
    null,       // amount - see $macc
    null,       // currency - see $macc
    'inv-bac',  // invoice id
    null,
    null,
    '$4.50 in cold hard cash'
);

// check $response
6.9 Importing Transactions from other Billing Systems to CashBox

Use `Transaction.migrate` to migrate historic Transaction information into CashBox. Each `MigrationTransaction` included in the `migrate` call will result in the creation of a Transaction that can be operated on (fetch, refund, and etc.) as if it had originated in CashBox. Note, however, that some operations (refund) require that the Transaction be in one of the following states:

- Captured
- Refunded
- Settled

After you send data to CashBox, CashBox will issue a Return object with `returnCode` and `returnString` to inform you if the call completed successfully. (Codes for the Return object are modeled after standard HTTP return codes). If the call succeeds, you receive a code of 200 and the string OK. `returnCode` and `returnString` may be used to interpret errors. If one or more of the `MigrationTransactions` included in the `migrate` call failed to be migrated, the return will also include an array of `TransactionValidationResponse` objects describing how/why the migration attempt failed. Be certain to act upon the `TransactionValidationResponses` returned.

For more information, see `Transaction.migrate` in the `CashBox API Guide`. 
6.10 Refunding Customers

Use the Refund object to refund customers. For compliance reasons, CashBox allows refunds for no more than the amount of the original transaction, but supports both full and partial refunds of the original charge.

CashBox automatically creates transactions for recurring billing from AutoBill objects. Fetch these transactions from CashBox by calling Transaction->fetchDeltaSince(), or search for them on the CashBox Portal. Use transaction data as a basis for your customer refund. Search by merchantTransactionId for an AutoBill-related transaction and for the refund amount.

Refund a previously completed Transaction:

(Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.)

```php
// Create a new Refund object
$refund = new Refund();

$txn = new Transaction();

// specify a known transaction by its merchant ID. This transaction
// should be in the 'Captured' state so it can be refunded
$txn->setMerchantTransactionId('WID-CUS-9302871');

// associate the account and refund objects
$refund->setTransaction($txn);

// set the amount of the refund
$refund->setAmount(10.00);
$refund->setTimestamp('2009-02-11T22:34:32.265Z');
$refund->setReferenceString('myRefundId101');</p>

// object created so we can call perform() method on it
$refundFactory = new Refund();

// refund the transaction using the SOAP call
$response = $refundFactory->perform(array($refund));
```

For more information, see the Section 15: The Refund Object in the CashBox API Guide.
7 Working with Entitlements

An **Entitlement** defines the goods or services to which a customer is entitled, as obtained through a subscription. An **Entitlement** object associated with an **Account** object specifies whether a customer has access to a service or product on the date the **Entitlement** object is retrieved from CashBox.

Entitlements may be associated with Accounts, Billing Plans, or Products.

The **Entitlement** object encapsulates the Entitlement's description, status, start and end timestamp, and the Account to which the Entitlement applies.

---

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See **Merchant Identifiers** for more information.

---

**Note:** If you are upgrading from CashBox 4.1 or previous, you must contact Vindicia Client Services to enable a merchant configuration setting which will allow Entitlements to work properly for CashBox 4.2 and greater.
7.1 Creating Entitlements

Entitlement IDs are optional, and are simple strings that are merchant-defined. The example in Section 4.1: Creating Billing Plans, defines the merchantEntitlementId: “Standard,” and associates it with the BillingPlan object. The example in Section 3.1: Creating Products, defines the merchantEntitlementId: “Video Access,” and associates it with the Product object. Billing plans and products may contain an unlimited number of entitlement IDs.

Use the online magazine site as an example in defining a customer’s access using entitlement IDs. Define one merchantEntitlementId for general access, and name it Standard. Create another merchantEntitlementId for more extensive access to the site, and name it Premium. Then, design your site so that premium customers can access a special multimedia content area in addition to the magazines available to standard subscribers.

To grant an entitlement to an Account, create an AutoBill that includes a Product with the entitlement, or assign the entitlement directly to the Account.

Entitlements granted directly to an Account must be granted and revoked manually; they will not be automatically generated by CashBox.

Entitlements granted to an Account through an AutoBill (with a Product or Billing Plan holding Entitlements), remain on the Account as long as the AutoBill is in Good Standing status.

The entitlement.fetch* methods will return entitlements granted both ways.

For example, if an AutoBill for an Account includes one Product that offers Video access entitlement, and a second Product that offers Premium entitlement, the effective entitlements available to the Account while the AutoBill object is active, are Video access and Premium.
7.2 Entitlement Status

CashBox manages Entitlements with the assumption that your customers will continue to pay their bills. Working under this premise, an Entitlement is deemed to be active until the end of Billing Plan associated with the AutoBill. If the Billing Plan defines an unlimited series of payments, the endTimestamp for the Entitlement will be infinite, and the Entitlement will be considered active until the Billing Plan ends, or the AutoBill is stopped due to customer request, or failure to pay.

In creating Entitlement object, CashBox assumes that the Entitlement will be active as long as the Billing Plan is in effect.

An Entitlement object becomes inactive:

- when the AutoBill ends.
- when the AutoBill is cancelled with immediate disentitlement.
- if your customer has failed to pay a scheduled payment, and their grace period has expired. (The grace period allows your customers continued access after the Billing date, to allow for attempted retries, if necessary. Note that the grace period does not extend the end-date if the AutoBill object has been cancelled.)

7.3 Caching Entitlements

Do not make a SOAP call to CashBox to check a customer’s account’s entitlements every time the customer logs in or attempts to access a certain resource. Instead, cache entitlements locally, and query their status at periodic intervals (for example, by making a $entitlement->fetchDeltaSince() call once a day).

While caching an Entitlement object for an Account object, remember that the active status of the entitlement is valid only until the endTimestamp value specified on the Entitlement object. If you make periodic Entitlement->fetchDeltaSince() calls, you may receive an updated Entitlement object. If you do not receive such an update, assume that the Entitlement object is still valid.

If you are not making periodic Entitlement->fetchDeltaSince() calls to automatically receive updated Entitlement objects, the cached active status of an entitlement is valid until endTimestamp. To proactively obtain an update to the Entitlement object, make an entitlement->fetchByEntitlementIdAndAccount() or Entitlement->fetchByAccount() call. If the Entitlement object is revoked prematurely due to an AutoBill cancellation, your cached records will not be up-to-date. Therefore, make a periodic Entitlement->fetchDeltaSince() call that returns all Entitlement objects that might have changed since the specified timestamp, to maintain current entitlement status.
When a customer logs into your site and tries to access a resource, examine the (cached) Account's Entitlements and their expiration dates, to determine whether to allow the customer entry. Do not retrieve the AutoBill object for the Account and examine its status, as Entitlements may remain active after an AutoBill has been stopped. For example, if a subscription is cancelled midway through a Billing Period, the AutoBill status will be Stopped, but the customer may be granted access until the paid period expires.

The Entitlement object provides two methods for retrieving entitlements by the Account object, entitlementID, or both:

```php
$entitlement->fetchByEntitlementIdAndAccount()
and
$entitlement->fetchByAccount().
```

Call these methods to determine if a customer can access a specific resource on your site. Both methods return Entitlement objects, each specifying an Account object, an entitlementID, and an endTimestamp value. To show if the Entitlement object is active on the date fetched, CashBox sets the value of the active flag on the Entitlement objects returned by the calls according to the status of the associated AutoBill object and its end-date (the time until which the customer is expected to pay).
8 Working with Rate Plans

CashBox Rate Plans allow you to create tiered pricing structures for your Products. These can be License (prepaid) or Usage based (postpaid), and the units by which they are measured may be defined to fit your needs.

Most Rate Plan operations should be performed using the CashBox GUI, including creating and applying Rate Plans to existing Products. Use the CashBox API to create an AutoBill that includes an AutoBillItem with a pre-defined Rate Plan, to upload collected Rated Units, or to fetch a history of reported Events.

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.
8.1 Recording Rated Units

“Rated Units” are the means by which CashBox measures the number of licenses or units of usage for which your customers are billed. CashBox needs to be informed of the actual usage of your product. To enter customer usage for billing calculations, you must report Rated Units as Events through the CashBox API.

Rated Units are grouped into Events for reporting purposes. Each Event must be associated with a single AutoBillItem; but one AutoBillItem can have any number of Events.

When Events are reported for usage-based plans, the events are stored as unbilled usage until the scheduled billing date, at which point they are aggregated and compared to the appropriate rate plan for rating and billing.

Use the RatePlan.recordEvent method to pass an array of Events to your CashBox system. If you wish to pass more than 50 Events, you must break your call into several separate Record calls. However, because each Event can have any Quantity, you can define an Event to be either the actual usage, or some group or period of usage.

---

Note: CashBox allows 50 Events to be reported through each Record call. Vindicia best practices recommendation is to use the recordEvent method to report batches of Events, at designated moments throughout the day.

---

Each Event refers to exactly one AutoBillItem, and the Event object must identify the item that is intended. When reporting Events, be certain to identify a unique AutoBillItem for each Event. The AutoBillItem may be identified using any combination of the following objects’ identifiers: Account, AutoBill, AutoBillItem, or Product. CashBox requires that at least one of the following three data members be specified: Account, AutoBill, or AutoBillItem.

When reporting Events, CashBox will issue an error if two AutoBillItems exist which fulfill the reported Event parameters. Be certain to pass in enough information to uniquely identify the AutoBillItem to which the Event should refer.

The following example identifies the AutoBillItem directly.
Record a Rated Unit Event:

```php
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_123');
$event->setMerchantAutoBillItemId('abitem_321');
$event->setAmount(42);
$response = $rateplan->recordEvent(array($event));
```

While the **merchantEventId** is optional, it may be used to guarantee that a single Event is not reported multiple times. If you report the same Event twice with the same identifier, CashBox will reject the second reported Event. It is also useful in customer support, when searching for a questioned billing item.

In the previous example, *rating_123* is used as an identifier for the Reported Event.

Record an Event for a specific AutoBill:

The following example identifies the rated **AutoBillItem** by its **MerchantAutoBillId**. If there is only one **AutoBillItem** on the listed **AutoBill**, this method will uniquely identify the **AutoBillItem**. If there is more than one **AutoBillItem** on the **AutoBill**, CashBox will return an error string saying the input **AutoBillItem** is not unique.

```php
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_124');
$event->setMerchantAutoBillId('ab_715');
$event->setAmount(42);
$response = $rateplan->recordEvent(array($event));
```

**Note:** When working with Rate Plans, assign a name to **AutoBillItems**, to facilitate working with **Events**.

Record an Event for a specific AutoBill and Product:

```php
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_125');
$event->setMerchantAutoBillId('ab_715');
$event->setMerchantProductId('pr_29');
$event->setAmount(42);
$response = $rateplan->recordEvent(array($event));
```

If there are multiple rated **Products** on an **AutoBill**, identifying both the **AutoBill** and the **Product ID** may uniquely identify the **AutoBillItem** associated with the **Event**.
8.2 Deducting Rated Units

CashBox also allows you to deduct unbilled Rated Units from an AutoBill.

Use the `deductEvent` method to reduce the outstanding, unbilled balance of Events for an AutoBill, by creating a new Event, with a negative value. Use the `reverseEvent` call to remove a specific, previously recorded Event.

---

**Note:** Calling `deductEvent` will fail if it results in a negative Rated Unit balance on the `AutoBillItem`. CashBox does not support negative balances on Rated Units.

---

Use `reverseEvent` to credit an Account for previously billed Events.

**Deduct Events:**

```php
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_129');
$event->setMerchantAutoBillId('ab_715');
$event->setAmount(2);

$response = $rateplan->deductEvent(array($event));
```

CashBox tracks this deduction as a distinct Event, available in any audit trail of Events.

8.3 Reversing (Billed) Rated Unit Events

`reverseEvent` is similar to `deductEvent`, but differs in that it must refer to an Event that has been previously recorded. `reverseEvent` may not be used to add a negative number of Rated Units to an Account; it may only be used to reverse a previously recorded Event.

`reverseEvent` may only be applied to Events for which the customer has not yet been billed. Therefore, CashBox will not construct a Credit or process a refund for the item.

**Reverse Rated Unit Events:**

```php
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_124');
$event->setMerchantAutoBillId('ab_715');

$response = $rateplan->reverseEvent(array($event));
```
8.4 Fetching and Reporting Rated Units

In working with Rated Products, your customers' access will be measured (and billed) in Rated Unit Events. CashBox offers an API interface to work with this reporting system.

8.4.1 Fetching a Summary (Total) of Unbilled Rated Unit Events

Calling `fetchUnbilledRatedUnitsTotal` calculates the number of Units and the currency amount billable for a given AutoBill (or AutoBills) at the moment of the call. This call returns a `RatedUnitSummary` object, which contains the totals for a single AutoBillItem.

| Note: | This call returns the number of unbilled Units at the moment of the call. This call will not reflect the amount for which your customer will be billed if more Events are reported before the end of the current Billing Cycle. |

This example requests a report for all the unbilled Rated Units for a specified AutoBill, and returns an array of one Summary for each rated AutoBillItem included on the AutoBill. For example, if an AutoBill has two rated AutoBillItems, the call will return an array of two `RatedUnitSummary` objects.

**Fetch a summary of unbilled Rated Unit Events:**

```php
$rateplan = new RatePlan;
$response = $rateplan->fetchUnbilledRatedUnitsTotal(  
    null, # $account
    $myAutoBill, # $myAutoBill
    null, # $product
    null, # $ratePlan
    null, # $startTimestamp
    null, # $endTimestamp
    0, # $page
    50, # $pageSize
);
$summaries = $response->{'data'}->ratedUnitSummary;
foreach ($summaries as $sum) {
    print $sum->{'ratedUnitTotal'};
    print $sum->{'currentTotalRatedUnitsBill'};
}
```
Fetch a summary of unbilled Events for a specified AutoBill and Product:

```php
$rateplan = new RatePlan;
$response = $rateplan->fetchUnbilledRatedUnitsTotal(
    null,       # $account
    $myAutoBill,# $myAutoBill
    $myProduct, # $myProduct
    null,       # $ratePlan
    null,       # $startTimestamp
    null,       # $endTimestamp
    0,          # $page
    50,         # $pageSize
);
$summaries = $response->['data']->ratedUnitSummary;
foreach ($summaries as $sum) {
    print $sum->ratedUnitTotal;
    print $sum->currentTotalRatedUnitsBill;
}
```

This call returns two Summary objects, as shown below.

<table>
<thead>
<tr>
<th>1st object</th>
</tr>
</thead>
<tbody>
<tr>
<td>accountVid</td>
</tr>
<tr>
<td>autoBillItemVid</td>
</tr>
<tr>
<td>autoBillVid</td>
</tr>
<tr>
<td>productVid</td>
</tr>
<tr>
<td>ratePlanVid</td>
</tr>
<tr>
<td>merchantAccountId</td>
</tr>
<tr>
<td>merchantAutoBillId</td>
</tr>
<tr>
<td>merchantAutoBillItemId</td>
</tr>
<tr>
<td>merchantProductId</td>
</tr>
<tr>
<td>merchantRatePlanId</td>
</tr>
<tr>
<td>currentTier</td>
</tr>
<tr>
<td>currentTotalRatedUnitsBill</td>
</tr>
<tr>
<td>eventCount</td>
</tr>
<tr>
<td>ratedUnit</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>ratedUnitTotal</td>
</tr>
</tbody>
</table>
This example returns two \texttt{RatedUnitSummary} objects, because there are two different \texttt{AutoBillItems} that match the query. The first bills for 37, and the second for 21 minutes of use on different Rate Plans. There is one event for each. If the customer were to be billed now, they would be charged for one minute at $4.27, and one hour at $3.15.

### 8.4.2 Fetching Billed or Unbilled Rated Unit Events

CashBox allows you to fetch both billed and unbilled Rated Unit Events, allowing you to compare your customer’s current with previous use patterns.

Calling \texttt{fetchUnbilledEvents} returns the (unbilled) Events themselves, rather than a Summary Report. Use this call to display your customer’s (not yet billed) use for the current Billing Cycle.

\texttt{fetchEvents} differs from this call only in that it will return \texttt{ALL} Events for the given input parameters, billed or unbilled. Use this call to compare your customer’s previous use with their current use, or to determine applicable upgrade plans to offer.

**Fetch unbilled Rated Unit Events:**
$rateplan = new RatePlan;
$response = $rateplan->fetchUnbilledEvents(
    null,       # $account
    $myAutoBill,# $myAutoBill
    $myProduct, # $myProduct
    null,       # $ratePlan
    null,       # $startTimestamp
    null,       # $endTimestamp
    0,          # $page
    50,         # $pageSize
);
$events = $response->['data']->event;
foreach ($events as $ev) {
    print $ev->amount;
    print $ev->description;
    print $ev->eventDate;
    print $ev->billedStatus;
    print $ev->VID;
}

For this call, the arguments are the same as those for
fetchUnbilledRatedUnitsTotal, but the objects returned are different;
fetchUnbilledRatedUnitsTotal returns all Events corresponding to the
AutoBillItems for the given AutoBill and Product, rather than simply a summary.

The returned Events include two fields in addition to those passed in using recordEvent:
   • billedStatus lists whether the event has been billed (in items returned from
     fetchUnbilledEvents, this will always be false; if you call fetchEvents, it could be
     true or false).
   • VID is Vindicia's unique identifier for the Event.

For more information on returned data members for the Event, see the Event Subobject in the
CashBox API Guide.

Note that all optional data members identifying the event (such as the autoBillVid) will
be entered by CashBox, if available.
8.5 Understanding License Based Quantities

When billing for license-based rated products, use the Quantity field for the related AutoBill Item to specify the number of licenses to prepay. You can change the quantity at any time during the billing cycle, using either the autobill.modify() method or through the CashBox portal. Proration of mid-cycle changes is available using the same proration parameters available for all modifications.
CashBox can automatically issue customer notifications at predefined moments in the billing cycle, using customized templates. Templates can be defined to notify your customers of billing events (imminent, in-process, successful, or failed), to submit invoices, to warn of a pending subscription expiration, to inform of an overdue balance, or to simply keep them informed of changes in their subscription plan. Work with Vindicia Client Services to create templates to keep your customers informed and engaged in their relationship with your company and your products.

**Note:** Creating CashBox templates differs for Billing notifications and Invoicing events, in that Billing templates use a different tag format than Invoicing templates. Be certain to use the appropriate system when creating your Templates.

CashBox requires that you submit an email template as well, if you wish Billing and Invoicing notifications to be emailed to your customers. The email template contains the email headers; the Billing and Invoicing templates include the email contents.

**Note:**
- If you do not submit an email template, no notifications will be emailed to your customers.
- If you do not define any templates, no notifications will occur. For example, if no Soft Fail notification is in the database, CashBox will not notify the customer on a soft fail.
- If you do not set a preferred language for any template and an English language template exists in the database, CashBox notifies the customer using the English language template.

If the `prenotifyDays` setting in a `BillingPlan` object is 0 or is not set, CashBox sends no prebilling notifications.
9.1 Setting the Preferred Language

CashBox allows you to offer templates in multiple languages. For example, you can define billing notification templates in English, German, French, and Chinese. The notification template used will be based on the customer’s preferred language setting in the Account object.

To define the preferred language, use the W3C IANA Language Subtag Registry standard. (CashBox supports the ISO-639.2 standard, but recommends the IANA Language Subtag Registry, which is more recent and complete than the ISO-639.2.)

If no active template in the customer’s preferred language exists for a billing event, CashBox sends the English version. If the English version does not exist, CashBox sends no notifications.

9.2 Working with Billing Events

CashBox can be configured to automatically send email notifications to your customers for various billing events, including impending transactions, AutoBill expiration or renewal, or payment processing. To enable these events, you must set the corresponding flags through the Cashbox API, and supply Vindicia with the corresponding email templates. If no template is supplied, no email can be sent.

Contact your Client Services representative for more information.

9.2.1 CashBox Billing Events

CashBox can be configured to issue email notification of the following billing events. To generate the email, the appropriate flag must be set to true, and the corresponding email template must be available to CashBox.
The following table lists the CashBox billing events and suggested email content.

Table 9-1 Billing Events

<table>
<thead>
<tr>
<th>Notice / Event</th>
<th>Suggested Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prebilling</strong></td>
<td>The billing event is pending.</td>
</tr>
<tr>
<td><strong>Initial Success</strong></td>
<td>The first billing event for a new AutoBill has been successful.</td>
</tr>
<tr>
<td><strong>Success</strong></td>
<td>A successful billing event has occurred.</td>
</tr>
<tr>
<td><strong>Soft Fail</strong></td>
<td>The billing attempt has failed. The payment processor's return code indicates that if the card is resubmitted, the billing might succeed. CashBox will retry.</td>
</tr>
<tr>
<td><strong>Hard Fail</strong></td>
<td>The billing attempt has failed. The payment processor's return code indicates that no more transactions will be accepted.</td>
</tr>
<tr>
<td><strong>Cancellation</strong></td>
<td>The customer has opted out of the AutoBill Subscription, and an upcoming bill has been cancelled.</td>
</tr>
<tr>
<td><strong>Billing Delay</strong></td>
<td>Issued upon a billing delay (extension of entitlements, without captured payment), only if the customer has not been pre-notified of the billing event.</td>
</tr>
<tr>
<td><strong>Prenotification: No Payment Method</strong></td>
<td>Issued as a Prebilling Notification, when no Payment Method is listed for the AutoBill.</td>
</tr>
</tbody>
</table>
Table 9-1 Billing Events *(Continued)*

<table>
<thead>
<tr>
<th>Notice / Event</th>
<th>Suggested Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Failure: No Payment Method</strong></td>
<td>The billing attempt has failed due to lack of a defined Payment Method. The date of the next billing attempt, with product information, billing address, and transaction details (transaction number, billing date, and payment information), and the total amount for the transaction. Include instructions for your customer to update their billing information.</td>
</tr>
<tr>
<td><strong>Credit Card Expiration Warning</strong></td>
<td>The customer’s credit card will expire in $x$ months, where $x$ is the number of months warning you want to give the customer. The name on the credit card, the last four digits of the card number, the expiration date of the card, the customer identifier. Include instructions for your customer to update their credit card.</td>
</tr>
<tr>
<td><strong>Expiration</strong></td>
<td>The billing plan is about to expire with no more periods defined. Product information, an expiration date for the subscription, and information on how to extend the subscription.</td>
</tr>
<tr>
<td><strong>End of Trial</strong></td>
<td>The customer’s free trial period is about to expire. Product information, the duration and expiration date of the free trial, subscription amount, and other billing details for the paying subscription that is about to begin. Include opt-out instructions.</td>
</tr>
<tr>
<td><strong>Real-Time Inbound Failure</strong></td>
<td>A real-time transaction initiated by a customer for you has failed. Product information, billing address, and transaction details, including the transaction number, billing date, account number, amount, currency and sales tax (if applicable). Include instructions on how to update the account and remedy any issues.</td>
</tr>
<tr>
<td><strong>Real-Time Inbound Success</strong></td>
<td>A real-time transaction initiated by a customer for you has succeeded. Product information, billing address, and transaction details, including the transaction number, billing date, account number, amount, currency and sales tax (if applicable).</td>
</tr>
<tr>
<td><strong>Real-Time Outbound Failure</strong></td>
<td>A real-time transaction initiated by you for a customer has failed. Line-item details on the transaction and on the account to which the payment applies.</td>
</tr>
<tr>
<td><strong>Real-Time Outbound Success</strong></td>
<td>A real-time transaction initiated by you for a customer has succeeded. Line-item details on the transaction and on the account to which the payment applies.</td>
</tr>
<tr>
<td><strong>Refund</strong></td>
<td>A refund to the customer has succeeded. Product information, billing address, and refund details: transaction number, refund date, payment method, and amount. (If the Payment Method is Tokens, provide a Token balance in the message.)</td>
</tr>
<tr>
<td><strong>Push Initiation</strong></td>
<td>A push payment has begun. Product information, and instructions on how to complete the transaction, including the URL for the payment slip form.</td>
</tr>
</tbody>
</table>
Table 9-1 Billing Events (Continued)

<table>
<thead>
<tr>
<th>Notice / Event</th>
<th>Suggested Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Push Reminder</strong></td>
<td>The customer has not completed a push payment transaction within the allotted time.</td>
</tr>
<tr>
<td><strong>Failure: Insufficient Tokens</strong></td>
<td>Not enough tokens are available to pay for a recurring Transaction.</td>
</tr>
<tr>
<td><strong>Failure: Insufficient Tokens</strong></td>
<td>Not enough tokens are available to pay for a one-time Transaction.</td>
</tr>
</tbody>
</table>

9.2.2 Billing Event Settings

The following table lists the customizations available to your notification timing through the CashBox API.

Table 9-2 Settings for Notification Templates

<table>
<thead>
<tr>
<th>Notification</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prebilling</td>
<td>BillingPlan.prenotifyDays: Sets the number of days before billing will occur to send the notification. If the prenotifyDays setting in a BillingPlan object is 0 or not set, CashBox sends no prebilling notifications. Account.warnBeforeAutobilling: Specifies whether or not to send prebilling notifications to the customer. doNotNotifyOnFirstBill: Cancels the first prebilling notification for a BillingPlan period, to prevent the customer from receiving a prebilling notification on the same day that they sign up.</td>
</tr>
<tr>
<td>Initial Success</td>
<td>None.</td>
</tr>
<tr>
<td>Success</td>
<td>None.</td>
</tr>
<tr>
<td>Hard Fail</td>
<td>Work with Vindicia to map the payment processor reason codes to hard fails, to define the number of days after the billing attempt fails CashBox should retry, and to define the number of retries. By default, CashBox retries hard fails only once, and sends notifications if the first retry fails. (CashBox may also be set to send hard-fail notifications for push payment methods after the transaction has expired, for example, if a customer does not perform the tasks necessary to complete the transaction.)</td>
</tr>
<tr>
<td>Soft Fail</td>
<td>Work with Vindicia to map the payment processor reason codes to soft fails, to define the number of days after the billing attempt fails CashBox should retry, and to define the number of retries. CashBox retries soft fails until it exhausts the number of retries specified. If the final retry fails, CashBox sets the Soft Fail to Hard Fail.</td>
</tr>
<tr>
<td>Cancellation</td>
<td>None.</td>
</tr>
<tr>
<td>End of Trial</td>
<td>BillingPlan.expireWarningDays: Sets the number of days before a free trial ends to send a warning email. Whether to send this notification may also be defined at the AutoBill level.</td>
</tr>
</tbody>
</table>
Parent-Child Account Billing Notifications

CashBox automatically determines which Accounts will receive Billing Notifications in a Parent-Child relationship, depending on which Account is the holder of the Payment Method attached to the AutoBill.

(In all cases, email generation is dependent upon your notification settings.)

For AutoBills held by a Child Account, but paid by the Parent’s Payment Method, the following notifications are sent to both the Parent and the Child Account:

- Billing Delay, No Payment Method?
- Cancellation
- Expiration
- Failure (Insufficient Tokens or No Payment Method)
- Pre-billing, No Payment Method

The following notifications are sent only to the Parent Account (the holder of the Payment Method associated with the AutoBill):

- Billing Delay
- End of Trial
- Hard Fail
- Pre-billing
- Real-Time Tx Outbound Fail
- Real-Time Tx Outbound Success
- Real-Time Tx, Insufficient Tokens
- Refund Success

Table 9-2 Settings for Notification Templates (Continued)

<table>
<thead>
<tr>
<th>Notification</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration</td>
<td>BillingPlan.expireWarningDays: Sets the number of days before a subscrip-</td>
</tr>
<tr>
<td></td>
<td>tion ends to send a warning email. Whether to send this notification may</td>
</tr>
<tr>
<td></td>
<td>also be defined at the AutoBill level.</td>
</tr>
<tr>
<td>Refund</td>
<td>None.</td>
</tr>
<tr>
<td>Real-Time Inbound Success</td>
<td>None.</td>
</tr>
<tr>
<td>Real-Time Outbound Success</td>
<td>None.</td>
</tr>
<tr>
<td>Real-Time Inbound Failure</td>
<td>None.</td>
</tr>
<tr>
<td>Push Initiation</td>
<td>None.</td>
</tr>
<tr>
<td>Push Reminder</td>
<td>Contact Vindicia Client Services to set the number of days after initia-</td>
</tr>
<tr>
<td></td>
<td>tion to send this reminder, and to specify the number of reminders (retry</td>
</tr>
<tr>
<td></td>
<td>times).</td>
</tr>
<tr>
<td>Insufficient Tokens</td>
<td>None.</td>
</tr>
<tr>
<td>Tokens Granted</td>
<td>None.</td>
</tr>
</tbody>
</table>
• Soft Fail
• Success

Note: If a Child Account is the holder of the Payment Method, only the Child Account will receive these notifications.

9.2.4 Creating Billing Notification Templates

To create a notification template, use variables, or “tags,” that pull information from CashBox to provide customer- and Account-specific information. Work with Vindicia Client Services to submit your templates for inclusion in your CashBox system.

Create billing notification templates in HTML. Vindicia recommends that you use an industry-standard HTML editor (do not use Word HTML). Host graphics, if any, from your site and point to them in the templates using HTML href tags.

Billing Event Template Tags

Tags are used to provide a place holder in the template where CashBox data will be inserted when the billing event notification is rendered. CashBox notification templates support looping, to allow for multiple charges, credits, or payments.

The following tags may be used in a Billing Event template:

Table 9-3 Billing Event Template Tags (Variables)

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;tpl name=&quot;address&quot;/&gt;</td>
<td>The billing address (multiple lines).</td>
</tr>
<tr>
<td></td>
<td>Note: This tuple will print the customer’s name, as well as all lines included in the billing address.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;amount&quot;/&gt;</td>
<td>The total transaction amount.</td>
</tr>
<tr>
<td></td>
<td>Note: This is a deprecated tag. Specify grand_total instead.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;billing_plan_desc&quot;/&gt;</td>
<td>The Billing Plan’s description.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;billing_plan_id&quot;/&gt;</td>
<td>The merchantBillingPlanId.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;ccnum&quot;/&gt;</td>
<td>The credit-card number (the last four digits only).</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;cctype&quot;/&gt;</td>
<td>The credit-card type, such as Visa or MasterCard.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;currency&quot;/&gt;</td>
<td>The currency code, for example, USD, or the description of the token type that serves as payment, for example, Award Points, Downloads, or Transférer.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;currency_symbol&quot;/&gt;</td>
<td>The Billing Plan’s currency, as indicated by the ISO 4217 currency code entered for the BillingPlanPrice object’s currency data member.</td>
</tr>
<tr>
<td>&lt;tpl name=&quot;date&quot;/&gt;</td>
<td>The billing date (MM-DD-YYYY).</td>
</tr>
</tbody>
</table>
Table 9-3 Billing Event Template Tags (Variables) (Continued)

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;tpl name=&quot;desc[n]&quot;/&gt;</code></td>
<td>An array of line-item descriptions that accompany real-time transaction</td>
</tr>
<tr>
<td></td>
<td>notifications. Specify each item of the array and provide the maximum</td>
</tr>
<tr>
<td></td>
<td>number of line items expected. For example:</td>
</tr>
<tr>
<td></td>
<td><code>&lt;tpl name=&quot;desc[0]&quot;/&gt;</code></td>
</tr>
<tr>
<td></td>
<td><code>&lt;tpl name=&quot;desc[1]&quot;/&gt;</code></td>
</tr>
<tr>
<td></td>
<td><code>&lt;tpl name=&quot;desc[2]&quot;/&gt;</code></td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;expirationdate&quot;/&gt;</code></td>
<td>The subscription’s expiration date (MM-DD-YYYY).</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;formaction&quot;/&gt;</code></td>
<td>The URL for a push payment method slip from the payment processor.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;grand_total&quot;/&gt;</code></td>
<td>The grand total of the transaction. For prebilling and postbilling</td>
</tr>
<tr>
<td></td>
<td>notifications, this is the total cost (subtotal plus tax). For tokens, this</td>
</tr>
<tr>
<td></td>
<td>value is the same as <code>&lt;amount&gt;</code></td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;interval&quot;/&gt;</code></td>
<td>The length of the billing period, such as 12 months.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;invoiceno&quot;/&gt;</code></td>
<td>The transaction ID, available only after you have submitted a transac-</td>
</tr>
<tr>
<td></td>
<td>tion.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;ISOdate&quot;/&gt;</code></td>
<td>The billing date (YYYY-MM-DD).</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;ISOexpirationdate&quot;/&gt;</code></td>
<td>The subscription’s expiration date (YYYY-MM-DD).</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;ISOnextdate&quot;/&gt;</code></td>
<td>The next billing date, that is, the next retry after failure or the next</td>
</tr>
<tr>
<td></td>
<td>scheduled billing (YYYY-MM-DD).</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;length&quot;/&gt;</code></td>
<td>The length of the current billing period, for example, 2-week or 1-month.</td>
</tr>
<tr>
<td></td>
<td>CashBox supports this tag only in the End of Trial and Expiration templates.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;merchant&quot;/&gt;</code></td>
<td>Merchant’s name.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;merchant_affiliate&quot;/&gt;</code></td>
<td>The partner or affiliate associated with the Billing event.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;name&quot;/&gt;</code></td>
<td>The customer’s first and last names.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;name_on_entitlement_account&quot;/&gt;</code></td>
<td>The Account name (merchantAccountId) referenced in the email. (The Account holding the entitlements referenced in the email.) When a parent Account is notified about a child Account’s entitlements, this field will display the child Account's name.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;name_on_payer_account&quot;/&gt;</code></td>
<td>The name of the payer account. When a child account is sent an email notification, this field will display the parent Account's name.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;nextdate&quot;/&gt;</code></td>
<td>The next billing date, that is, the next retry after failure or the next</td>
</tr>
<tr>
<td></td>
<td>scheduled billing (MM-DD-YYYY).</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;payment_provider&quot;/&gt;</code></td>
<td>The Payment Provider who handled the Billing event.</td>
</tr>
</tbody>
</table>
Table 9-3 Billing Event Template Tags (Variables) *(Continued)*

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;tpl name=&quot;payment_token_balance&quot;/&gt;</td>
<td>Valid for tokens only, this tag, which supports English only, returns the sentence “Your <em>token-account</em> balance is <em>X</em>,” where <em>token-account</em> is the description of the token type and <em>X</em> is the balance. For example: “Your Award Points balance is 50.00.” Note that the balance is the token balance after the transaction. If multiple token types apply to the customer account, this tag returns multiple lines, with each line corresponding to a different token type. Note: If included in an email notification template but tokens are not in use, this tag returns a blank.</td>
</tr>
</tbody>
</table>
| <tpl name="payment_type"/> | A descriptor of the payment method, as follows:  
• For credit cards, the descriptor is “credit card.”  
• For ECP, the descriptor is "bank account."  
• For PayPal, the descriptor is “PayPal account.”  
• For direct debits, the descriptor is “direct debit accounts.”  
• For Boleto Bancário, the descriptor is “conta bancária” (Portuguese only).  
• For tokens, the descriptor is the token type for payment, followed by account. For example, if the token type is Award Points, the descriptor is “Award Points account.” |
| <tpl name="price"/> | An array of product prices that accompanies recurring or real-time transaction notifications. If used in conjunction with multiple line items and the desc tag, specify the maximum number of line items for each item, for example:  
<tpl name="price[0]"/>  
<tpl name="price[1]"/>  
<tpl name="price[2]"/> |
| <tpl name="product"/> | The product name.  
**Note:** This tuple will be populated only for AutoBills, and not for One-Time Transactions. |
| <tpl name="refid"/> | The Refund ID. |
| <tpl name="refund_amount"/> | The amount of the refund. In the case of tokens, this is the number of units of the token type that serves as payment. |
| <tpl name="refund_approval_code"/> | The Payment Processor’s refund approval code. |
| <tpl name="refund_capture_timestamp"/> | The Refund object’s timestamp. |
| <tpl name="refund_currency"/> | The currency of the refund. In the case of tokens, this is the description of the token type that serves as payment, for example, Award Points, Downloads, or Transférer. |
| <tpl name="refund_currency_symbol"/> | The refund’s currency symbol, as indicated by the ISO 4217 currency code of the Refund object’s currency data member. |
| <tpl name="refund_merchant_identifier"/> | The Refund object’s merchantRefundId. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.) |
### Table 9-3 Billing Event Template Tags (Variables) *(Continued)*

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;tpl name=&quot;refund_note&quot;/&gt;</code></td>
<td>A note on the refund.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;refund_payment_provider&quot;/&gt;</code></td>
<td>The Payment Processor for the refund.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;refund_pp_order_number&quot;/&gt;</code></td>
<td>The Payment Provider's order number for the refund.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;refund_status&quot;/&gt;</code></td>
<td>The refund's status.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;refund_timestamp&quot;/&gt;</code></td>
<td>The timestamp in the format &quot;2008-09-19 15:20:04.&quot;</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;send_to_email&quot;/&gt;</code></td>
<td>The email address to which the Billing Event email should be sent.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;serialnum&quot;/&gt;</code></td>
<td>Your identifier for the AutoBill object.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;sku&quot;/&gt;</code></td>
<td>Your product identifier.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;statementno&quot;/&gt;</code></td>
<td>The statement number for the Billing event.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;subtotal&quot;/&gt;</code></td>
<td>The pretax amount. For tokens, this value is the same as <code>amount</code>.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;tax&quot;/&gt;</code></td>
<td>The applicable tax. If the payment method is tokens, the value is 0.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;token_balance&quot;/&gt;</code></td>
<td>Available remaining Tokens for the Account.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;token_change&quot;/&gt;</code></td>
<td>The change in number of Tokens available to the Account as a result of this Billing event.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;token_id&quot;/&gt;</code></td>
<td>The <code>merchantTokenId</code> for the Tokens transferred in this Billing event.</td>
</tr>
<tr>
<td><code>&lt;tpl name=&quot;uri&quot;/&gt;</code></td>
<td>The URL the Payment Processor returned in response to the present-</td>
</tr>
<tr>
<td></td>
<td>ment of a fiscal number (for Boleto Bancario.)</td>
</tr>
</tbody>
</table>
| `<tpl name="vid"/>`         | CashBox's unique identifier for the AutoBill object, which is useful if embedded in a URL to which your site is redirected when you call `AutoBill.fetchByVid()`.

**Note:** Not all Billing Event tags are available to all Billing events. For example, refund tuples may not be available to pre-billing notifications. Please work with your Vindicia Client Services representative for more information.
9.3 Working with Invoices

An invoice is used to notify customers of their closing balance for the current billing cycle. You can define the number of days before a Billing Cycle closes for an Invoice to be issued.

An Invoice typically lists an opening balance, previously submitted invoices, payments, credit memos, debit memos, and an ending balance for a given billing cycle.

CashBox automatically generates email messages in parallel with Invoice processing, to which a rendered Invoice template may be attached. You may create your own, custom template, or use one of the default templates provided. In either case, CashBox saves an image of each Invoice sent to a customer, as a PDF, which may be retrieved at a later date for bookkeeping or record keeping purposes.

To generate Invoice emails from CashBox:

- Supply an email template to Vindicia Client Services. This template will be used to generate email notifications to your customers, and must be supplied or no invoice or dunning notifications will be mailed to your customers.
- Supply an invoice template to Vindicia Client Services. Vindicia provides a Default Invoice Template, which may be used in place of your own, customized template.
- Supply a dunning template to Vindicia. If no template is supplied, dunning notices will not be sent to your customers.

**Note:** If you supply a dunning template you must also provide an invoice template.

Work with Vindicia Client Services to enable Invoice and Dunning Notice generation, and to define the timing for these notifications.

Dunning Notices

Dunning is an extension of Invoicing, and is the process of systematically reminding a customer that payment is overdue, and informing them of the payment process. Dunning notices typically progress from reminders of overdue payment, to notice of imminent account closure. The last dunning notice usually informs the customer of account closure, and entitlement revocation.

CashBox allows you to define the timing of each step in this process. By default, the first dunning/overdue notice is issued a week after the initial due date, to allow time for payments arriving on the due date to be processed and entered into the system. The sequence may be customized to change the timing, content, or inclusion of dunning notices.

(For all steps in this process, CashBox recommends that you include appropriate links and phone numbers to contact your Customer Service department to arrange payment.)

As with all CashBox customer notifications, you must supply CashBox with an email template and a Dunning Notice template for these notices to be rendered and mailed.

---

**Note:** Dunning notice timing is set by Vindicia Client Services. Please speak with your Vindicia representative to define these intervals for your company.
9.3.1 CashBox Invoicing Events

CashBox provides several pre-defined invoice events, which will automatically generate an email notification to your customers. Emails will be sent to the email address specified on the Account on the AutoBill, with the subject line "Invoice <invoice number> dated <date>," and your email address (if supplied) as the From: field.

**Note:** If you do not supply CashBox with an email template, no invoices will be issued. An Invoice will be rendered, but it will not be mailed to your customer.

Work with Vindicia Client Services if you wish to alter the invoicing schedule or if you wish to send more than two dunning notices.

CashBox can be configured to render and issue the following emails in relation to the Invoicing cycle:

Table 9-4  Invoicing Events

<table>
<thead>
<tr>
<th>Notice / Event</th>
<th>Suggested Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open Invoice</strong></td>
<td>An open invoice may be generated a merchant-specified number of days before the end of every billing cycle. An email message to the customer, with the invoice attached as a PDF, or inline as plain text or HTML (depending on the customer’s email preferences).</td>
</tr>
<tr>
<td><strong>Payment Due (1st dunning Notice)</strong></td>
<td>An invoice becomes Due a merchant-defined number of days after the billing cycle closes. A reminder that payment is now due. This may include notice of any interest charges or penalties will be added to the account.</td>
</tr>
<tr>
<td><strong>Overdue (2nd Dunning Notice)</strong></td>
<td>An account becomes Overdue a merchant-defined number of days after the Due date. A notice that payment is overdue, which may include any interest charges or penalties that have been added to the account. This notice often includes information on future action, including account closure and collection agency involvement.</td>
</tr>
</tbody>
</table>

9.3.2 Creating Invoice Templates

Invoice templates allow you to create custom Invoices. They may include custom text, like customer support information, marketing information, or custom graphics. CashBox also provides a generic Invoice Template, if you do not wish to create your own.

If you create a customized template, create both a plain text, and an HTML version, to provide for customers’ email preferences settings. You may use text and standard HTML markup in the template.

The tags used in Invoice Templates map directly to your CashBox database, as described in Table 9-5: Invoice Template Tags (Variables).
Default Invoice Template

CashBox supplies a default Invoice template in both plain text and HTML. This Template includes the most common Invoice components.

| % format_amount=format(%10.2f);-% |
| % merchant % | Invoice #: % invoice_num % |
| % cust_name % | Date: % invoice_date % |
| %cust_address % |

Previous Balance | % format_amount(balance_forward) % |

Payments:

| % FOR x IN payments % |
| % x.amount % | % x.date % |
| % END % |

Total Payments: | % format_amount(total_payments % |

Balance: | % format_amount(opening_balance) % |

Current Charges:

| % FOR x IN charges % |
| % x.product % | % x.desc % |
| % x.quantity % | % x.total % |
| % END % |

Total Current Charges: | % format_amount(total_charges) % |

Credits:

| % FOR x IN credits % |
| % x.date % |
| % END % |

Total Credits: | % format_amount(total_credits) % |

Tax: | % format_amount(tax) % |

Total Amount Due: | % format_amount(balance_due) % |

Pay By: | % payment_due_date % |

Figure 9-1 Default Invoice Template (HTML)
Invoice Template Tags

Tags are used to provide a place holder in the template where CashBox data will be inserted when the Invoice is rendered. CashBox Invoice templates support looping, to allow for multiple charges, credits, or payments.

The following tags may be used in an Invoice template:

Note: Because CashBox allows for complex charge calculations, the charges tags are called out separately in the table.

Note: Arrays are shown in Vindicia Red in the following table.

Table 9-5 Invoice Template Tags (Variables)

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[% date %]</td>
<td>Today's date.</td>
</tr>
<tr>
<td>[% merchant %]</td>
<td>Your merchant name as it is currently defined in CashBox.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If this value is not as you expect, please work with your Vindicia Client Support contact to change it.</td>
</tr>
<tr>
<td>[% invoice_num %]</td>
<td>The auto-generated Invoice Number. This will be based on the Merchant AutoBill Identifier with a sequence number identifying the billing covered, for example: SUBMONTHLYAhd38-000000003. If you do not define Merchant AutoBill Identifiers for subscriptions, the VID will be used in its place.</td>
</tr>
<tr>
<td>[% opening_balance %]</td>
<td>The amount after payments have been subtracted from the balance forward.</td>
</tr>
<tr>
<td>[% payment_type %]</td>
<td>The payment type (MAP, CC, EDD, etc.) used to make payment of the balance due.</td>
</tr>
<tr>
<td>[% balance_forward %]</td>
<td>The balance carried forward from previous invoices.</td>
</tr>
<tr>
<td>[% balance_due %]</td>
<td>The balance due after all payments, credits, charges and taxes have been applied to the balance forward.</td>
</tr>
<tr>
<td>[% transaction_id %]</td>
<td>Unique identifier, generated by CashBox for the Invoice.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This field will be populated only after a payment is made against the Invoice.</td>
</tr>
<tr>
<td>[% invoice_date %]</td>
<td>The date the invoice was created and sent.</td>
</tr>
<tr>
<td>[% currency %]</td>
<td>The currency used for the transaction.</td>
</tr>
<tr>
<td>[% payment_due_date %]</td>
<td>The date the invoice becomes due.</td>
</tr>
<tr>
<td>[% cust_name %]</td>
<td>The customer’s name.</td>
</tr>
<tr>
<td>[% cust_email_address %]</td>
<td>The customer’s email address.</td>
</tr>
</tbody>
</table>
Table 9-5  Invoice Template Tags (Variables) *(Continued)*

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[% cust_address %]</td>
<td>The customer’s address. A concatenation of all available customer address information. For example: 1820 Gateway St$(sep)Apt. A$(sep)Foster City, California 94403$(sep)US</td>
</tr>
<tr>
<td>[% cust_address_street1 %]</td>
<td>The customer’s street address (1st line).</td>
</tr>
<tr>
<td>[% cust_address_street2 %]</td>
<td>The customer’s street address (2nd line).</td>
</tr>
<tr>
<td>[% cust_address_street3 %]</td>
<td>The customer’s street address (3rd line).</td>
</tr>
<tr>
<td>[% cust_address_city %]</td>
<td>The customer’s city.</td>
</tr>
<tr>
<td>[% cust_address_district %]</td>
<td>The customer’s state.</td>
</tr>
<tr>
<td>[% cust_address_postal_code %]</td>
<td>The customer’s zip code.</td>
</tr>
<tr>
<td>[% cust_address_city_dist %]</td>
<td>The customer’s city, state, and zip code. For example: Foster City, California 94403</td>
</tr>
</tbody>
</table>

**Payments**

| [% total_payments %]                | Currency value of all the payments.                                                                                                             |
| [% payments %]                      | An array of payments applied to the AutoBill.                                                                                                  |
| [% FOR x IN payments %]             |                                                                                                                                                |
| [% x.type %]                        | type Used with the [% payments %] tag to retrieve the type of payment used.                                                                     |
| [% x.date %]                        | date Used with the [% payments %] tag to retrieve the date the payment was applied to the account.                                             |
| [% x.amount %]                      | amount Used with the [% payments %] tag to retrieve the payment amount.                                                                       |

**Credits**

| [% total_credits %]                 | Currency value total of all credits.                                                                                                            |
| [% credits %]                       | An array of credits applied to the AutoBill.                                                                                                |
| [% FOR y IN credits %]              |                                                                                                                                                |
| [% y.credit_date %]                 | date Used with the [% credits %] tag to retrieve the date the credit was made to the account.                                                 |
| [% y.credit_amount %]               | amount Used with the [% credits %] tag to retrieve the credit amount.                                                                         |
### Table 9-5 Invoice Template Tags (Variables) *(Continued)*

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[% total_charges %]</td>
<td>Currency value total of all charges.</td>
</tr>
<tr>
<td>[% charges %]</td>
<td>An array of charges applied to the AutoBill.</td>
</tr>
<tr>
<td>![Code](% FOR c IN charges %)</td>
<td>![Code](%% product %) ![Code](%% desc %) ![Code](%% price %) ![Code](%% quantity %) ![Code](%% total %) ![Code](%% rate_plan_id %) ![Code](%% rate_plan_description %) ![Code](%% included_units %) ![Code](%% min_fee %) ![Code](%% max_fee %) ![Code](%% unit_name_singular %) ![Code](%% unit_name_plural %) ![Code](%% unit_total_amount %) ![Code](%% unit_amount_and_name %) ![Code](%% rate_plan_tiers %) ![Code](%% rated_unit_events %) ![Code](%% END %)</td>
</tr>
<tr>
<td>product</td>
<td>Used with the [% charges %] tag to retrieve the Product's ID.</td>
</tr>
<tr>
<td>desc</td>
<td>Used with the [% charges %] tag to retrieve the Product's description.</td>
</tr>
<tr>
<td>price</td>
<td>Used with the [% charges %] tag to retrieve the Product's price.</td>
</tr>
<tr>
<td>quantity</td>
<td>Used with the [% charges %] tag to retrieve the number of Products.</td>
</tr>
<tr>
<td>total</td>
<td>Used with the [% charges %] tag to retrieve the total charge.</td>
</tr>
<tr>
<td>rate_plan_id</td>
<td>Your Rate Plan ID.</td>
</tr>
<tr>
<td>rate_plan_description</td>
<td>Your description for the Rate Plan.</td>
</tr>
<tr>
<td>included_units</td>
<td>The number of Units included with the Rate Plan.</td>
</tr>
<tr>
<td>min_fee</td>
<td>The minimum fee for the Rate Plan.</td>
</tr>
<tr>
<td>max_fee</td>
<td>The maximum fee for the Rate Plan.</td>
</tr>
<tr>
<td>unit_name_singular</td>
<td>The singular version of the Unit name.</td>
</tr>
<tr>
<td>unit_name_plural</td>
<td>The plural version of the Unit name.</td>
</tr>
<tr>
<td>unit_total_amount</td>
<td>The total number of reported Units.</td>
</tr>
</tbody>
</table>
Table 9-5  Invoice Template Tags (Variables) *(Continued)*

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>unit_amount_and_name</code></td>
<td>The number and name of the reported Units. (CashBox will automatically return the singular or plural name, dependent upon the reported number of Units.)</td>
</tr>
<tr>
<td><code>[% rate_plan_tiers %]</code></td>
<td>An array of all the Tiers in the Rate Plan.</td>
</tr>
<tr>
<td></td>
<td><code>[% FOR t in c.rate_plan_tiers %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tier_name %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tier_begins_at_level %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tier_ends_at_level %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tier_rate_price %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tierRated_units_tierTotal %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% t.tier_cost_total %]</code></td>
</tr>
<tr>
<td><code>[% END %]</code></td>
<td></td>
</tr>
<tr>
<td><code>tier_name</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the name of the Tier.</td>
</tr>
<tr>
<td><code>tier_begins_at_level</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the beginsAtLevel for the Tier.</td>
</tr>
<tr>
<td><code>tier_ends_at_level</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the endsAtLevel for the Tier.</td>
</tr>
<tr>
<td><code>tier_rate_price</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the ratePrice for the Tier.</td>
</tr>
<tr>
<td><code>tier_rated_units_tier_total</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the number of Rated Units reported for the Tier.</td>
</tr>
<tr>
<td><code>tier_cost_total</code></td>
<td>Used with the <code>[% rate_plan_tiers %]</code> tag to retrieve the total charge for the Tier.</td>
</tr>
<tr>
<td><code>[% rated_unit_events %]</code></td>
<td>An array of all (unbilled) Rated Unit Events applied to the AutoBill.</td>
</tr>
<tr>
<td></td>
<td><code>[% FOR e IN c.rated_unit_events %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.event_date %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.received_date %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.amount %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.unit_name %]</code> // singular or plural, based on # of units</td>
</tr>
<tr>
<td></td>
<td><code>[% e.description %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.rate_plan_id %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.rate_plan_description %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.product_id %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% e.product_description %]</code></td>
</tr>
<tr>
<td></td>
<td><code>[% END %]</code></td>
</tr>
<tr>
<td><code>event_date</code></td>
<td>Used with the <code>[% rated_unit_events %]</code> tag to retrieve the date the specified Event occurred, or the date the Event was reported to CashBox.</td>
</tr>
</tbody>
</table>
### Table 9-5  Invoice Template Tags (Variables) (Continued)

<table>
<thead>
<tr>
<th>CashBox Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>received_date</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the date the event was received.</td>
</tr>
<tr>
<td>amount</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the number of Rated Units included in the Event.</td>
</tr>
<tr>
<td>unit_name</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the name for the Unit associated with the Event. CashBox will automatically return the singular or plural version of the name, dependent upon the number of Units reported for the Event.</td>
</tr>
<tr>
<td>description</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the description for the Event.</td>
</tr>
<tr>
<td>rate_plan_id</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the Rate Plan ID for the Event.</td>
</tr>
<tr>
<td>rate_plan_description</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the description for the Rate Plan associated with the Event.</td>
</tr>
<tr>
<td>product_id</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the Product ID associated with the Event.</td>
</tr>
<tr>
<td>product_description</td>
<td>Used with the [% rated_unit_events %] tag to retrieve the description for the Product associated with the Event.</td>
</tr>
</tbody>
</table>

#### Taxes

- [% tax %]  The total of all taxes applied to the Invoice.  
- [% taxes %]  An array of taxes applied to the AutoBill.  

  ```
  [% FOR t IN taxes %]
  [% t.description %]
  [% t.amount %]
  [% END %]
  ```

- description  Used with the [% taxes %] tag to retrieve the description of the tax.  
- amount  Used with the [% taxes %] tag to retrieve the amount of the tax.  

- tax_exemption_id  The Tax Exemption Code for the primary Sales Tax Exemption defined for this Account. The most common example is the customer VAT ID—also known as the VAT Registration Number or VAT Identification number (VATIN).

- [% cust_address_city_dist_country %]  The customer city, state, zip/postal code, and country. For example: Foster City, California, 94403 US.
10 Working with Tokens

A Token object represents a metering or virtual-currency unit of a specific type, and may be used to support billing models that use arbitrary tracking units with tokens and related objects in the CashBox API. The units are of your own choosing and may be minutes, downloads, incentive points, virtual currency, storage space, number of users, or any other imaginable unit. In the CashBox API, those units are represented by a generic Token object. Tokens allow you to define token types, and associate them with a customer Account. Tokens may be purchased, granted, decremented, or refunded, and you may retrieve Token balances for customer Accounts.

**Note:** Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.

The following table describes the three token-related objects.

Table 10-1 Token-Related Objects

<table>
<thead>
<tr>
<th>CashBox Object</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Token</td>
<td>Defines a token of a certain type. It must have a unique ID.</td>
</tr>
<tr>
<td>TokenAmount</td>
<td>The number of tokens, of a certain type, used to define a Billing Plan or product price in terms of tokens.</td>
</tr>
<tr>
<td>TokenTransaction</td>
<td>A purchase made with tokens. TokenTransaction contains attributes that specify the customer account that made the purchase, the amount, and the token type. TokenTransaction also includes a timestamp that shows when the transaction occurred. The purchase is a lightweight transaction that can be conducted in lieu of standard CashBox transaction.</td>
</tr>
</tbody>
</table>

You may define any number of Tokens, and can manage each customer’s associated balance of units by granting (incrementing), and decrementing Token counts through Products, Billing Plans, or AutoBills.

Token Transactions pass through the CashBox Token Processor, and appear as Transactions in all applicable CashBox Portal pages, including generated Reports.
10.1 Understanding CashBox Token Objects

Any number of token types may be defined that include token IDs and descriptions. The description attribute provides a user-friendly token name, which can be included in email notifications. To create Tokens with multiple language-descriptions, create multiple language-specific token types.

For example, if you have customers in the United States and France, define the token types as shown below.

Table 10-2 Multiple Language-Specific Token Types

<table>
<thead>
<tr>
<th>Token ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01_EN_Downloads</td>
<td>Downloads</td>
</tr>
<tr>
<td>01_FR_Downloads</td>
<td>Transférer</td>
</tr>
<tr>
<td>04_EN_Storage</td>
<td>Storage</td>
</tr>
<tr>
<td>04_FR_Storage</td>
<td>Entreposage</td>
</tr>
</tbody>
</table>

The following CashBox objects are related to tokens:

- **BillingPlan**: You can create billing plans for recurring billing in tokens or in currency. Use tokens or currency, but do not mix them in billing. Specify the quantity and token type for token billing plans. At billing time, if the customer does not have enough tokens in the account, have CashBox notify the customer with instructions for obtaining additional tokens. For billing plans with multiple token types, CashBox uses the type specified in the payment method for the related AutoBill object to determine the amount for the bill.

- **Account**: An Account object can possess multiple token types. The Account object’s tokenBalances data member houses the current amounts of different token types that are available to the Account.

- **AutoBill**: An AutoBill object may have a billing plan that is priced in terms of tokens of a certain type. If the payment method associated with the AutoBill is token-based, then the AutoBill’s recurring billings will be transacted in tokens.

- **Transaction**: A Transaction object may be for Product objects (used as transaction line items) that grant tokens. Tokens granted by each Product are defined by the Product's creditGranted attribute. A transaction may also be performed in tokens, if the transaction uses a token-based payment method. The line items include the tokens that will be consumed when the transaction is captured.

In refunding a transaction which originally granted tokens, you may leave the token balance unchanged (default), zero out the balance, or specify a negative balance for the token type. In refunding a transaction in tokens, CashBox adds the number of tokens to the customer’s applicable token balance.
10.2 Understanding Token Activities

View token activities on the CashBox Portal by selecting **Search > Token Activity** from the menu bar, then specifying your company name. The four token activity types are:

- **Decrement**: When a customer accesses a service (downloads music or uses storage), make an API call to deduct the appropriate number of tokens.
- **Grant**: Grant tokens to a customer by making an API call or by performing a customer-service action of Grant Tokens on the CashBox Portal.
- **Purchase**: A one-time or recurring transaction that references a product with tokens granted, or a transaction whose payment method is tokens.
- **Refund**: Refund a purchase that was transacted in tokens or that was for a product that had tokens granted.

**Table 10-3 Token Activity Types**

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Example</th>
<th>Description</th>
<th>Results</th>
<th>Token Balance</th>
</tr>
</thead>
</table>
| Decrement     | The customer accesses a service, and the merchant reduces the customer’s token balance. | Call the API’s `decrementTokens` method on the customer account. | • Reduced token balance.  
• Updated token activity on customer’s Account Details page.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page. | Decremented |
| Grant         | Add tokens to a customer’s account for filling out a survey. | Call the API’s `incrementTokens` method on the customer account. | • Increased token balance.  
• Updated token activity on customer’s Account Details page.  
• New token payment methods, if they do not already exist.  
• Details on the Token Activity Results page. | Incremented |
| Grant         | Add tokens to a customer’s account to compensate for degraded service. | Grant tokens on the CashBox Portal. | • Notification email to the customer on the tokens granted.  
• New token payment methods, if they do not already exist.  
• Increased token balance.  
• Updated token activity on the customer’s Account Details page.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page. | Incremented |
Table 10-3 Token Activity Types (Continued)

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Example</th>
<th>Description</th>
<th>Results</th>
<th>Token Balance</th>
</tr>
</thead>
</table>
| Purchase      | A customer makes a purchase that adds token types to the customer’s account balance. The transaction is successfully captured. | Grant tokens to a one-time purchase. | • Notification email to the customer on the token activity and account balance.  
• New token payment methods, if they do not already exist.  
• Increased token-type balance.  
• Display of line items associated with each token type in the Token Activity table on the Transaction Details page.  
• Updated token activity on the customer’s Account Details page.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page.  
• Reference of the transaction ID by the activity. | Incremented |
| Purchase      | A customer has an AutoBill subscription for a product that adds multiple token types to the customer’s account balance. The transaction is successfully captured. | Grant tokens to an AutoBill subscription with a product that has associated tokens granted. | Same as above. | Decremented |
| Purchase      | A customer makes a purchase for which you accept tokens as the payment method. Afterwards, you submit a transaction to CashBox and reference the token type. | Transact a one-time purchase in tokens. | • Notification to the customer: Real-Time Statement of Success or Real-Time Statement of Failure.  
• Reduced token-type balance.  
• Inclusion of the line items associated with the token type in the transaction.  
• Updated token activity on the customer’s Account Details page.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page. | Decremented |
### Table 10-3 Token Activity Types (Continued)

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Example</th>
<th>Description</th>
<th>Results</th>
<th>Token Balance</th>
</tr>
</thead>
</table>
| Purchase      | A customer has an AutoBill subscription for a product associated with a billing plan that is transacted in tokens. There are enough tokens in the related account to cover the cycle cost. | Transact an AutoBill subscription with a billing-period cycle in tokens.     | • Prebilling notification to the customer.  
• A success notification to the customer if there are enough tokens in the account. Otherwise, the notification states that not enough tokens are available.  
• Reduced token-type balance.  
• Inclusion of the line items associated with the token type in the transaction.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page.  
• Updated token activity on the customer’s Account Details page. | Decremented    |
| Refund        | A customer makes a purchase with tokens and then requests a refund. (CashBox only supports full refunds for token transactions.) | Refund a real-time transaction that was paid for in tokens.                  | • Refund notification.  
• Updated transaction in question.  
• Increased token-type balances.  
• Updated token balance for the related payment method.  
• Details on the Token Activity Results page.  
• Updated token activity on the customer’s Account Details page. | Incremented    |
Table 10-3 Token Activity Types *(Continued)*

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Example</th>
<th>Description</th>
<th>Results</th>
<th>Token Balance</th>
</tr>
</thead>
</table>
| Refund        | A customer who has an AutoBill subscription that references a billing plan transacted in tokens, requests a refund. | Refund an AutoBill transaction that was paid for in tokens. | • Refund notification.  
• Updated transaction in question.  
• Increased token-type balances.  
• Updated token balance for the related payment method.  
• Details on the **Token Activity Results** page.  
• Updated token activity on the customer’s **Account Details** page. | Incremented |
| Refund        | A customer purchases a product that has tokens granted and then requests a refund. | Refund a one-time purchase transacted in currency for a product for which tokens were granted. | • Refund notification.  
• Reduced token-type balances.  
• Updated token balance for the related payment method.  
• Details on the **Token Activity Results** page.  
• Updated token activity on the customer’s **Account Details** page. | Decremented |
| Refund        | A customer has an AutoBill subscription for a product that has tokens granted and requests a refund. | Refund of an AutoBill subscription transacted in currency for a product for which tokens were granted. | • Refund notification.  
• Reduced token-type balances.  
• Updated token balance for the related payment method.  
• Details on the **Token Activity Results** page.  
• Updated token activity on the customer’s **Account Details** page. | Decremented |
10.3 Defining New Token Types

Define new token types by instantiating Token objects and making API calls to specify the new types in the CashBox database.

**Define a new Token type:**

```php
$tok = new Token();

// Use a unique id when defining a new token type
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");

$tok->setDescription("A frequent book buyer point for US customers");

// Make SOAP call to create token in CashBox database
$response = $tok->update();

if($response["returnCode"] == 200)
{
    print "Token created successfully"
}
```

10.4 Incrementing Token Balances

You can increment a customer account's token balance in several ways: through a successfully captured transaction (purchase), through a refund of a transaction that was paid for in tokens, with a grant-tokens call through a customer-service interaction, or with the increment method.

If a token balance is incremented but does not exist in the related Account object, CashBox creates a new PaymentMethod object of type Token.
10.4.1 Purchasing Tokens

Because token balances are associated with an Account object, to allow customers to purchase tokens, you must define Product objects and specify how many tokens of a certain type to grant to a customer (Account object) when that customer purchases the related products. After each purchase, CashBox adds the appropriate number of tokens to the balance attached to the Account object.

The following example creates a Product object that grants 10 tokens, of the type defined in the previous example, to an Account object that purchases the Product object.

Use a Product purchase to grant Tokens:

```
$prod = new Product();
$prod->setMerchantProductId("sku101");

// Populate various product attributes here
$tok = new Token();

// we created token with this id already - we want to refer to the // same token type
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");

// create a TokenAmount object and populate it with token type // and quantity
$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(10);

// we need an array of token amounts since a product can // grant multiple token types. However, in our example the // product grants only one token type
$tokAmounts = array($tokAmt);

$cr = new Credit();
$cr->setTokenAmounts($tokAmounts)

// Specify token amounted granted by purchase of this product
$prod->setCreditGranted($cr);

// Make SOAP call to create the product in CashBox database
$response = $prod->update();
if($response["returnCode"]==200) {
    print "Product created successfully";
}
```
The Product object created can be used in both one-time and recurring billing:

- **Recurring billing**: Construct an AutoBill object with the Product object. With successful capture of each recurring transaction generated by the AutoBill, CashBox adds the tokens granted by the Product to the Account object associated with the AutoBill.

- **Real-time billing**: Construct a one-time transaction that refers to the Product object as one of its transaction items. Specify the SKU of TransactionItem as merchantProductId for Product. With a successful capture of a one-time transaction, CashBox adds the tokens granted by Product to the Account object associated with the transaction.

**Use a Product that grants Tokens in a one-time Transaction:**

```php
$tx = new Transaction();

// Reference an existing account to which tokens are to be granted
$account = new Account();
$account->setMerchantAccountId('9876-5432');
$tx->setAccount($account);

// One of the line items of the transaction should be the product
// that grants tokens
$tx_item = new TransactionItem();
$tx_item->setSku('sku101'); // the id of the product that grants tokens
$tx_item->setName('Token granter product');
$tx_item->setPrice(75.00);
$tx_item->setQuantity(1);
$tx->setTransactionItems(array($tx_item));

// set other transaction attributes here

$sendEmailNotification=false;
$response = $tx->authCapture($sendEmailNotification);
// SOAP call
if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        print "Purchase complete. Tokens granted";
    }
}
```
10.4.2 Granting Tokens to Accounts

To grant a customer tokens outside the framework of recurring or real-time billing transactions (for example, to compensate a customer for an issue, or to reward a customer for completing a survey) the Account object supports calls to directly increment or decrement token balances.

Increment an Account’s Token balance:

// Reference an existing account to which tokens are to be granted
$acct = new Account();
$acct->setMerchantAccountId('9876-5432');

// Refer to an existing token type using its id
$tok = new Token();
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");

// create a TokenAmount object and populate it with token type and quantity
$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(5);
// want to award the Account with 5 tokens of this type

// Refer to another existing token type using its id
$tok2 = new Token();
$tok2->setMerchantTokenId("US_FREQ_DVD_BUYER_PT");

// create a TokenAmount object and populate it with token type and quantity
$tokAmt2 = new TokenAmount();
$tokAmt2->setToken($tok2);
$tokAmt2->setAmount(2);
// want to award the Account with 2 tokens of this type

$tokAmounts = array($tokAmt, $tokAmt2);

// make the SOAP call to increment tokens
$response = $acct->incrementTokens($tokAmounts);

if($response['returnCode']==200) {
    // the call returns new token balances on the account
    // print those out
    $newTokBalances = $response['tokenAmounts'];
    foreach ($newTokBalances as $newTokBal) {
        print "Token type" . $newTokBal->token->merchantTokenId; . "\n";
        print "Token amount available" . $newTokBal->amount; . "\n";
    }
}

The drawback of incrementing tokens on an Account object is that the action is not registered in CashBox’s transaction framework. It is, however, tracked and available on the CashBox Portal (choose Search > Token Activity). You may also obtain all token activities with SOAP 3.5 API calls.
10.5 Decrementing Token Balances

Your customers can spend tokens by purchasing a product that is priced in tokens, or by signing up for a subscription (represented by an AutoBill object) with a billing plan priced in tokens.

Reduce a customer’s token balance, as the result of a billing event, by making a decrement call. Because decrement calls are made directly on Account objects, the action lies outside of Vindicia’s transaction framework, with no accounting of the spent tokens unless you develop separate client-side mechanisms to maintain an audit trail. However, Vindicia tracks the action and makes it available on the CashBox Portal (choose Search > Token Activity). You may also obtain all token activities with SOAP 3.2 API calls.

Decrement an Account’s Token balance:

```php
// Reference an existing account from which the tokens
// are to be decremented
$acct = new Account();
$acct->setMerchantAccountId('9876-5432');

// Refer to an existing token type using its id
$tok = new Token();
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");

// create a TokenAmount object and populate it with token type and
// quantity
$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(20); // remove 20 tokens from the account's balance

// Refer to another existing token type using its id
$tok2 = new Token();
$tok2->setMerchantTokenId("US_FREQ_DVD_BUYER_PT");

// create a TokenAmount object and populate it with token
// type and quantity
$tokAmt2 = new TokenAmount();
$tokAmt2->setToken($tok2);
$tokAmt2->setAmount(40);
// want to decrement 40 tokens from the account's balance
$tokAmounts = array($tokAmt, $tokAmt2);

// make the SOAP call to decrement tokens
$response = $acct->decrementTokens($tokAmounts);

if($response['returnCode']==200) {
    // the call returns new token balances on the account
    // print those out
    $newTokBalances = $response['tokenAmounts'];
    foreach ($newTokBalances as $newTokBal) {
        print "Token type" . $newTokenBal->token->merchantTokenId . "\n";
        printf "Token amount available" . $newTokenBal->amount . "\n";
    }
}
```
10.5.1 Transacting Purchases in Tokens

You may also decrement a customer’s token balance by conducting a transaction with the TokenTransaction object. Unlike the Transaction object, which works with both tokens and money (currency), TokenTransaction deals only with tokens. The advantage of using TokenTransaction over Transaction is that you need not define a token-based BillingPlan or Product object. Use TokenTransaction if you wish to take advantage of CashBox’s token ledger for token accounting and record-keeping, but do not have BillingPlan objects explicitly priced in tokens, or do not want to browse transaction reports and make refunds on the CashBox Portal.

Conduct multiple Token transactions, for multiple Token types, in a single call:

```php
//Create a new TokenTransaction object
$tokTxn1 = new TokenTransaction();

// Reference an existing account to which this transaction is to be applied
$acct = new Account();
$acct->setMerchantAccountId('9876-5432');

$tokTxn1->setAccount($acct);

// Specify information about the token type that will be used for this transaction
$tok1 = new Token();
$tok1->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");
$tokAmt1 = new TokenAmount();
$tokAmt1->setToken($tok1);
$tokAmt1->setAmount(4); // number of tokens used with this transaction

$tokTxn1->setTokenAmount($tokAmt1);
$tokTxn1->setDescription("Purchase: Infinite Jest-Paperback");

$tokTxn2 = new TokenTransaction();

$tokTxn2->setAccount($acct);

// Specify information about the tokens that will be used for this transaction
$tok2 = new Token();
$tok2->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");
$tokAmt2 = new TokenAmount();
$tokAmt2->setToken($tok2);
$tokAmt2->setAmount(3); // Number of tokens used with this transaction

$tokTxn2->setTokenAmount($tokAmt2);
$tokTxn2->setDescription("Purchase: Blink-Paperback");

$tokTxns = array($tokTxn1, $tokTxn2);

// make the SOAP call to perform the token transaction
$response = $acct->tokenTransaction($tokTxns);
```
if($response['returnCode']==200) {
    // the call returns new token balances on the account.
    // print the new balances.
    $newTokBalances = $response['tokenAmounts'];
    print "New token balances for account with id \\
        \"$acct->merchantAccountId \n";
    foreach ($newTokBalances as $newTokBal) {
        print "Token type\\n            \$newTokBal->token->merchantTokenId;\\n        print "Token amount available" . $newTokBal->amount;\\n    }
}

10.5.2 Token Transactions in Real Time

To track your customers’ token transactions in CashBox, execute standard Transaction objects. For example, if your customer makes a one-time purchase for which the price is a token type instead of currency, construct a real-time Transaction object.

Note:

- The Transaction object’s sourcePaymentMethod attribute must refer to a PaymentMethod object called Token.
- The transaction items in the Transaction object must all be for amounts that are in tokens.
- Token transactions must have a _VT setting for currency, which is Vindicia’s internal code for token-based payment.
- You cannot mix items priced in currency and tokens. Apply only a token type to the Transaction object.

Create and process a real-time Transaction:

    //Create a new Transaction object
    $tx = new Transaction();
    
    // Reference an existing account to which tokens are to be granted
    $account = new Account();
    $account->setMerchantAccountId('9876-5432');
    $tx->setAccount($account);
    
    // One of the line items of the transaction must be the
    // product that grants tokens
    $tx_item = new TransactionItem();
    $tx_item->setSku('sku112');
    $tx_item->setName('Product priced in token');
    $tx_item->setPrice(2); // this is the number of tokens
    $tx_item->setQuantity(1);
    $tx->setTransactionItems(array($tx_item));
    
    // The source payment method used for the transaction must be
    // a token payment method
    $srcPm = new PaymentMethod();
    $srcPm->setType('Token');
    $tx->setSourcePaymentMethod($srcPm);
// because the product we want to purchase uses tokens of a
// certain type, create Token objects of that type to specify
// in the payment method
$tok = new Token();
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");

$srcPm->setToken($tok);

// set the payment method in the transaction
$tx->setSrcPaymentMethod($srcPm);

// set currency of the Transaction to be tokens
$tx->setCurrency('_VT');

// set other transaction attributes here
...

$sendEmailNotification=false;
$response = $tx->authCapture($sendEmailNotification);
// SOAP call
if($response['returnCode']==200) {
    if($tx->statusLog[0]->status=='Authorized') {
        print "Purchase complete";
    }
}
10.6 Handling Recurring Billing with Tokens

To enable customers to pay for recurring billing with tokens, construct an **AutoBill** object with a **BillingPlan** object that is transacted in tokens, and a token-based **PaymentMethod** object.

**Create a Billing Plan priced in Tokens:**

```php
//Create a new BillingPlan object
$bp = new BillingPlan();

// first, create a TokenAmount object that will be used as price of
// the billing plan
$tok = new Token();
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");
$tokAmt = new TokenAmount();
$tokAmt->setToken($tok2);
$tokAmt->setAmount(2);

// Price of the billing plan in terms of tokens
$price = new BillingPlanPrice();
$price->setTokenAmount($tokAmt);

// create a billing plan period that uses the token-based price
$bperiod = new BillingPlanPeriod();
bperiod->setType('Month');
bperiod->setQuantity(1); // a billing period of 1 month
$bperiod->setCycles(0); // infinite
$bperiod->setPrices(array($price)); // token-based price as defined above

// now create a billing plan that uses the period that uses
// token-based price
$bp->setMerchantBillingPlanId("bpid-111");
$bp->setDescription("Token priced billing plan");
$bp->setPeriods(array($bperiod)); // use the period defined above

// set other billing plan attributes below
...
```

// Next, create an **AutoBill** object for the **BillingPlan** object:
$abill = new AutoBill();

// Reference an existing account. The monthly transaction will
// deduct tokens from this account
$acct = new Account();
$acct->setMerchantAccountId('9876-5432');
$abill->setAccount($acct);

// Use the token-based billing plan created above
$abill->setBillingPlan($bp);

// you may also reference a **Product** that grants Tokens for
// an **AutoBill** (use this to exchange one type of tokens for
// another)
// The payment method used for the autobill must be a token-based
// payment method
$pm = new PaymentMethod();
$pm->setType('Token');

// since the billing plan uses tokens of certain type, create
// Token object of that type to specify in the payment method
$tok = new Token();
$tok->setMerchantTokenId("US_FREQ_BOOK_BUYER_PT");
$pm->setToken($tok);

// set the payment method in the autobill
$abill->setPaymentMethod($pm);

// Populate other autobill attributes here
...
$dupBehave = 'Duplicate';
$minChargebackProb = 100; // don't check for risk screen
$validatePm = false;
// do not validate payment method since it is tokens

// Make SOAP call to create the autobill
$response = $abill->update($dupBehave, $validatePm, $minChargebackProb);
if($response['returnCode']==200) {
    print 'AutoBill created!';
}

The AutoBill object you created generates monthly transactions that decrement tokens from the related Account object. If you fetch the transactions with the CashBox API, note the following:

- The PaymentMethod object in the Transaction object’s sourcePaymentMethod attribute has a type setting of Token. The token attribute of the PaymentMethod object contains the token type for the transaction.
- The currency attribute of the Transaction object is _VT, CashBox’s internal currency code for tokens.
- The Transaction object’s amount attribute refers to the total number of tokens used (decremented from the Account object in question) for the transaction.
Process a Token-based Transaction fetched from CashBox:

// Create a transaction object so we can make the fetch call
$soapTx = new Transaction();
// now load the most recently changed 100 transaction records,
// using a date prior to Jan 1 1970
$paymentMethod = null;
// do not filter returned transactions by payment method
$since = '1969-01-01T00:00:00Z';
$today = '2009-05-19T00:00:00Z'; // until today
$pageNumber = 0; // want to get the first page
$pageSize = 100; // want 100 records in a page
$response = $tx->fetchDeltaSince($since, $today, $paymentMethod, $pageNumber, $pageSize);
if ($response['returnCode'] == 200) {
    $fetchedTxs = $response['transactions'];
    foreach ($fetchedTxs as $fetchedTx) {
        $srcPm = $fetchedTx->sourcePaymentMethod;
        if ($srcPm->type == 'Token' && $fetchedTx->currency == '_VT') {
            // This is a token-based transaction
            print "This transaction used tokens of type ".
                . $srcPm->token->merchantTokenId . "\n";
            print "Amount of tokens decremented by this transaction ".
                . $tx->amount;
        }
    }
}
10.7 Refunding Transactions in Tokens

The CashBox API allows you to refund transactions that granted or decremented tokens. Refunding token transactions returns the tokens to the token balance in the customer’s account.

If a refund is for a Product that granted tokens, be sure to define the action to take for the tokens. When creating the Refund object, specify the tokenAction attribute, which is an enumeration of the following three values:

- **None**: Makes no changes to the token balance. All previous token balances will stand as if the transaction had not been refunded.
- **CancelZeroBalance**: CashBox will cancel all previous token transactions. If the cancellation causes the token balance to drop below zero, CashBox will reset it to zero.
- **CancelNegativeBalance**: CashBox will cancel all previous token transactions. If the cancellation causes the token balance to drop below zero, the negative balance will remain, and subsequent token-based transactions will fail until the balance rises above zero.

**Refund a Transaction that granted Tokens to an Account:**

(Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.)

```php
//Create a new refund object
refund = new Refund();
$txn = new Transaction();

// specify a known transaction by its merchant ID. This transaction // should be in the 'Captured' state so it can be refunded $txn->setMerchantTransactionId('WID-CUS-9302871');

// associate the account and refund objects $refund->setTransaction($txn);

// set the amount of the refund $refund->setAmount(10.00);
$refund->setTimestamp('2009-02-11T22:34:32.265Z');
$refund->setReferenceString('myRefundId101');
$refund->setTokenAction('CancelNegativeBalance');

$tempSoapRef = new Refund();

// refund the transaction $response = $tempSoapRef ->perform(array($refund));
```
10.8 The CashBox Token Processor

Token transactions are processed using Vindicia’s Token Processor. Like other payment processors, the Token Processor returns reason codes for transaction requests, as shown below.

<table>
<thead>
<tr>
<th>Reason Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>Approved.</td>
</tr>
<tr>
<td>001</td>
<td>Fractional funds.</td>
</tr>
<tr>
<td>002</td>
<td>No customer tokens.</td>
</tr>
<tr>
<td>003</td>
<td>Insufficient funds.</td>
</tr>
<tr>
<td>004</td>
<td>Authorization failed.</td>
</tr>
</tbody>
</table>

The reason code describes whether a token transaction succeeded or failed, and suggests appropriate action. For example, in the case of an insufficient token balance, direct the customer to a site to purchase a product that grants the token type in question.
11 Working with Campaigns

CashBox Campaigns allow you to offer discounts on existing Products, or time grants to existing AutoBills. Discounts may be currency or percentage based, and may be single purchase, or period based offers. Time grants serve to grant customers free time extensions to their existing AutoBills.

Use the CashBox Portal to define Campaign parameters, then generate and retrieve Campaign Codes. Use the CashBox API to apply a (Coupon or Promotion) Campaign to an AutoBill.

Note: Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.

CashBox offers several ways in which a Campaign discount may be applied to an AutoBill.

- Use `AutoBill.update` to create an AutoBill and apply a Campaign discount Code simultaneously.
- Use `AutoBill.addCampaign` to apply a Campaign Code to an existing AutoBill.
- Use `AutoBill.modify` to add a new Product and/or Billing Plan, and its corresponding Campaign discount, to an existing AutoBill.
11.1 Creating an AutoBill with a Campaign discount

CashBox allows you to create an AutoBill and apply a Campaign discount Code in a single operation, using AutoBill.update.

Create an AutoBill with an attached Campaign Code:

```php
$autobill = new AutoBill();
$response = $autobill->update(
    'SucceedIgnore',// Duplicate Behavior
    false, // validate PaymentMethod?
    100, // min Chargeback Probability
    true, // ignore Avs Policy?
    true, // ignore Cvn Policy?
    'promoABC' // promoCode
);

// check $response
```

**Note:** This example neither validates the Payment Method, nor checks the chargeback probability or AVS and CVN returns. These parameters must be populated so that the promoCode is the 6th parameter.
11.2 Adding a Campaign Code to an AutoBill

Both \texttt{AutoBill.update} and \texttt{AutoBill.addCampaign} may be used to apply a Campaign discount to an existing AutoBill. With these methods, CashBox will automatically apply the Campaign discount to all eligible Products and Billing Plans that do not yet have a discount applied.

For more information on discount calculation, see Chapter 10: Campaigns in the \textit{CashBox User Guide}.

If there are any eligible Products on an existing AutoBill, a Campaign discount may be applied toward it, regardless of the history of the AutoBill, or the length of its duration.

\begin{center}
\begin{tabular}{l}
\textbf{Note:} For rolling promotion campaigns spanning multiple billing periods, the billing terms must be homogeneous. You cannot offer a rolling campaign if the Billing Plan has varied term lengths. Free cycles are ignored.
\end{tabular}
\end{center}

11.2.1 Applying a Campaign Code to an existing AutoBill

Use \texttt{AutoBill.addCampaign} to add a Campaign Code to an existing AutoBill.

\textbf{Add a Campaign Code to an existing AutoBill:}

First, create the AutoBill:

\begin{verbatim}
$autobill = new AutoBill();
$autobill->update(
    'SucceedIgnore',// Duplicate Behavior
    false,        // validate PaymentMethod?
    100,          // min Chargeback Probability
    true,         // ignore Avs Policy?
    true,         // ignore Cvn Policy?
    null          // NO promoCode
);
\end{verbatim}

\begin{center}
\begin{tabular}{l}
\textbf{Note:} This example neither validates the Payment Method, nor checks the chargeback probability or AVS and CVN returns. The default behavior for \textit{duplicateBehavior} is used. These parameters must be populated, simply to set a variable for the last in the sequence (\textit{ignoreAvsPolicy}).
\end{tabular}
\end{center}

To attach the Campaign Code, use \texttt{AutoBill.update}, or \texttt{AutoBill.addCampaign}. (\texttt{AutoBill.addCampaign} works similarly to \texttt{AutoBill.update} when adding a Campaign Code to an existing AutoBill.)

\begin{verbatim}
$response = $autobill->addCampaign(
    'promoABC'    // promoCode
);
\end{verbatim}

// check $response
If there is an error with the discount, CashBox will not process the `AutoBill.update`, and will return an error code of 400, with a text string explanation. The error may be that no Product or Billing Plan on the AutoBill is eligible for the Promotion, or that the Coupon Code has already been used against its defined number of AutoBills, or that the Promotion Code is out of date.

Applying a Campaign Code to a Specific Product on an AutoBill

11.2.2 Applying a Campaign Code to a Specific Product on an AutoBill

Using `AutoBill.addCampaign` will automatically calculate the Product(s) and Billing Plan(s) to which the Campaign should apply, based on the eligible products and billing plans, as defined in the Campaign.

To specify the Product and Billing Plan to which a Campaign Code should be applied, use `AutoBill.modify` to add a Product, Billing Plan, and Campaign Code simultaneously.

**Add a Product and Billing Plan, with an attached Campaign Code, to an AutoBill:**

Using `modify` with a Campaign Code as a parameter forces the discount to be applied to the added Product and Billing Plan. It will not be applied to any other Product or Billing Plan on the AutoBill.

```php
$response = $autobill->modify(
    $ab_item, // AutoBillItem
    false, // addNextPeriod
    false, // proRate
    'promoABC' // promoCode
);
// check $response
```

**Note:** If you use a separator character between the Coupon Prefix string and the Coupon Code string, do not also use one in your prefix, as that might cause confusion about what is actually the prefix. The coupon prefix and autogenerated code: Holiday-2015-934sd553, for example, is ambiguous. Holiday2015-934sd553 is not.

Using `modify` without specifying the `campaignCode` parameter, then using `addCampaign` against the same AutoBill, will apply the Campaign discount to all Products and Billing Plans in the AutoBill eligible for the discount.
12 Credit Grants and Gift Cards

CashBox supports multiple payment methods, such as credit cards, PayPal, and electronic checks, that you can attach to an AutoBill object. In a recurring billing model, CashBox uses the PaymentMethod object as the source Payment Method for the periodic billing transactions it processes with the payment processor, charging the customer for every periodic bill.

CashBox also allows you to place credit on an AutoBill or on a customer’s Account. Transactions generated by an AutoBill first attempt to use credit available on that AutoBill or customer Account, and bill the AutoBill PaymentMethod for any remaining balance after the credit is redeemed. CashBox automatically adjusts one-time transactions by the amount of credit available on a customer Account, redeems the appropriate credit, and adjusts the transaction for the remaining balance. Customers can also pay for a transaction with currency credit present in their account without specifying a payment method, provided there is credit in the account to cover the transaction. If available credit is insufficient, the transaction is denied.

Credits are stored in the form of tokens (see Section 17: The Token Object in the CashBox API Guide), time or currency. Token and currency credits are automatically deducted from available balances when a transaction is processed using the same token type or currency. Time credits serve to delay an AutoBill’s billing process by the amount of time granted.

CashBox redeems credit automatically when transactions are processed, in an order determined by the credit type, sort value, and time stamp. You can assign Time and Currency credits a sort value upon grant, to customize the order in which they are redeemed.

You can add credit to an Account or AutoBill using the CashBox Portal or an API call. All credit activity is marked with a timestamp, enabling you to analyze your grant and consumption of credit.
12.1 Working with Credit

The Credit object encapsulates the different types of credit that can be stored on a Product, Account or AutoBill, and applied to one-time or recurring transactions.

- **Tokens**: You can use tokens as both payment methods, and credit options. The merchantTokenId attribute of a Token object identifies its type. Use this data member to define your Token types.

  For example, create an AutoBill with a monthly BillingPlan whose price is defined in terms of Tokens of a certain type. Create a Product object that grants credit for a number of Tokens of that type. Allow your customer to purchase the Product and acquire the allotted Tokens. Then, each time the AutoBill is due, CashBox deducts the specified number of Tokens from the available Token credit.

- **Credits (time)**: Grant time credit to an AutoBill by including an array of TimeInterval objects in the Credit object associated with the AutoBill. The TimeInterval object allows you to define a time extension to an AutoBill in terms of years, months, weeks, or days. When you grant time credit to an AutoBill, CashBox delays the next billing for the AutoBill by the specified amount of time, similar to calling delayBillingByDays() on the AutoBill object.

- **Credits (currency)**: CashBox enables you to grant or revoke currency credits to Accounts and AutoBills. All ISO 42171 currencies are supported. For more information, see the Credit Subobject in the CashBox API Guide.

- **Gift Cards**: Add Token credits to an AutoBill or an Account by redeeming a gift card. Your customers may redeem gift cards, through CashBox, to add credit to their Account. For more information, see Section 12.2: Working with Gift Cards.

12.1.1 Redeeming Credit

CashBox automatically processes all credit redemption. Neither the CashBox API, nor the CashBox Portal allow you to manually redeem Credit. CashBox does, however, provide you with rules you can use to determine the order in which Credits are redeemed.

Time and Currency credits may be assigned a Sort Value when they are granted. They also carry a VID and timestamp. Use these values to both track your credit grants and revocations, and to define the order in which granted Credits should be redeemed when AutoBill Transactions are processed.

CashBox processes Credit redemption in the following order:

1. Time Interval credits are redeemed before currency credits.

2. Credits automatically granted by CashBox are redeemed before those granted through the CashBox Portal or API.

3. Credits are redeemed based on Sort Value. Use this value to define the order in which you would like Credits to be redeemed.

4. After Sort Value has been considered, Credits are redeemed based on Grant time, from oldest to most recent.

Credits may not be revoked after they've been redeemed, and they may not be redeemed after they've been revoked.
12.1.2 Using Credits with an Account

The read-only `credit` attribute of the `Account` object holds the current credits available to the `Account`. Use the `grantCredit` and `revokeCredit` calls to manipulate credit. These methods generate appropriate audit trails of credit changes. Do not set the value of this attribute directly. (For example, when creating a new `Account` object by calling `update()`.)

---

**Note:** Use token-related methods such as `Account.incrementTokens()` or `decrementTokens()` to manipulate tokens available to the `Account`. CashBox can handle tokens both as payment methods outside the credit framework, and as part of the credit system.

Although you can use Tokens interchangeably across the two systems, Vindicia recommends that in your implementation, you choose one system, rather than mixing the two. If you have not previously implemented a token-as-payment-method system, choose credit-based token management, because the `Credit` object allows you to abstract the type of credit, and therefore offers more flexibility for future replacement.
Granting Credit to an Account

If a customer performs a specific activity at your site, you may choose to give that customer credit. For example, if a customer redeems a phone card, a cell phone company may add a number of cell phone minutes to the customer’s account. You may also apply currency credits to the account. Use the Credit’s name-value pairs to define the reason for the Grant, and to provide another field by which your Credit activity may be analyzed.

Use `Account.grantCredit` to add credit to an Account:

```php
$acct = new Account();
// account id for an existing customer
$acct->setMerchantAccountId('jdoe101');
$tok = new Token();
// specify the id of an existing token type.
// (the assumption here is that you have already created
// a Token object with this id.)
$tok->setMerchantTokenId('ANYTIME_PHONE_MINUTES_2010');
$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(100);
$cr = new Credit();
$cr->setTokenAmounts(array($tokAmt));
// make the SOAP API call to grant credit to the acct
$response = $acct->grantCredit($cr);
if ($response['returnCode'] == 200) {
    // Credit successfully granted to the account
    $updatedAcct = $response->['account'];
    $availableCredits = $updatedAcct->getCredit();
    $availableTokens = $availableCredits->getTokenAmounts();
    print "Available token credits: \n";
    foreach($availableTokens as $tkAmt) {
        print "Token type: " . $tkAmt->getMerchantTokenId() . " ";
        print "Amount: " . $tkAmt->getAmount() . "\n";
    }
} else {
    // Error while granting credit to the account
    print $response['returnString'] . "\n";
}
```

Note: CashBox does not allow you to grant time-based credit to an Account object.
Revoking Credit from an Account

For some customer activities, you might revoke credit from the customer’s account. For example, if a customer uses airline frequent flier miles to book a flight, an airline company would deduct frequent flier miles from the customer’s account. If you accept currency credits, you may also deduct currency from the account.

Use \texttt{Account.revokeCredit} to deduct credit from an Account:

```php
$acct = new Account();
// account id for an existing customer
$acct->setMerchantAccountId('ff_flier_101');
$tok = new Token();
// specify the id of an existing token type.
// (the assumption here is that you have already created
// a Token object with this id.)
$tok->setMerchantTokenTypeId('UA_FF_MILES');
$tokAmt = new TokenAmount();
$tokAmt->setTokenType($tok);
$tokAmt->setAmount(25000);
$cr = new Credit();
$cr->setTokenAmounts(array($tokAmt));
// make the SOAP API call to deduct miles
$response = $acct->revokeCredit($cr);
if ($response['returnCode'] == 200) {
    // Credit successfully revoked from the account
    $updatedAcct = $response->['account'];
    $availableCredits = $updatedAcct->getCredit();
    $availableTokens = $availableCredits->getTokenAmounts();
    print "Available token credits: \n"
    foreach ($availableTokens as $tkAmt) {
        print "Token type: " . $tkAmt->getMerchantTokenTypeId() . " " ;
        print "Amount: " . $tkAmt->getAmount() . "\n";
    }
} else {
    // Error while revoking credit from the account
    print $response['returnString'] . "\n";
}
```

\textbf{Note:} If the amount of token-based credit to be revoked results in a negative balance, CashBox sets the balance to 0.
Using Credits for a One-Time Transaction

One-time transactions may use credit available to an Account. To use Credits for one-time transactions, make certain that the Transaction object includes a PaymentMethod that matches the currency or token type you wish to use to conduct the transaction. If the customer Account has enough credit to support the transaction, CashBox authorizes the transaction, and adds a new transaction item to the Transaction object returned to you in response to your authCapture() call. This transaction item has its sku attribute set to VIN_Credit, and its price set to a negative value (equivalent to the amount of the transaction), signifying that CashBox deducted the credit from the customer’s account.

Note: You can also have CashBox process a one-time transaction that does not consume available currency credits. In the Transaction object, populate the name-value pair vin:ignoreCredits = true and the Transaction will charge against the payment method, using no currency credits.

Create a one-time credit transaction:

```php
$acct = new Account();
// account id for an existing customer
$acct->setMerchantAccountId('jdoe101');

$tok = new Token();
// specify the id of an existing token type.
// (the assumption here is that the customer with
// account id 'jdoe101' has credit available in this
// type of token.)

$tok->setMerchantTokenId('ANYTIME_PHONE_MINUTES_2010');

// source payment method for the transaction should be
// a token-based payment method
$srcPm = new PaymentMethod();
$srcPm->setType('Token');
$srcPm->setToken($tok);
$srcPm->setMerchantPaymentMethodId('5933054820');

$txn = new Transaction();
$txn->setAccount($acct);
$txn->setSourcePaymentMethod($srcPm);

// This transaction will deduct 50 credit units from the account
$txn->setAmount(50);
$txn->merchantTransactionId('TK00234918'); // must be unique

// Add a transaction item describing the transaction detail
$txItem = new TransactionItem();
$txItem->setSku('MONTH50');
```
$txItem->setName('Monthly Anytime Minutes');
$txItem->setPrice(50);
$txItem->setQuantity(1);

// set the transaction item into the transaction
$txn->setTransactionItems(array($txItem));

$sendEmail = false;

// Make the SOAP call to authorize and capture the transaction
$response = $txn->authCapture($sendEmail);

if ($response['returnCode'] == 200) {
    // the SOAP call succeeded. Now check if the
    // transaction was authorized
    $retTxn = $response->['transaction'];
    if($retTxn->statusLog[0]->status=='Authorized') {
        print "Transaction approved"
    }
    else if($retTxn->statusLog[0]->status=='Cancelled') {
        print "Transaction not approved 
"
    }
    else {
        print "Error: Unexpected transaction status"
    }
}
else {
    // Error while conducting transaction
    print $response['returnString'] . "\n";
}
Fetching Account Credit History

CashBox maintains a log of credit-related events for each Account. This log keeps track of various credit-related events such as credit granted, revoked, consumed, or earned from a gift card redemption. Retrieve the audit log by calling the Account object’s fetchCreditHistory() method. The method includes paging and a time range, so you can limit the number of records returned. It returns an array of CreditEventLog objects. Each CreditEventLog object holds the Credit object, a timestamp, the type of activity performed with the Credit object, and a note text field.

Call Account.fetchCreditHistory:

```php
$acct = new Account();

// account id for an existing customer whose credit history you want to retrieve
$acct->setMerchantAccountId('jdoe101');

$page = 0; // paging begins at 0
$pageSize = 5; // five records
$startTime = '2010-01-01T22:34:32.265Z';
$endTime = '2010-01-30T22:34:32.265Z';

do {
    $ret = $acct->fetchCreditHistory($startTime, $endTime, $page, $pageSize);
    $count = 0;
    if ($ret['returnCode'] == 200) {
        $fetchedLogs = $ret['creditEventLogs'];
        $count = sizeof($fetchedLogs);
        foreach ($fetchedLogs as $log) {
            $credit = $log->getCredit();
            $ts = $log->getTimestamp();
            $eventType = $log->getType();
            // process retrieved credit event log details here.
        }
    }
    $page++;
} while ($count > 0);```
12.1.3 Using Credits with an AutoBill

The read-only credit attribute of the AutoBill object holds the array of Credit amount objects available to the AutoBill. Do not set this field directly by calling AutoBill.update. Instead, use AutoBill methods such as grantCredit() and revokeCredit() to alter credits available to the AutoBill, and provide an audit trail in the credit log. Currency-, time-, and token-based credits may be used with AutoBill objects. CashBox manages credits available to an AutoBill object as follows:

- CashBox draws currency- and token-based credits from the AutoBill for each periodic transaction it generates for the AutoBill.
- If the Account associated with the AutoBill also has currency- or token-based credits available to it, when the AutoBill is billed, AutoBill credits are redeemed before Account credits.
- If an AutoBill has an associated time credit, CashBox uses this credit before redeeming any token-based or currency credits.
- CashBox uses currency and token-based credit to process an AutoBill’s periodic transaction only if both of the following are true:
  - The payment method specified on the AutoBill is a currency or token-based payment method that specifies a type of applicable token,
  - The billing plan associated with the AutoBill has a price listed in terms of the same token type or currency.
- When CashBox applies time-based credit to an AutoBill, it adjusts the next billing date of the AutoBill accordingly. For example, a 15-day credit will postpone an AutoBill object’s next billing date by 15 days. Application of such a credit does not generate a transaction.
Granting Credit to an AutoBill

Some situations may require you to extend a customer’s subscription to your site. For example, if a technical problem at your site prevented a customer from accessing the site for two days, a customer service representative might decide to extend the customer’s subscription by two days, to guarantee customer satisfaction. The grantCredit() method of the AutoBill object allows you to add time credit to an AutoBill object to implement such an extension.

Use grantCredit to add time credit to an AutoBill:

```php
$abill = new AutoBill();

// autobill id for an existing subscription
$abill->setMerchantAutoBillId('SBCR312345');

// We want to grant 2 days of credit
$time = new TimeInterval();
$time->setType('Day');
$time->setAmount(2);

$cr = new Credit();
$cr->setTimeIntervals(array($time));

// Now make the SOAP API call to grant credit to the autobill
$response = $abill->grantCredit($cr);

if ($response['returnCode'] == 200) {
    // Credit successfully granted to the autobill
    $updatedABill = $response['data']->autobill;

    print "Current entitlements are valid till: ";
    print $updatedABill->getEndDate() . "\n";
} else {
    // Error while granting credit to the account
    print $response['returnString'] . "\n";
}
```
Revoking Credit from an AutoBill

Some activities a customer performs at your site might revoke credit from an AutoBill object. For example, an online game company might offer subscriptions that are paid for by points a customer earns in the game. If the customer loses some points in the game, the company might deduct the same number of points from the customer’s subscription. (Note: Time-based credit granted to an AutoBill cannot be revoked.)

Use `revokeCredit` to revoke currency or Token-based credits from an AutoBill:

```php
$abill = new AutoBill();

// autobill id for customer's existing subscription to a game
$abill->setMerchantAutoBillId('STARWARS-239181');

$tok = new Token();

// specify the id of an existing token type.
// the autobill has a payment method defined in terms of this
// token type. Also the billing plan used by the autobill
// specifies a price in terms of this token type.
$tok->setMerchantTokenType('STARWARS_POINTS');

$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(100); // customer lost 100 points in the game

$cr = new Credit();
$cr->setTokenAmounts(array($tokAmt));

// Now make the SOAP API call to deduct points from customer's
// subscription
$response = $abill->revokeCredit($cr);

if ($response['returnCode'] == 200) {
    // Credit successfully revoked from the autobill
    $updatedAbill = $response->['data']->autobill;
    $availableCredits = $updatedAbill->getCredit();
    $availableTokens = $availableCredits->getTokenAmounts();
    print "Available points to subscription: \n";
    foreach($availableTokens as $tkAmt) {
        print "Token type: " . $tkAmt->getMerchantTokenType() . " ";
        print "Amount: " . $tkAmt->getAmount() . "\n";
    }
} else {
    // Error while revoking credit from the autobill
    print $response['returnString'] . "\n";
}
```
If the amount of currency or token-based credit to be revoked results in a negative balance, CashBox sets the balance to 0. Disentitlement (loss of customer access to the product) will occur when CashBox attempts to process the next billing transaction for the *AutoBill*, and the transaction fails due to insufficient credit.

**Fetching AutoBill Credit Transactions**

CashBox stores token- and currency-based periodic transactions in the same way that it stores *AutoBills* paid for with currency payment methods. Fetch token-based transactions with API calls such as the *Transaction* object's `fetchByAutoBill()` method. These transactions contain a transaction item with `sku` attribute set to `VIN_Credit`, and `price` attribute set to a negative value equivalent to the amount of the transaction (signifying that CashBox deducted the credit).
CashBox 25.0.0: Programming Guide

Using Credits with an AutoBill

Fetching AutoBill Credit History

CashBox maintains a log of credit-related events for each AutoBill object. This log tracks credit-related events such as credit granted, revoked, consumed, and earned due to a gift card redemption. Retrieve the audit log with the AutoBill object’s `fetchCreditHistory()` method. (Because the method includes paging and a time range, you may limit the number of records returned.)

`fetchCreditHistory()` returns an array of `CreditEventLog` objects. Each `CreditEventLog` object holds the `Credit` object used for that specific event, a timestamp, the type of activity performed with the `Credit` object, and a text note field.

Use `fetchCreditHistory` to return an array of `CreditEventLog` objects:

```
$abill = new AutoBill();

// autobill id for an existing customer whose
// credit history you wish to retrieve
$abill->setMerchantAccountId('jdoe101');

$page = 0; // paging begins at 0
$pageSize = 5; // five records
$startTime = '2010-01-01T22:34:32.265Z';
$endTime = '2010-01-30T22:34:32.265Z';

do {
    $ret =
        $abill->fetchCreditHistory($startTime, $endTime, $page, $pageSize);
    $count = 0;
    if ($ret['returnCode'] == 200) {
        $fetchedLogs = $ret['creditEventLogs'];
        $count = sizeof($fetchedLogs);
        foreach ($fetchedLogs as $log) {
            $credit = $log->getCredit();
            $ts = $log->getTimeStamp();
            $eventType = $log->getType();
            // process retrieved credit event log
            // details here.
        }
        $page++;
    }
} while ($count > 0);
```
12.2 Working with Gift Cards

You can also add credit to an AutoBill or Account by redeeming a gift card. CashBox processes Gift Cards much like currency, in that CashBox contacts a gift card processor company, which notifies CashBox if a gift card is redeemable, and handles the transaction.

Gift Cards can be used to add Token Credits to an AutoBill, in that a Gift Card may be used to purchase a Product which grants Token Credits.

---

**Note:** Products associated with Gift Cards are a special case, in that they may hold only Token Credits.

---

Store Products created for Gift Card redemption in CashBox in order to track the SKU provided by the gift card processor. Do not create AutoBills which contain these Products.

12.2.1 Understanding the Attributes of the GiftCard Object

The GiftCard object encapsulates gift card details such as the card’s unique identification number (pin) and the processor that CashBox should contact for redemption of the gift card. When you make the API call to redeem a gift card, CashBox also assigns a unique VID to the corresponding GiftCard object, and stores the latest status of the gift card (such as whether it was redeemed or is still pending) in the status attribute of the GiftCard object. See Section 9: The GiftCard Object in the CashBox API Guide for details.

12.2.2 Determining Redemption Credit Amount

CashBox redeems Gift Cards for Token credit associated with a Product object.

When a customer offers a Gift Card PIN for redemption, CashBox contacts your gift card processor to redeem the card, and the processor returns a SKU or a UPC number if the card is valid. This SKU or UPC must match the merchantProductId of a Product object that you have previously created in CashBox. When you create the Product, use the creditGranted data member to associate a number of Token credits with it, which will be granted to the Account or AutoBill upon redemption of the associated Gift Card.
To redeem a Gift Card:

1. CashBox sends the Gift Card number (as defined by you and your gift card processor, and presented by your customer) to your gift card processor.

2. Your card processor validates that the Gift Card associated with the number is still active.

3. Upon validation, your Gift Card processor returns a SKU or UPC number to CashBox.

4. CashBox matches this SKU to a Product's `merchantProductId` (or SKU).

5. If a match is found, the Token credits associated with the Product are granted to the Account or AutoBill.

Before accepting gift cards, work with your gift card processor to define the SKU or UPC your processor will return for each type of gift card you accept, and create Product objects with the corresponding `merchantProductId` in CashBox.

The following example creates a new Product object that grants token-based credit (5000 tokens of type `STARWARS_POINTS`). The `merchantProductId` of this Product matches the SKU/UPC the processor returns when a $10 gift card is redeemed.

```
$product = new Product();

// Identify the product by your unique identifier
// This should be the SKU/UPC returned by gift card processor
$product->setMerchantProductId('49238434023383');

$product->setStatus('Active');
$product->setDescription('Redeem product for ten dollar gift');

// define the credit that this product will grant
$tok = new Token();

$tok->setMerchantTokenId('STARWARS_POINTS');

$tokAmt = new TokenAmount();
$tokAmt->setToken($tok);
$tokAmt->setAmount(5000);

$cr = new Credit();
$cr->setTokenAmounts(array($tokAmt));

// Set the credit into the product
$product->setCreditGranted($cr);

// Now make API call to create the product
$response = $product->update(DuplicateBehavior::SucceedIgnore);
if($response['return Code'] == 200 && $response['created']) {
    $createdProduct = $response['data']->product;
    print "Created product with VID ", $createdProduct->getVID();
}
```
12.2.3 Redeeming a Gift Card

Redeeming a gift card is a two-step process. First, check whether the gift card is redeemable by calling the `GiftCard` object's `statusInquiry()` method. If the call shows that the status of the gift card is `Active`, you may redeem the gift card.

**Determine the status of a Gift Card:**

```php
$gc = new GiftCard();

// set the PIN provided by the customer
$gc->setPin('683092298403');
$gc->setPaymentProvider('your gift card processor');

// Now make API call to inquire about the status of the gift card
$response = $gc->statusInquiry();
if($response['returnCode'] == 200) {
    // The API call is successful. Now check the
    // status in the updated GiftCard object returned by
    // this call
    $updatedGc = $response['data']->giftcard;
    $status = $updatedGc->getStatus();
    // the status thus obtained is an object of type GiftCardStatus
    // Now check if it says the gift card is redeemable
    if ($status->getStatus() == 'Active') {
        // The gift card is redeemable, retrieve its VID
        // so we can reference it just by VID when we redeem it
        $gcVID = $updatedGc->getVID();
    } else {
        // Gift card is not redeemable. Inform the customer here
        // You may want to include the response received from the
        // gift card processor
        $responseCode = $status->getProviderResponseCode();
        $responseMsg = $status->getProviderResponseMessage();
    }
}
```

After determining the status of the gift card, you may redeem the card. Both `AutoBill` and `Account` objects support `redeemGiftCard` calls. When `redeemGiftCard` is successful, the credit granted by the `Product` (with `merchantProductId` returned by the gift card processor in response to this call) is added to the `Account` or `AutoBill` object against which the call was made.
Redeem a Gift Card, and add credit to an AutoBill:

```php
$abill = new AutoBill();

// autobill id for a customer's existing subscription
// the customer wants to redeem a gift card and add credit
// to this autobill
$abill->setMerchantAutoBillId('SBCR312345');

$gc = new GiftCard();

// set the VID of the gift card, obtained when the status
// status of the gift card was checked, and determined to be active
$gc->setVID($gcVID);

// Now make the SOAP API call to redeem the gift card
$response = $abill->redeemGiftCard($gc);

if ($response['returnCode'] == 200) {
    // Redemption successful. Check if credit was added
    // to the autobill
    $updatedABill = $response['data']->autobill;
    $availableCredits = $updatedABill->getCredit();
    $availableTokens = $availableCredits->getTokenAmounts();
    print "Available token credits: \n";
    foreach($availableTokens as $tkAmt) {
        print "Token type: " . $tkAmt->getMerchantTokenId() . " ";
        print "Amount: " . $tkAmt->getAmount() . "\n";
    }
    // Also make sure status of the gift card is 'Redeemed'
    $updatedGc = $response['data']->giftcard;
    print "Status of the gift card: ";
    print $updatedGc->getStatus()->getStatus() . "\n";
} else {
    // Error while granting credit to the account
    print $response['returnString'] . "\n";
}
```

**Note:** CashBox allows only full redemption of a gift card. You may not partially redeem a gift card.
12.2.4 Reversing a Gift Card Redemption

A gift card must be **Active** before a successful `redeemGiftCard()` call can be made. It is possible that during your redemption attempt, due to a technical problem such as a connection drop out, the operation does not complete and the underlying `Account` or `AutoBill` does not receive any credit. If this happens, make the `redeemGiftCard()` call again.

To reverse a gift card redemption, first ensure that the status of the gift card is **Active**, in case a previous operation has (erroneously) changed the status. If the gift card is no longer **Active**, you may reverse the last operation upon it using the `GiftCard.reverse()` method.

---

**Note:** The purpose of this call is to correct an unwanted situation, as described above. Do not use this call to reverse a successful redemption call. It does not automatically revoke credits granted in the previous redemption call.

---

Reverse a Gift Card redemption:

```php
// set the VID of the gift card. We obtained this when we
// inquired status of the gift card
$gc->setVID($gcVID);

// Now make the SOAP API call to reverse the redemption
$response = $gc->reverse();

if ($response['returnCode'] == 200) {
    // Reversal successful.
    // fetch the autobill against which we originally
    // redeemed the gift card here.

    // Also make sure status of the gift card is 'Active'
    $updatedGc = $response['data']->giftcard;
    if($updatedGc->getStatus()->getStatus() == 'Active') {
        // try redemption again here
    }
}
else {
    // Error while reversing the card
}
```
13 Hosted Order Automation with Hosted Fields

CashBox Hosted Order Automation (HOA) with Hosted Fields allows you to accept and process sensitive customer payment information without involving your own servers, instead submitting the payment information directly from your customer’s browser to Vindicia over HTTPS (a secure HTTP connection using Transport Layer Security (TLS)). When your customer’s browser loads your checkout page, some or all of the input boxes in the checkout form are iframes loaded from Vindicia.com.

This means sensitive information is not loaded, or saved, to your server. Should your server experience some kind of attack, such as a JavaScript injection, the credit card information is still protected. This gives you the ability to create a storefront that processes credit cards without ever loading or saving the card numbers yourself. HOA with Hosted Fields bypasses your server at form submission, eliminating your system’s exposure to customer credit card information.

Using your SOAP client, you call WebSession.initialize() to generate a web session ID. This ID is placed in a hidden field in your form. At the end, when your form has been submitted, you call WebSession.finalize() to create the CashBox objects (PaymentMethod, AutoBill, Transaction, Account). When you call finalize, simply pass in the ID of the sparse webSession object (the VID). Do not populate any privateFormValues or post values. In rare cases, you can pass in MethodParamValues—for example if you want to pass in a campaign code to an AutoBill.update call after collecting it in the payment form.

The WebSession object is used to temporarily store payment method information in the CashBox database, where it is permanently saved when the WebSession.finalize() method is called. For more information on the WebSession object, see Section 19: The WebSession Object in the CashBox API Guide.

Use of HOA with Hosted Fields satisfies the minimum audit burden of SAQ-A (Self-Assessment Questionnaire—version A) requirements when accepting payment information from your customers. For that reason, the WebSession object is limited in scope and properties, and is meant only to create or authorize AutoBills, PaymentMethods, and Transactions. HOA is not designed to create other CashBox objects.

Note: If you have already integrated HOA with your CashBox implementation and just want to set up Hosted Fields, see the User Experience Flow, then skip ahead to Section 13.4.3: Setting Up Hosted Fields.
13.1 HOA Features

HOA guarantees security for the following reasons:

- Vindicia receives data submitted by the order form over HTTPS (a secure HTTP connection using Transport Layer Security (TLS)).

- HOA tracks an order-form submission through a WebSession object, which is created on the Vindicia server before the order form is presented to your customer. This allows you to preload information, including the IDs of CashBox objects to which the order refers (such as an existing BillingPlan or Product object), without displaying the information on the form.

- A WebSession object has a 40-character unique ID, which is included as the session ID in the form. This ID expires, 1) after a form is submitted using that ID, 2) after 1 hour (3600 seconds, the default expiration time), or 3) after an expiration time you configure, whichever occurs first. This prevents illegal or repeated use of session IDs by hackers. HOA stores the results of the API call in the CashBox WebSession object. You fetch this object and, based on the results, determine the next steps the customer should take on your site.

- Once you call WebSession.finalize(), you will have new CashBox objects that you can access using the standard CashBox API or the Portal. The CashBox API protects sensitive payment information.

Except for iframes, Vindicia does not host any HTML pages in the process. Your customers might notice Loading https://secure.vindicia.com.... in the status bar of their browser, but only momentarily during iframe load, after submitting the Web order form, and before HOA loads your redirection page. Your order form and success or failure pages, with your branding style, are the only pages visible to your customers.

HOA does not make the API call to create objects containing sensitive payment information, such as an AutoBill or a PaymentMethod object, until you finalize the WebSession object (call Websession.finalize()) from the success page that you host. Therefore if the connection is lost while HOA is redirecting the customer's browser from the Vindicia server to your server, your success page will never be reached, the WebSession will not finalize, and HOA will not make the API call. This approach preserves data integrity in cases of connections dropped during the processes.

For pure Ajax (asynchronous JavaScript and XML) solutions, you will have to call your own success or failure back-end function. See Using Hosted Fields with Ajax onSubmitCompleteEvent for details..

---

**Note:** Vindicia never returns or displays sensitive payment information, such as credit card account numbers, in full. When returning information through an API call, or displaying the data in the Portal, CashBox always partially masks account numbers.
13.2 HOA with Hosted Fields Process Flow

The HOA process differs from standard CashBox processes in that, using HOA, you do not pass customer credit card information directly to the CashBox servers. Instead, you use HOA with Hosted Fields to handle transfer of this sensitive information.

13.2.1 User Experience Flow

The HOA with Hosted Fields process proceeds as follows:

1. Customer navigates to your offer page.
   You use this page to request non sensitive information, such as name, address and email, to create the customer Account.
   
   When the customer clicks **Submit** or **Save**
   
   a. Use `Account.update()` to create a new `Account` object, and load the acquired customer information
   b. Call `WebSession.initialize()` to create a `WebSession` object, and a VID, which will be used to track and manage this session
   c. Redirect the customer to your Payment Information page

2. Customer arrives at your Payment Information page.
   Use this page, and HOA, to collect sensitive payment information, such as the credit card number, its expiration date, and the CVN code on the reverse side of the card.
   
   When the customer clicks **Submit**
   
   a. Data is temporarily stored within the CashBox database, awaiting the session to terminate by timeout or by finalizing the HOA calls.
   b. Redirect the customer to your Confirmation page.

3. Customer arrives at your Confirmation page.
   
   a. The confirmation page is loaded with the WebSession ID (in a hidden form), to confirm the validity of the transaction
   b. Customer clicks **Submit**

4. To determine how to route the customer, call `WebSession.finalize()` to confirm the submission, finalize the session, and instruct CashBox HOA to make the SOAP calls necessary to load the temporary data from the `WebSession` object into the appropriate CashBox objects.
13.2.2 HOA Server Work Flow

This section describes the data flow from the customer’s browser through your website servers, to the CashBox WebSession servers and the CashBox database.

Figure 13-1 HOA Server Work Flow

1. Your customer requests a page from your Web application (makes an HTTP call to your Web site), such as your Order page, which requires that they submit payment information.

2. Call `WebSession.initialize()` in the CashBox API to initialize a WebSession object on the Vindicia server. In the WebSession object, specify two key attributes:
   - The IP address from which the customer requested the order form. For example:

     ```php
     billing_CODE_ONLY.php:$ws->setIpAddress($ip_address);
     ```
• The API call HOA should make when the customer submits the form. For example, calling `PaymentMethod.update()` allows you to create a new payment method. For example:

```html
<div id="vin_PaymentMethod_creditCard_account"></div>
```

The `initialize` call creates a `WebSession` object, which may include a method data member. You can use this data member to specify the SOAP call for which this `WebSession` is acting as proxy. Valid input includes:

- `Account_Update`
- `Account_UpdatePaymentMethod`
- `AutoBill_Update`
- `PaymentMethod_Update`
- `PaymentMethod_Validate`
- `Transaction_Auth`
- `Transaction_AuthCapture`

(The `initialize` call takes several parameters to mitigate the risk of an unauthenticated call.)

---

**Note:** To help Vindicia assess fraud risk, capture the customer’s IP address. This aids the Vindicia ChargeGuard team in chargeback investigations.

3. After the `initialize()` call is made, the `WebSession` object returns a Vindicia ID (VID).

This VID is used to track the HOA session, and serves as a means of control and authentication. Only one VID is generated per session, and it has a time limit for validity. CashBox returns the `WebSession` VID to your application in response to the `initialize()` call. Other form elements, hidden or to be provided by the customer, must be consistent with the data required to complete a `PaymentMethod.update()` call (or other API call, listed above). The form’s action URL points to the HOA address on the Vindicia server.

4. Return the checkout form from the merchant server to the browser with this VID. This will be a hidden field called `WebSessionId`.

---

**Note:** Steps 1 through 4 are parts of a single synchronous call and response chain initiated by the customer's request for the order form.

5. As the page loads in the browser, iframes will load from Vindicia.com to protect sensitive payment fields (Hosted Fields).
6. The customer fills out your form, and clicks **Save** or **Submit**. The entire form, including the hidden VID is posted directly to the Vindicia servers. Your server is bypassed completely with this form submission.

**Note:** The customer must complete the form within one hour (the default expiration time), or within your specified expiration time, after which CashBox marks the WebSession object expired.

7. Vindicia saves the form data to CashBox in a temporary area.

   HOA loads the WebSession object with vin_WebSession_VID, which accompanied the form, and stores the data submitted by the order form. Note that HOA does not make the API call to create the PaymentMethod object at this point in the process. At this point you need only pass in the object attributes you have collected—the remainder can be passed in with the WebSession.finalize call (in Step 10).

8. CashBox returns the redirectURL back to the browser. If you’re using a pure Ajax solution, the onSubmitCompleteEvent is called. Otherwise the browser is redirected to this URL. This URL (the redirectURL) is either your confirmation page or your error page that you previously defined in your web session.

9. The browser is either redirected to the merchant page or process for completing the order, or an Ajax call is made to indicate success to the merchant server. The redirect carries the VID for the WebSession back to the merchant site, allowing you to finalize this session.

10. Within the page or process resulting from confirmation or Ajax call on the merchant server, you execute a WebSession.finalize SOAP call to Vindicia.

   When you call finalize, simply pass in the ID of the sparse webSession object (the VID). Do not populate any privateFormValues or post values. In rare cases, you can pass in MethodParamValues—for example if you want to pass in a campaign code to an AutoBill.update call after collecting it in the payment form.

   WebSession.finalize returns both the WebSession results and the result for the underlying API calls. (For more information, see Section 19: The WebSession Object in the *CashBox API Guide.*) You can also pass other parameters for the CashBox method that you did not pass initially.

11. During the CashBox finalize, all temporary session data is converted to objects in the Vindicia database, which CashBox begins processing immediately. For example, a new AutoBill might capture the funds on a first transaction.

12. The results returned by the finalize() call contain enough information to either present a Thank You page to the customer or satisfy your Ajax function call, or react to any errors in case more action is required from the customer.

13. Your merchant server page communicates results to the browser, either through an HTML or an Ajax response.
13.3 Working with HOA with Hosted Fields

Using the CashBox API, you can access objects generated during an HOA process using their WebSessionVid, and the fetchByWebSessionVid method. CashBox objects you can fetch using their WebSessionVid include the following:

- Account
- AutoBill
- PaymentMethod
- Transaction

The following sections provide some guidelines for working with HOA with Hosted Fields. For a complete procedure for integrating HOA with Hosted Fields with your CashBox implementation, see Section 13.4: Implementing HOA with Hosted Fields. If you have already integrated HOA with your CashBox implementation and just want to set up Hosted Fields, see Section 13.4.3: Setting Up Hosted Fields.

13.3.1 HOA Naming Schema

Web forms are a flat name space. To accommodate this, CashBox flattens its standard SOAP calls by concatenating them using underscores. HOA uses the following naming rules:

- Every name begins with vin_
- Followed by the object type you want to create: vin_Transaction_
- Followed by the name of the data member you want to set:
  vin_Transaction_amount
- Followed by the value for the data member: vin_Transaction_amount => 100

*Note:* HOA naming rules are case-sensitive.

Follow the same pattern to set the value for an object:

vin_PaymentMethod_billingAddress_addr1 => "1639 Harrison Ave."

In creating forms, use the format:

 `<input type="text" name="vin_Transaction_transactionItems_0_sku"/>`

For example:

vin_PaymentMethod_billingAddress_addr1 => "1639 Harrison Ave."

In the form, becomes:

 `<input type="text" name="vin_PaymentMethod_billingAddress_addr1"/>`
### Naming schema for parameter values

Setting parameter values follows the same structure. For example, to set `minChargebackProbability` to 100:

```plaintext
vin_Transaction_auth_minChargebackProbability => 100
```

### Naming scheme for an object with an array

Comma delimited values are used for private form values, therefore you cannot use them elsewhere, and you cannot use them to define an array.

To set an array of values, use the pattern described above, but add the index value for the item after the name of the attribute, then the item itself.

```plaintext
"Transaction_taxExemptions_0_taxExemption"
"Transaction_taxExemptions_1_taxExemption2"
```

### Naming scheme for name-value arrays

To set a name-value array, simply use the flattened object name, method name, and parameter name, concatenated with an underscore:

```plaintext
Transaction_nameValues_name => value
$mpnv1->setName('AutoBill_Update_minChargebackProbability');
$mpnv1->setValue('95');
```

### 13.3.2 HOA Form Post Parameters

To create a Form Post parameter, simply create an HTML form that contains elements, forms, and widgets whose names follow the examples shown here. The values associated with these names will be dependent upon your customer's actions or selections in the HTML form.

The following lists examples of HOA Form Post parameters:

```plaintext
vin_WebSession_version='3.9'
v_WebSession_method='Account_updatePaymentMethod'
v_WebSession_vid
vin_PaymentMethod_type='CreditCard'
```

---

**Note:** Calling `WebSession.finalize` instructs HOA to take ALL form information gathered through the HOA http POST, and create and populate the appropriate CashBox objects.
vin_PaymentMethod_accountHolderName
vin_PaymentMethod_creditCard_account

// Upon form submission, HOA will validate the value entered in this field by running a Luhn check. If the check fails, the customer’s browser will be redirected to your error URL.

vin_PaymentMethod_creditCard_expirationDate='YYYYMM'

// Upon form submission, HOA will validate the value entered in this field by making certain the year begins with “20,” and the month is between 01 and 12. If this check fails, your customer’s browser will be redirected to your error URL.

// (full expirationDate takes precedence)

vin_PaymentMethod_creditCard_expirationDate_Month='MM'

// Upon form submission, HOA will validate the value entered in this field by making certain that the month is between 01 and 12. If this check fails, your customer’s browser will be redirected to your error URL.

vin_PaymentMethod_creditCard_expirationDate_Year='YYYY'

// Upon form submission, HOA will validate the value entered in this field by making certain that the year begins with “20.” If this check fails, your customer’s browser will be redirected to your error URL.

vin_PaymentMethod_nameValues_cvn
vin_PaymentMethod_billingAddress_name
vin_PaymentMethod_billingAddress_addr1
vin_PaymentMethod_billingAddress_addr2
vin_PaymentMethod_billingAddress_city
vin_PaymentMethod_billingAddress_district
vin_PaymentMethod_billingAddress_postalCode
vin_PaymentMethod_billingAddress_country
vin_PaymentMethod_billingAddress_phone

If the customer is redirected to your error URL by one of these error checks, be certain to inform them why form submission failed. Then, initiate a new WebSession, and re-present the order form to your customer.

Private Form Values

To set the merchantTransactionId of a Transaction, pass a FORM name-value pair to a WebSession NameValuePair object. For example:

    {name => 'vin_Transaction_merchantTransactionId', value => 'tx_' . $time}

(Notice that the Transaction object's merchantTransactionId data member is flattened out and prefixed with vin_.)

The following lists examples of HOA Private Form values:

vin_Account_merchantAccountId
vin_PaymentMethod_merchantPaymentMethodId
13.3.3 HOA Method Parameters

To pass a variable to a CashBox method, use a name-value pair.

For example, to pass the `minChargebackProbability` attribute to the `Transaction.auth` method:

```plaintext
{name => 'Transaction_Auth_minChargebackProbability', value => 1},
```

The following lists examples of HOA Method parameters:

- `Account_updatePaymentMethod_replaceOnAllAutoBills=true`
- `Account_updatePaymentMethod_updateBehavior=Validate`
- `Account_updatePaymentMethod_ignoreAvsPolicy=false`
- `Account_updatePaymentMethod_ignoreCvnPolicy=false`

13.3.4 HOA Error Checking

It is possible for the `WebSession.finalize` call to be successful while the underlying SOAP API call was not.

Therefore, your code should check that both the `WebSession.finalize` call and the API return within it returned a 200 for success.

As different API calls will use the same return codes to mean different things, please reference API name, return code, and return strings to get a complete error view and reference lists for each method in the `CashBox API Guide`.

13.3.5 WebSession Object

The `WebSession` object must be created before serving the order form to the customer for submission to the Vindicia server.

The `WebSession` object:

- Tracks the submission of an order form containing sensitive payment data. Use the `WebSession`’s VID as a session ID, to track the session from your customer’s first order form request, to your final success or failure page for the session.
- Establishes a time limit for the entire sequence.
- Ensures that a single form submission from a customer results in only one API call, specified when the session is initiated (see the `WebSession` object’s method data member). That way, if the customer submits the same form repeatedly, HOA does not make multiple API calls, resulting in the creation of multiple CashBox objects. The `WebSession` object supports the following CashBox API calls (methods):

```plaintext
Account_Update
Account_UpdatePaymentMethod
AutoBill_Update
PaymentMethod_Update
PaymentMethod_Verify
```
• Stores the result of the CashBox API calls made by HOA after finalization of the **WebSession** object. Your success / failure page then examines this information to determine its content, and directs the customer to the appropriate next steps. (See the **WebSession** object's `apiReturn` attribute in Section 19.1: WebSession Data Members in the *CashBox API Guide*.)

• Holds some of the data required to complete the CashBox API call that HOA makes after the customer has submitted the form. (See the **WebSession** object's `privateFormValues` attribute in Section 19.1: WebSession Data Members in the *CashBox API Guide*.)

For details on the **WebSession** object's attributes, see Section 19.1: WebSession Data Members in the *CashBox API Guide*.

The following example shows a typical initialization of a **WebSession** object. This example creates an **AutoBill** object for a new subscription, without passing sensitive Payment Method information through your servers. When a customer requests a page to start a subscription, initiate a **WebSession** object.

To populate the data in the **WebSession** object:

• **HOA** calls **AutoBill.update** when you finalize the **WebSession** object.

  **AutoBill.update()** may use an existing **Account** object for the customer.

  **Note:** Do not allow this object's VID to appear in the form sent to the customer's browser, not even as a hidden element.

• **AutoBill.update()** uses an existing **Product** object.

  **Note:** Do not allow this object's VID to appear in the form sent to the customer's browser. Hiding this VID prevents hackers from specifying a random Product ID, that may correspond to a Product ID that you do not wish to make available for subscriptions in this context.

• **AutoBill.update()** uses one of two existing **BillingPlan** objects. (Specify existing Billing Plan IDs to prevent other, possibly inactive or invalid, IDs from being submitted. This helps to regulate and control the AutoBill creation process.)

Because all POSTed data is submitted through an HTTP Post, it must be submitted as name-value pairs.

(Note: These are HTTP name-value pairs; not CashBox NameValuePair objects.)

```php
$ws = new WebSession();

// HOA must use CashBox API version 3.4 or later to make the // AutoBill.update call
$ws->setVersion('3.4');

// HOA should make an AutoBill.update call when the form // is submitted
$ws->setMethod('AutoBill_Update');
```
// Capture the customer's IP address. When the customer submits the form,
// it should come from the same IP address

$ws->setIpAddress("124.23.210.175");

// Page to which HOA will redirect customer's browser after
// successfully storing the data received when the customer
// submits the form


// Page to which HOA will redirect customer's browser if HOA fails to
// store the data received when the customer submits the form

$ws->setErrorURL("https://merchant.com/subscribe/failed.php");

// Private name-value pairs. These are needed to create the AutoBill
// object, but are NOT included in the customer form

$pnv1 = new NameValuePair();

// The name is a flattened object name, concatenated
// with attribute names with an underscore.

// The CashBox Account object for which HOA should create the
// AutoBill object

$pnv1->setName('vin_Account_merchantAccountId');
$pnv1->setValue('df943');

// The CashBox Product object HOA should use to construct
// the AutoBill object

$pnv2 = new NameValuePair();
$pnv2->setName('vin_Product_merchantProductId');
$pnv2->setValue('BlorgWars II');

$pnv3 = new NameValuePair();
$pnv3->setName('vin_BillingPlan_merchantBillingPlanId');

// When customer submits the form, the Billing Plan
// must be one of these two comma separated values

$pnv3->setValue('GoldAccess2010, PlatinumAccess2010');

$ws->setPrivateFormValues(array($pnv1, $pnv2, $pnv3));

// Create method parameter name-value pairs. These are needed to make the
// AutoBill.update call which takes parameters in addition to the
// AutoBill object itself. Do not allow these to come from the form
// submission, because that makes them susceptible to hacking

$mpnv1 = new NameValuePair();

// The name is flattened object name, method name, and
// parameter name, concatenated with underscores.
$mpnv1->setName('AutoBill_Update_minChargebackProbability');
$mpnv1->setValue('80');

// Leave other parameter values to their default values

$ws->setMethodParamValues (array($mpnv1));

// Now create the WebSession object on Vindicia servers
// by making the SOAP call to initialize the object

$response = $ws->initialize();

if ($response['returnCode'] == 200) {
    $ret_ws = $response['data']->session;

    // The VID of the WebSession object serves as session id
    $sessionId = $ret_ws->getVID();

    // Embed the sessionId as a hidden field named
    // vin_WebSession_VID in the order web form

    // Compose and present the order web form to the customer here
} else {
    // Return error to the customer who requested the web order form
}

Note that this example stores the merchant IDs of the *Account*, *BillingPlan*, and other objects as private values in the *WebSession* object, and assumes that objects with these IDs already exist in CashBox. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.) Always specify merchant IDs of objects as private values stored in the *WebSession* object, even if the objects do not yet exist. These are your internal object IDs; for security reasons do not pass them in through the form submission, or store them as hidden fields in the form. If an object ID is present in the *WebSession* object's private values, when HOA completes the desired API call, HOA first looks for an object with that ID in the CashBox database. If no such object is available, HOA creates a new object with that ID, and populates it with related data, either submitted through the form, or previously stored in the *WebSession* object.

For example, if an *Account* with merchantAccountId: df943 does not yet exist in CashBox, when the *WebSession* is finalized, HOA will create a new *Account* object with merchantAccountId: df943. In this case, the *Account* attributes, such as customer's name, email, and shipping address, must be passed in through the form; which means that your form must include the fields necessary for your customer to submit this information.

The *WebSession* object created remains valid for one hour (by default), within which time the customer must complete and submit the form.
13.3.6 Creating Order Forms for HOA

To provide payment information and other data required by the `WebSession` object, your customer order form must contain the following attributes:

- The VID of the corresponding `WebSession` object as a hidden element named `vin_WebSession_VID` in the form, for example:

  ```html
  <input type="hidden" name="vin_WebSession_VID" value="$sessionId" />
  ```

- The action URL of the form pointing to the HOA page on the Vindicia server (https://secure.vindicia.com). The method for submitting the form is POST.

---

**Note:** URLs vary by working environment. Please contact Vindicia client services for your current location.

- **Prodtest:** https://secure.prodtest.sj.vindicia.com/vws
- **Staging:** https://secure.staging.sj.vindicia.com/vws
- **Production:** https://secure.vindicia.com/vws

- The attributes required for the CashBox objects HOA will create with finalization of the `WebSession`. These attributes must be present as form elements, unless stored as private values in the `WebSession` object. The element name must begin with the prefix `vin_`, followed by a flattened attribute name that contains the object name, sub-object name, and attribute name, concatenated by underscores.

In the following example, the form collects data for a `BillingPlan` object and a `PaymentMethod` object to construct an `AutoBill` object. The corresponding `WebSession` object specifies `AutoBill_Update` in its method attribute.

```html
Select Billing Plan: <p>
<input type="radio" name="vin_BillingPlan_merchantBillingPlanId" value="GoldAccess2010" />
<input type="radio" name="vin_BillingPlan_merchantBillingPlanId" value="PlatinumAccess2010" />
<input type="hidden" name="vin_AutoBill_currency" value="USD" />
<input type="hidden" name="vin_PaymentMethod_Type" value="CreditCard" />

Enter credit card details: <p>
Account Holder Name: <div id="vin_PaymentMethod_accountHolderName"></div>
Credit card number: <div id="vin_PaymentMethod_creditCard_account"></div>
Expiration Date: <div id="vin_PaymentMethod_creditCard_expirationDate"></div>
CVV Number: <div id="vin_PaymentMethod_nameValues_cvn"></div>
```
If an attribute is an array, concatenate the element with a number that specifies the array index.

For example, to specify the line items to construct the Transaction object's items attribute (for a WebSession object with the Transaction.auth method):

```html
<input type="text" name="vin_Transaction_transactionItems_0_sku"/>
<input type="text" name="vin_Transaction_transactionItems_0_name"/>
<input type="hidden" name="vin_Transaction_transactionItems_0_price" value="9.95"/>
<input type="text" name="vin_Transaction_transactionItems_0_quantity"/>

<input type="text" name="vin_Transaction_transactionItems_2_sku"/>
<input type="text" name="vin_Transaction_transactionItems_2_name"/>
<input type="hidden" name="vin_Transaction_transactionItems_2_price" value="8.88"/>
<input type="text" name="vin_Transaction_transactionItems_2_quantity"/>
```

If you include elements in the form that are relevant to you, but not required by a Vindicia object (such as form elements whose names do not contain the vin_prefix), HOA stores the corresponding HTTP POST data in the postValues attribute of the corresponding WebSession object. After posting, the data is available to you when you retrieve the WebSession object on your success or failure page.

When your customer submits the form, HOA stores the form data with the WebSession object. It does not create any CashBox objects (by making the API call you specified in the method attribute of the WebSession object) until you call finalize() on the WebSession object. Finalize the WebSession from the success page to which HOA redirects the customer's browser after storing the form data.

**Note** To ensure optimal compatibility of UTF-8 form input with Vindicia HOA form handling, set the enctype attribute on the form to 'multipart/form-data'.

### 13.3.7 Creating Success or Failure Pages for HOA

When a customer submits an order form, HOA receives and stores the data on Vindicia servers, and redirects the customer's browser to your success page, hosted on your server. Specify the URL of your success page in the returnURL attribute of the WebSession object.
object. (This is generally a dynamically generated page that intersperses CashBox API calls with HTML to be sent to the browser.)

If a failure occurs when HOA stores the form data, HOA redirects the customer's browser to the page specified in the WebSession object's errorURL attribute. (This is also a dynamically generated page hosted on your server, but which in this case is used to notify your customer of a failure, and its causes.) If you do not specify the errorURL attribute, HOA will use the returnURL for redirection upon failure.

To work with the CashBox API and your success and failure pages:

- When HOA redirects to the success or failure pages, it passes the WebSession object's VID. Use this WebSessionVid to make a finalize() call on the WebSession object. Upon finalization, HOA internally makes the call specified in the method data member of the corresponding WebSession object, creates the desired object or objects on the Vindicia server, and updates the WebSession object with the call's results. This updated WebSession object is available to you in the response to your finalize() call.

- When creating a success page, extract the non-Vindicia form data submitted by the customer by examining the WebSession object's postValues data member.

- On the success page, fetch the object created by the API call made by HOA. For example, if your WebSession object's method data member is set to AutoBill.update, after finalization of the WebSession, HOA creates an AutoBill object. Fetch that object with the WebSession object's VID by calling AutoBill.fetchByWebSessionVid(). Similar methods are available for the Account, Transaction, and PaymentMethod objects. You may then include information from these objects on your success page.
13.4 Implementing HOA with Hosted Fields

The following sections form a complete procedure for setting up HOA with Hosted Fields, from the creation of customer Accounts for HOA, to the setup of HOA with Hosted Fields, to finalizing the HOA integration.

If you are already using HOA with CashBox and want to implement Hosted Fields (and satisfy the minimum audit burden of SAQ-A (Self-Assessment Questionnaire—version A) requirements when accepting payment information from your customers), skip ahead to Section 13.4.3: Setting Up Hosted Fields.

13.4.1 Setting up Accounts

Before you set up HOA you will need to create accounts, where your customers enter identifying information before the payment page is presented. This example shows how to create an account in the Vindicia database. (For more information about creating customer accounts, see Chapter 2: Working with Accounts in the CashBox Programming Guide.)

1. Receive the form Post of Account sign up fields.

```
$product_id = "GamePlay01";
$billing_plan = $_POST['billing_plan'];
$name = $_POST['name'];
$addr1 = $_POST['address1'];
$addr2 = $_POST['address2'];
$city = $_POST['city'];
$state = $_POST['state'];
$postalcode = $_POST['zip'];
$country = $_POST['country'];
$phone = $_POST['phone'];
$email = $_POST['email'];
$coupon = $_POST['coupon'];
```

2. Build the Address object

```
$address = new Address();
$address->setName($name);
$address->setAddr1($addr1);
$address->setAddr2($addr2);
$address->setCity($city);
$address->setDistrict($state);
$address->setPostalCode($postalcode);
$address->setCountry($country);
$address->setPhone($phone);
```

3. Build the Account object, use address.

```
$account_id = 'sgtestaccount' . rand(1000,9999); // generate a random account number
$account = new Account();
$account->setMerchantAccountId($account_id);
$account->setEmailAddress($email);
$account->setShippingAddress($address);
```
$account->setEmailTypePreference('html');
$account->setName($name);

4. Send Account object to Vindicia.

$srd = ""; // Soap version 13.0 and higher uses SRD
$response = $account->update($srd);

5. Verify that Account creation was successful.

$return_code = $response['returnCode'];
if ($return_code == "200")
{
    // success
    if (isset($response['data'])) {
        $response_object = $response['data'];
    }
    // It worked. Account was created.
    $account = $response_object->account;
    if ($account_id == $account->merchantAccountId)
    {
        // It was saved in Vindicia's database
    }
} else {
    // failure
    print "<h2>Error: Could not create account object in Vindicia's database</h2>";
    $return_string = $response['returnString'];
    print $return_code . " " . $return_string;
    exit;
}

You can now use $account_id as a private name-value pair in the WebSession.

Proceed to Setting up HOA.

13.4.2 Setting up HOA

This section shows how to set up basic HOA.

1. Include the SOAP Client in your page.

   <?php
   require_once("Vindicia/Soap/Vindicia.php");
   ?>

2. Start a new WebSession object.

   <?php
   define("HOA_RETURN_URL", "https://store.merchant.com/websession/success.php");
   define("HOA_CANCEL_URL", "https://store.merchant.com/websession/error.php");
   $websession = new WebSession();
   $websession->setReturnURL(HOA_RETURN_URL);
$websession->setErrorURL(HOA_CANCEL_URL);
?>

3. Load the WebSession with private values.

```php
<?php
/privateVals = array();
$nvp0 = new NameValuePair();
$nvp0->setName('vin_Account_merchantAccountId');
$nvp0->setValue($account_id); // use the account we just created on a previous page
/privateVals[] = $nvp0;

$nvp1 = new NameValuePair();
$nvp1->setName('vin_AutoBill_merchantAutoBillId');
$nvp1->setValue($autobill_id);
/privateVals[] = $nvp1;

$nvp2 = new NameValuePair();
$nvp2->setName('vin_AutoBill_items_0_Product_merchantProductId');
$nvp2->setValue($product_id);
/privateVals[] = $nvp2;

$nvp3 = new NameValuePair();
$nvp3->setName('vin_BillingPlan_merchantBillingPlanId');
$nvp3->setValue($billing_plan);
/privateVals[] = $nvp3;

$websession->setPrivateFormValues($privateVals);
?>
```

4. Load the WebSession with method parameter values.

```php
<?php
$websession->setMethod('AutoBill_Update');

$nvp12 = new NameValuePair();
$nvp12->setName('AutoBill_Update_duplicateBehavior');
$nvp12->setValue('Fail');

$nvp13 = new NameValuePair();
$nvp13->setName('AutoBill_Update_validateForFuturePayment');
$nvp13->setValue('1');

$nvp14 = new NameValuePair();
$nvp14->setName('AutoBill_Update_minChargebackProbability');
$nvp14->setValue('99');

$nvp15 = new NameValuePair();
$nvp15->setName('AutoBill_Update_ignoreAvsPolicy');
$nvp15->setValue('true');

$nvp16 = new NameValuePair();
$nvp16->setName('AutoBill_UpdateIgnoreCvnPolicy');
$nvp16->setValue('true');
```
$nvp17 = new NameValuePair();
$nvp17->setName('AutoBill_Update_campaignCode');
$nvp17->setValue($coupon);

$websession->setMethodParamValues(array($nvp12,$nvp13,$nvp14,$nvp14,$nvp15));
?>

Note that nvp16 and nvp17 are purposely not passed into WebSession. They are provided as additional examples.

5. Initialize the WebSession to generate a session ID.

```php
<?php
$srd = ""; # Soap 13.0 and higher has SRD
$rc = $websession->initialize($srd);
$response_object = $rc['data'];
$return_code = $rc['returnCode'];
$return_object = $response_object->session;
$session_id = $return_object->VID; # Web Session ID for embedding in html form
?>
```

6. Create a form with some hidden fields.

Two hidden fields are required:

- **vin_WebSession_version** (SOAP version)
- **vin_WebSession_vid** (Session Id)

Note that SOAP versions 13 and higher use Sparse Response Descriptions (SRD).

```html
<h3>Credit/Debit Card Information</h3>

<form id="mainForm" name="mainForm" class="form-horizontal" action="https://secure.vindicia.com/vws" method="post">
    <input type="hidden" name="vin_WebSession_version" value="21.0" />
    <input type="hidden" name="vin_WebSession_vid" value="<?php print $session_id ?>" />
    <input type="hidden" name="vin_PaymentMethod_type" value="CreditCard" />
</form>
```

7. Create some input fields that do not require protection (Hosted Fields).

```html
<input type="text" class="form-control" id="vin_PaymentMethod_accountHolderName" name="vin_PaymentMethod_accountHolderName" placeholder="Enter Cardholder Name" value=""/>
```

8. Create some input fields that do require protection (Hosted Fields).

```html
<div id="vin_PaymentMethod_creditCard_account"></div>
<div id="vin_PaymentMethod_creditCard_expirationDate"></div>
<div id="vin_PaymentMethod_nameValues_cvn"></div>
```

9. Call vindicia.setup to establish the protected fields (Hosted Fields) inside iframes.
13.4.3 Setting Up Hosted Fields

If you are already using HOA with CashBox and want to implement Hosted Fields (and satisfy the minimum audit burden of SAQ-A (Self-Assessment Questionnaire—version A) requirements when accepting payment information from your customers), begin here and continue through Section 13.4.12: Allowed Styles.

When your customer's web browser loads your checkout page, some or all of the input boxes in the checkout form become iframes. These iframes load their HTML and JavaScript from Vindicia.com.

Note: When using HOA with Hosted Fields, the vindicia.js JavaScript library uses its own namespace, rather than the global namespace.

This section describes how to modify your current HOA checkout page to incorporate Hosted Fields. The focus in these sections is on Step 3.

1. Change <input> Tags to <div> Tags in your form.

   For sensitive data, such as the credit card number, expiration date and CVN number, use a div tag instead of an input field in your form. For example, change the following:

   ```html
   <input type="text" id="vin_PaymentMethod_creditCard_account"
   name="vin_PaymentMethod_creditCard_account"
   placeholder="Enter Credit Card Number" />
   ```

   to this:

   ```html
   <div id="vin_PaymentMethod_creditCard_account"></div>
   ```

2. Include vindicia.js on your checkout page

   ```html
   <script src="https://secure.vindicia.com/ws/vindicia.js"></script>
   ```

   There is no JQuery or other JavaScript framework requirement, but Vindicia recommends that you include vindicia.js after you include the framework file. This will instantiate an object called vindicia.

3. Call vindicia.setup() with options.

   Call the vindicia.setup() method to initialize the Hosted Fields on your checkout form. The vindicia.setup() call will take over the submit event in your form. To do validation you must pass in some options to the setup() method.

   ```html
   <script>
   vindicia.setup(options);
   </script>
   ```
These three steps will cause a redirect to a Success or Error page after form submission. If you want full Ajax control over this form, see the section Using Hosted Fields with Ajax onSubmitCompleteEvent.

**Example: Initializing Hosted Fields**

This JavaScript example uses all the optional features of the `vindicia.setup()` method for HOA with browser redirect. It initializes the Hosted Fields on the checkout form. The Using Hosted Fields with Ajax onSubmitCompleteEvent provides a complete Ajax solution.

```javascript
vindicia.setup({
  // Options
  formId: "mainForm",  // dom element of form
  vindiciaServer: "secure.vindicia.com",
  hostedFields: {
    cardNumber: {
      selector: "#vin_PaymentMethod_creditCard_account",
      placeholder: "Enter Credit Card Number"  // optional field
    },
    expirationDate: {
      selector: "#vin_PaymentMethod_creditCard_expirationDate",
      placeholder: "Expiration Date MM/YY",  // optional field
      format: "MM/YY"  // optional, default is MM/YY
    },
    cvn: {
      selector: "#vin_PaymentMethod_nameValues_cvn",
      placeholder: "Enter CVV"  // optional field
    },
    styles: {
      "input": {
        "width": "100%",
        "font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
        "font-size": "14px",
        "color": "#555",
        "height": "34px",
        "padding": "6px 12px",
        "margin": "5px 0px",
        "line-height": "1.42857",
        "border": "1px solid #ccc",
        "border-radius": "4px",
        "box-shadow": "0px 1px 1px rgba(0,0,0,0.075) inset",
        "-webkit-transition": "border-color 0.15s ease-in-out 0s, box-shadow 0.15s ease-in-out 0s",
        "transition": "border-color 0.15s ease-in-out 0s, box-shadow 0.15s ease-in-out 0s"
      },
      "select": {
        "width": "100%",
        "font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
```
iframeHeightPadding: 2, // optional
onSubmitEvent: function(theForm) {
  return merchantValidate(theForm);
},
onVindiciaFieldEvent: function(event) { // optional
  if (event.detail.fieldType == 'cardNumber') {
    setCardImage(event.detail.cardType); // bright or dim the card logo
  }
  if (event.detail.fieldType == 'expirationDate') {
    if (!event.detail.isValid)
      console.log('vindiciaEvent expirationDate not valid');
  }
  if (event.detail.fieldType == 'cvn') {
    if (!event.detail.isValid)
      console.log('vindiciaEvent cvn not valid');
  }
  console.log('cvn length ' + event.detail.dataLength);
The function `merchantValidate(theForm)` is a custom function, to be written by you.

### 13.4.4 Hosted Fields options

The `vindici.setup()` method takes one argument, `options`:

```
vindici.setup(options);
```

Setup options include the following:

- `formId`: Required: This is the ID of the form as shown below in this sample HTML:

  ```html
  <form id="mainform">
  
  and would look like this:
  ```

  ```javascript
  formId: "mainform",
  ```
vindiciaServer: Optional: string
Defaults to “secure.vindicia.com”

vindiciaServer: “sercure.vindicia.com”,

Use this if you want to point to Prodtest, Staging, or QA.

hostedFields: This option has many sub objects, one for each input field that you want protected, and a “styles” sub object.

Required: cardNumber string
Required: object
cardNumber: {
  selector: "#vin_PaymentMethod_creditCard_account",
  placeholder: "Enter Credit Card Number" // optional field
},

expirationDate Required: Not required if using expirationMonth/expirationYear pair.
object
Expiration
expirationDate: {
  selector: "#vin_PaymentMethod_creditCard_expirationDate",
  placeholder: "Expiration Date MM/YY", // optional field
  format: "MM/YY" // defaults to MM/YY
},

Supported formats:
'MM/YY' (the default), 'MM-YY', 'MMYY', 'YY/MM', 'YY-MM', 'YYMM', 'YYYY/YY', 'YYYY-MM', 'YYYYMM', 'MM/YYYY', 'MM-YYYY', 'MYYYY'}
expirationMonth

Required: Not required if using expirationDate. Creates a dropdown box for entering the month.

    expirationMonth: {
        selector: 
            "#vin_PaymentMethod_creditCard_expirationDate_month",
        format: "N - A"
    },


expirationYear

Required: Not required if using expirationDate. Creates a dropdown box for entering the year. The supported formats are YY and YYYY.

    expirationYear: {
        selector: 
            "#vin_PaymentMethod_creditCard_expirationDate_year",
        format: "YY"
    },

Default format: "YYYY"

cvn

Optional: cvn: {
    selector: 
        "#vin_PaymentMethod_nameValues_cvn",
    placeholder: "Enter CVV" // optional field
}},
styles

Optional:

```
styles: {
  object
    "input": {
      "width": "100%",
      "font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
      "font-size": "14px"
    }
}
```

Besides basic CSS styles, there are two special classes: valid, notValid. If they are provided, they will be applied during validation.

```
".valid": { // optional
  "border-color": "#228B22",
},

".notValid": { // optional
  "border-color": "#ff0000",
},
```

Use either expirationDate or the pair expirationMonth and expirationYear but not both.

View the list of allowed expiration date formats.
View the list of allowed styles.

iframeHeightPadding: Optional:

integer

During vindicia.setup() the iframe height is adjusted to be the size of the input field inside of it. If any styles require some extra padding around the input box, this is the way to do that. It defaults to zero px.

```
iframeHeightPadding: 3,
```

onSubmitEvent: Optional:

function

This is where you will define a function to be executed when the submit button is pressed. It can be anonymous or a call to an existing function.

```
onSubmitEvent: function(myform) {
  return merchantValidate(myform);
},
```

onSubmitCompleteEvent: Optional:

function

If you do not want the browser to redirect to the success or error page, use this function. This allows you to perform a purely AJAX interaction. When the submit event to Vindicia is complete, this function will be called. It can be anonymous or a call to an existing function.

```
onSubmitCompleteEvent: function(event) {
  return doAjaxCompletion(event.details.url);
},
```
13.4.5 Setting Up Custom Fields

In addition to the basic credit card fields, you can have Vindicia host some custom fields. To do that, put a `div` tag in your form as a place holder for the iframe, which is created automatically later.

```
<div id="vin_shoesize"></div>
```

Then, in `vindicia.setup()` options, add lines as shown in this example:

```javascript
shoesize: {
    selector: "#vin_shoesize",
    placeholder: "Enter Shoe Size"
},
```

When the page loads and the `setup()` method is called, it creates an iframe. Notice the key `shoesize`. You can use this later if you want to validate this field.

When the fills out the form (enters a shoe size) and submits it, the shoe size is transmitted from the browser directly to Vindicia, and stored in your web session. It does not pass through your Web server.

Custom fields cannot contain credit card numbers at submit time. This is part of the automatic validation check. Also, a valid custom field is just a field that is not blank.

**Custom Validation**

You can also respond to validation onblur events with this custom field.

```javascript
onVindiciaFieldEvent: function(event) {
    if (event.detail.fieldType == 'shoesize') {
        if (!event.detail.isValid)
            alert('Shoe size cannot be blank');
    }
},
```
13.4.6 Understanding onVindiciaFieldEvent

Events happen inside iframes that the parent window is not allowed to respond to. The onVindiciaFieldEvent property can be used to call your function when validation events are happening inside the iframes.

```javascript
onVindiciaFieldEvent: function(event) {
    if (event.detail.fieldType == 'cardNumber') {
        setCardImage(event.detail.cardType); // bright or dim the card logo
    }
    if (event.detail.fieldType == 'expirationDate') {
        if (!event.detail.isValid) {
            alert('vindiciaFieldEvent expirationDate not valid');
        }
    }
    if (event.detail.fieldType == 'cvn') {
        if (!event.detail.isValid && event.detail.dataLength > 0) {
            alert('vindiciaFieldEvent cvn not valid');
        }
    }
}
```

event.detail.fieldType | cardNumber, expirationDate, cvn or a custom string you provided during setup.

- **cardNumber**—validation by Luhn check, forces all numeric characters, returns a cardType if detectable.
- **expirationDate**—defaults to *mm/yy* format for validation, but you can specify another format.
- **cvn**—forces all numeric characters. Valid if character count is 3 or 4.
13.4.7 Using Hosted Fields with Ajax onSubmitCompleteEvent

If you want a purely Ajax interaction, in which the browser does not redirect after form submission, use `onSubmitCompleteEvent` in your options and HOA with Hosted Fields will not redirect. (If you leave `onSubmitCompleteEvent` out of the options, redirect will occur.)

In a purely Ajax interaction, when the customer clicks the **Submit** button in the parent window form an Ajax call submits all of the form fields back to Vindicia. Upon completion, there is typically a redirect to a Success or Error page.

Place code similar to the following in your options and there will be no redirect. Instead, your function `finishCheckout` will be called after the Submit to Vindicia completes.

```javascript
onSubmitCompleteEvent: function(event) {
    finishCheckout(event.detail.url);
}
```

<table>
<thead>
<tr>
<th>event.detail.cardType</th>
<th>String property to hold the short name of the card type that was detected. It exists only on events with <code>fieldType cardNumber</code>. Supported values include:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• amex</td>
</tr>
<tr>
<td></td>
<td>• dankort</td>
</tr>
<tr>
<td></td>
<td>• dinners_club_carte_blanche</td>
</tr>
<tr>
<td></td>
<td>• dinners_club_international</td>
</tr>
<tr>
<td></td>
<td>• discover</td>
</tr>
<tr>
<td></td>
<td>• jcb</td>
</tr>
<tr>
<td></td>
<td>• visa Electron</td>
</tr>
<tr>
<td></td>
<td>• visa</td>
</tr>
<tr>
<td></td>
<td>• mastercard</td>
</tr>
<tr>
<td></td>
<td>• maestro</td>
</tr>
</tbody>
</table>

| event.detail.isValid        | Boolean value. If `True`, the data is acceptable and can be submitted. If `False`, the value is illegal or incomplete. |

| event.detail.dataLength     | This method will return an integer that is a count of characters inside the input box in the iframe. A blank field returns zero. |

| event.detail.fieldType      | String Always returns submit at this time. |

© 2019 Vindicia, Inc.  Table of Contents  Hosted Order Automation with Hosted Fields 13 - 30
13.4.8 onSubmitEvent: Merchant Form Validation

Because the Vindicia object takes over the Submit event when you call `vindicia.setup()`, you cannot call a validation function directly. Instead, your validation function is called for you. Specify the validation function in `vindicia.setup()` as follows:

```javascript
onSubmitEvent: function(theForm) {
    return merchantValidate(theForm);
},
```

When the user clicks the **Submit** button, `merchantValidate(theForm)` is called. You must return a boolean value. **True** causes the form to be submitted, **false** blocks submission of the form.

Structure your validation function as follows:

```javascript
function merchantValidate(theform) {
    if (!vindicia.isValid('vin_PaymentMethod_creditCard_account')) {
        // sensitive field
        alert('Please enter a valid credit card before submitting');
        return false;
    }
    if (!vindicia.isValid('vin_PaymentMethod_creditCard_expirationDate')) {
        // sensitive field
        alert('Please enter a valid expiration date YYYYMM before submitting');
        return false;
    }
    if (theform.vin_PaymentMethod_accountHolderName.value.length == 0) {
        // non sensitive field
        alert('Please enter the Account Name');
        return false;
    }
    if (vindicia.cardType == "amex" &&
        vindicia.dataLength('vin_PaymentMethod_nameValues_cvn') != 4) {
        alert("American Express CVV must be 4 digits");
        return false
    }
```

---

<table>
<thead>
<tr>
<th></th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>event.detail.url</td>
<td>String</td>
<td>Contents is the redirect URL. This reflects the WebSession success or error URL that was previously defined.</td>
</tr>
<tr>
<td>event.detail.isValid</td>
<td>Boolean</td>
<td>Always returns true at this time.</td>
</tr>
<tr>
<td>event.detail.dataLength</td>
<td>Number</td>
<td>Always returns zero at this time.</td>
</tr>
</tbody>
</table>
return true;
}

You must return true or false.

13.4.9 Validating iframes

Access to iframe field data is restricted, but you can validate iframe fields in a several ways:

- Inside your own merchant validation function at submit
- As blur events occur when the user tabs from field to field in the iframes
- As a call to `vindicia.isValid()` for all iframes or for a single iframe
- Let the Submit button block naturally if iframe fields do not contain valid data

Methods to validate iframe fields

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>vindicia.cardType</code></td>
<td>A string property to hold the short name of the card type that was detected.</td>
</tr>
<tr>
<td></td>
<td>Supported values include</td>
</tr>
<tr>
<td></td>
<td>• amex</td>
</tr>
<tr>
<td></td>
<td>• dankort</td>
</tr>
<tr>
<td></td>
<td>• diners_club_carte_blanche</td>
</tr>
<tr>
<td></td>
<td>• diners_club_international</td>
</tr>
<tr>
<td></td>
<td>• discover</td>
</tr>
<tr>
<td></td>
<td>• jcb</td>
</tr>
<tr>
<td></td>
<td>• visa.electro</td>
</tr>
<tr>
<td></td>
<td>• visa</td>
</tr>
<tr>
<td></td>
<td>• mastercard</td>
</tr>
<tr>
<td></td>
<td>• maestro</td>
</tr>
<tr>
<td></td>
<td>This is available only with the CardNumber iframe.</td>
</tr>
<tr>
<td><code>vindicia.dataLength(selector)</code></td>
<td>This method returns a positive integer that is a count of characters inside the input box in the iframe. If no selector is specified, or if the selector cannot find the iframe, it returns zero. This is very useful when detecting if the card is an &quot;amex&quot; and in the CVV field four numbers were entered</td>
</tr>
<tr>
<td></td>
<td>if (vindicia.cardType == &quot;amex&quot; &amp;&amp; vindicia.dataLength('vin_PaymentMethod_nameValues_cvn') != 4)</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>alert(&quot;American Express CVV must be 4 numbers&quot;);</td>
</tr>
<tr>
<td></td>
<td>return false</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
</tbody>
</table>
Methods to validate iframe fields

<table>
<thead>
<tr>
<th>vindicia.isValid(selector)</th>
<th>This method returns true or false if the input box in the iframe is valid. If no selector is specified, it returns true if all iframes are valid, and false if at least one iframe is not valid.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>if (!vindicia.isValid('vin_PaymentMethod_creditCard_account'))</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>alert('Please enter a valid credit card before submitting');</td>
</tr>
<tr>
<td></td>
<td>return false</td>
</tr>
</tbody>
</table>

Accessing onblur events with vindicia.setup()

```javascript
onVindiciaFieldEvent: function(event) {
  if (event.detail.fieldType == 'cardNumber') {
    setCardImage(event.detail.cardType); // bright or dim the card logo
  }
  if (event.detail.fieldType == 'expirationDate') {
    if (!event.detail.isValid) {
      console.log('vindiciaFieldEvent expirationDate not valid');
    }
  }
},
```

13.4.10 Vindicia Object Properties and Methods

The following properties are supported.

**vindicia.setup**

The heart of the Hosted Fields system. Calling this function takes over the submit event and creates iframes on your checkout page. Each iframe represents a single input field, such as credit card number, expiration date, CVN.
**vindicia.cardType**  
String property to hold the short name of the card type that was detected.  
Supported values include the following:  
- amex  
- dankort  
- diners_club_carte_blanche  
- diners_club_international  
- discover  
- jcb  
- visa_electron  
- visa  
- mastercard  
- maestro  

**vindicia.dataLength(selector)**  
This method returns an integer that is a count of characters inside the input box in the iframe. If no selector is specified or if the selector cannot find the iframe, it returns zero.  
This the following is useful for detecting whether the number entered is an Amex card, and whether four numbers were entered in the CVV field:  
```javascript  
if (vindicia.cardType == "amex" && vindicia.dataLength('vin_PaymentMethod_nameValues_cvn') != 4)  
{
    alert("American Express CVV must be 4 numbers");
    return false
}
```

**vindicia.isValid(selector)**  
This method returns a boolean value that represents whether or not the input box in the iframe is valid. If no selector is specified, the method checks all the iframe input boxes and returns true if all are valid, false if at least one is not valid.  
```javascript  
if (!vindicia.isValid('vin_PaymentMethod_creditCard_account'))  
{
    alert("Please enter a valid credit card before submitting");
}
```
vindicia.isSynced()  
This method returns True if all the iframes have reported their data to the master iframe. This method will return False if at least one iframe has not reported its data. Reporting is triggered by an onblur or onchange event. This method was added to help work around a Mobile Safari bug (still extant as of this writing) in which blur events are not consistently being triggered.

vindicia.clearSyncFlags()  
This method sets all iframe sync values to False. It is typically called just before syncData(). You can also use this method on vindicia.submit() to ensure that changes in the form fields are captured.

vindicia.syncData()  
This method sends a message to each iframe to simulate a blur event. This causes each iframe to validate its form data, send its results to the master iframe, and notify the parent window for validation purposes. This method is provided to help you work around a Mobile Safari bug (still extant as of this writing) in which blur events are not consistently being triggered. This method is called every 300ms, when on Mobile Safari devices, to ensure that blur events are triggered. See also: noSafariMobileTimer(), isSynced(), and clearSyncFlags(). You can also use this method on vindicia.submit() to ensure that changes in form fields are captured.

vindicia.clearData()  
This method clears the data in the iframes input boxes and drop-down boxes. It also clears the sync flags and isValid flags, and set isComplete() to False.

vindicia.resetCompleteStatus()  
This method sets isComplete() to False, allowing the submit button to initiate another POST. This is useful in single page Apps when you do not want to call clearData().

vindicia.submit()  
This method causes all iframes to submit their data directly to Vindicia.com, provided their data is valid. Not required for normal operation.

13.4.11 Allowed Expiration Formats

For a single input element, the expiration date can be an input element or a pair of drop-down elements on your checkout page.

When passing in format using the setup() method, as shown in this example

```javascript
expirationDate: {
    selector: "#vin_PaymentMethod_creditCard_expirationDate",
    placeholder: "Expiration Date MM/YY", // optional field
}
```
format: "MM/YY" // optional, default is MM/YY
},

only the following month and year formats are allowed:

"MM/YY"
"MM-YY"
"MMYY"
"YY/MM"
"YY-MM"
"YYNN"
"YYYY/MM"
"YYYY-YY"
"YYYYMM"
"NN/YYYY"
"NN-YYYY"
"NNYYYY"

The default format is MM/YY. Any other format will generate a browser error.

If you prefer drop down boxes for month and year instead of a text input box, use the following setup sub objects:

   expirationMonth: { // optional dropdown field or use expirationDate
   selector: "#vin_PaymentMethod_creditCard_expirationDate_month",
   language: "fr", // en, es, de, pt, fr, zh, ja only allowed
   month, A=Alphabetic Month)
   },

The language element is optional and can be only the above language codes ("en" for English, "es" for Spanish, "de" for German, and so on.

The following elements are allowed:

"N"
"A"
"N A"
"N-A"
"N - A"

where N refers to a numeric value for month, and A refers to an alphabetical value for month.

Options for year include YY and YYYY.

   expirationYear: { // optional dropdown field or use expirationDate
   selector: "#vin_PaymentMethod_creditCard_expirationDate_year",
   language: "fr", // en, es, de, pt, fr, zh, ja only allowed
   format: "YY" // defaults to YYYY
   },

If you prefer input boxes instead of drop-down boxes, use the following:
expirationMonthInput: {
    selector: "#vin_PaymentMethod_creditCard_expirationDate_month",
    placeholder: 'Month',
    format: "MM" // only "MM" is supported
},

expirationYearInput: {
    selector: "#vin_PaymentMethod_creditCard_expirationDate_year",
    placeholder: 'Year',
    format: "YYYY" // "YY" or "YYYY", defaults to YYYY
},

13.4.12 Allowed Styles

When passing in styles using the setup() method, the following specific tags are allowed. Any other styles are ignored. Attempts to send script tags in values are ignored.

color
width
height
border
border-color
border-radius
font
font-family
font-size
font-size-adjust
font-stretch
font-style
font-variant
font-variant-alternates
font-variant-caps
font-variant-east-asian
font-variant-ligatures
font-variant-numeric
font-weight
line-height
opacity
outline
padding
margin
text-shadow
box-shadow
-webkit-box-shadow
-moz-osx-font-smoothing
-moz-transition
-webkit-font-smoothing
-webkit-transition
transition
13.4.13 Finalize HOA

You can finalize your HOA setup via a browser redirect, or with an Ajax call. The following procedure works either way.

1. Include the SOAP Client in your page.

```php
t<?php
require_once("Vindicia/Soap/Vindicia.php");
?>
```

2. Retrieve the WebSession.
Pass the session ID to this PHP page so you can retrieve the object from Vindicia.

```php
t$session_id = $_GET['session_id'];

$websession = new WebSession();
$srd = ""; // Soap version 13.0 and higher uses SRD
$response = $websession->fetchByVid($srd, $session_id);
$return_code = $response['returnCode'];
$response_object = $response['data'];
$websession = $response_object->session;
?>
```

3. Verify that fetchBVid succeeded.

```php
t<?php
if (($return_code=="200") && ($websession->apiReturn->returnCode == "200"))
{
   // All is good to finalize
   else
   {
      // fetchByVid failed
      $error_message = $websession->apiReturn->returnCode . " " . $websession->apiReturn->returnString;
   }
}?
```

4. Finalize WebSession.

```php
t<?php
$show_receipt = false;
$srd = "";
$response_final = $websession->finalize($srd);
$response_object_final = $response_final['data'];
$websession_final = $response_object_final->session;
if ($response_final['returnCode'] == 200)
{
   if ($websession_final->apiReturn->returnCode == "200")
   {
      // Created autobill, show receipt page
   }
}
```php
if ($show_receipt) {
    $receipt_values = $websession_final->apiReturnValues->autoBillUpdate->autobill;
    $trans = $websession_final->apiReturnValues->autoBillUpdate->initialTransaction;
    $pay_method = $trans->sourcePaymentMethod;
    $account = $receipt_values->account->merchantAccountId;
    $name = $receipt_values->account->name;
    $cc_number = $pay_method->creditCard->account;
    $billing_plan = $receipt_values->billingPlan->description;
    $trans_id = $trans->merchantTransactionId;
    $currency = $trans->currency;
    $amount = $trans->amount;
}
```

5. Show receipt data in the browser from WebSession.

```php
<?php
    if ($show_receipt) {
        $receipt_values = $websession_final->apiReturnValues->autoBillUpdate->autobill;
        $trans = $websession_final->apiReturnValues->autoBillUpdate->initialTransaction;
        $pay_method = $trans->sourcePaymentMethod;
        $account = $receipt_values->account->merchantAccountId;
        $name = $receipt_values->account->name;
        $cc_number = $pay_method->creditCard->account;
        $billing_plan = $receipt_values->billingPlan->description;
        $trans_id = $trans->merchantTransactionId;
        $currency = $trans->currency;
        $amount = $trans->amount;
    }

    <h3>Receipt</h3>
    <p>Account: <?php print $account; ?></p>
    <p>Name: <?php print $name; ?></p>
    <p>Transaction: <?php print $trans_id; ?></p>

    <table class="table">
        <thead>
            <tr>
                <th>Quantity</th>
                <th>Description</th>
                <th>Amount</th>
            </tr>
        </thead>
        <tbody>
            <?php
            foreach ($trans->transactionItems as $line_item) {
                print "<tr>
                    $description = $line_item->name;
                    $price = $line_item->price;
                    $quantity = $line_item->quantity;
                
```
print "<td> . $quantity . "<td>
print "<td> . $description . "<td>
print "<td> . $price . "<td>
print "<tr>"
}
?>
</tbody>
</tfoot>
<tr>
<td> </td>
<td> </td>
<td><strong><?php print $amount; ?></strong></td>
</tr>
</tfoot>
</table>
<?php
} // bottom of "if show_receipt"
?>
14 Payment Method Tokenization

Payment method tokenization (PMT) is very similar to HOA (Hosted Order Automation). This means you can accept credit cards on your website securely without ever handling the sensitive information within your network.

What makes it different is that PMT uses REST (api.vindicia.com) to send the credit card information back to Vindicia. HOA uses the SOAP interface. Also, PMT can only create a payment method. It does not create other objects that HOA can.

**Note:** This system conforms with PCI SAQ A compliance

14.1 Setting up Payment Method Tokenization

This explains how to use a checkout page for PCI SAQ A compliance with the Vindicia REST back end. We call this Payment Method Tokenization PMT.

1. Place a DIV tag in your form.
   Instead of an input field for sensitive data (credit card number, expiration date, cvn), which would look like this:

   `<input type="text" id="vin_credit_card_account" name="vin_credit_card_account" placeholder="Enter Credit Card Number" />

   add a DIV tag as follows:

   `<div id="vin_credit_card_account"></div>`

2. Include vindicia.js on you checkout page.
   For example:

   `<script src="https://secure.vindicia.com/pmt/vindicia.js"></script>`
Although there is no requirement for JQuery or any other Javascript framework, Vindicia recommends that you include vindicia.js after you include the framework file. This instantiates an object called vindicia.

3. Call `vindicia.setup()` with options.

Call the `vindicia.setup()` method to initialize the Hosted Fields on your checkout form.

Note that `vindicia.setup()` will take over the submit event in your form. To validate, you will need to pass in some options to the `setup()` method.

```html
<script>
vindicia.setup(options);
</script>
```

A `vindicia.setup()` example

This Javascript example uses all the optional features of the `vindicia.setup()` method. It initializes the Hosted Fields on the checkout form.

```javascript
vindicia.setup({
  // Options
  formId: "mainForm", // dom element of form
  vindiciaAuthId: "aXdjbF9vbmVfdGltZV9sb2dpbjpBTG5JWnRjZA==", // Authorization: Basic header
  vindiciaServer: "secure.qa.vindicia.com", // to load the iframes from
  vindiciaRestServer: "api.qa.vindicia.com", // REST server to submit JSON to
  hostedFields: {
    cardNumber: {
      selector: "#vin_credit_card_account",
      placeholder: "Enter Credit Card Number", // optional field
      autocomplete: "cc-number", // optional field
      formatinput: true, // optional field
      maskinput: false // optional field, show asterisks
    },
    expirationDate: {
      selector: "#vin_credit_card_expiration_date",
      placeholder: "Expiration Date MM/YY", // optional field
      format: "MM/YY", // optional, default is MM/YY. Supported formats are: MM/YY, MM-YY, MMYY, YY/MM, YY-MM, YYMM, YYYY/MM, YYYY-MM, YYYYMM, MM/YYYY, MM-YYYY, MYYYYY
      formatinput: true, // optional field
      autocomplete: "cc-exp" // optional field
    },
    cvn: {
      selector: "#vin_credit_card_cvn",
      placeholder: "Enter CVV", // optional field
```
autocomplete: "cc-csc", // optional field
maskinput: false // optional field, show asterisks
},
styless: { // optional
"input": {
"width": "100%",
"font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
"font-size": "14px",
"color": "#555",
"height": "34px",
"padding": "6px 12px",
"margin": "5px 0px",
"line-height": "1.42857",
"border": "1px solid #ccc",
"border-radius": "4px",
"box-shadow": "0px 1px 1px rgba(0,0,0,0.075) inset",
"-webkit-transition": "border-color 0.15s ease-in-out 0s, box-shadow 0.15s ease-in-out 0s",
"transition": "border-color 0.15s ease-in-out 0s, box-shadow 0.15s ease-in-out 0s",
"focus": { // optional
"border-color": "#66afe9",
"outline": "0",
"-webkit-box-shadow": "inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, .6)",
"box-shadow": "inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, .6)"
},
"valid": { // optional
"border-color": "#228B22",
},
"notValid": { // optional
"border-color": "#ff0000",
},
// custom width
@media (min-width: 600px) and (max-width: 800px): {
"input": {
"font-size": "16pt"
}
}
},
iframesHeightPadding: 2, // optional
onSubmitEvent: function(myform) {
return merchantValidate(myform); // this method is for your use to interact with the user when the user presses the Submit button. It’s for when you want to validate the fields for yourself.
},
onSubmitCompleteEvent: function(data) {
$('message').html('submitted OK, vid ' + data.detail.vid);
return;
},
onSubmitCompleteFailedEvent: function(data) {
console.log(data.detail.status);
if (data.detail.error) {
console.log(data.detail.error);
}
vindicija.setup() options explained

This setup method takes one argument.

vindicija.setup(options);

Top level options
<table>
<thead>
<tr>
<th>Property</th>
<th>Required, Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>formId:</td>
<td>Required, string</td>
<td>This is the id of the form as shown below in this sample HTML: <code>&lt;form id=&quot;mainform&quot;&gt; formId: mainform,</code></td>
</tr>
<tr>
<td>vindiciaAuthId:</td>
<td>Required, object</td>
<td>This option is for your login. We use it for “Basic Authentication” <code>vindiciaAuthId: &quot;aXdjbF9vbmVfdGltZV9sb2dpbjpBTG5JWnRjZA==&quot;, // Authorization: Basic header&quot;</code></td>
</tr>
<tr>
<td>vindiciaServer:</td>
<td>Required, object</td>
<td>This option specifies the location of vindicia REST server to create the payment method on. If not provided it will default to &quot;api.vindicia.com&quot; our production server. <code>vindiciaServer: &quot;api.vindicia.com&quot;,</code></td>
</tr>
<tr>
<td>vindiciaRestServer:</td>
<td>Required, object</td>
<td>This option specifies the location of vindicia REST server to create the payment method on. If not provided it will default to &quot;api.vindicia.com&quot; our production server. <code>vindiciaServer: &quot;api.vindicia.com&quot;,</code></td>
</tr>
</tbody>
</table>
hostedFields: Required, object

This option has many subobjects, one for each input field that you want protected and a "styles" sub object. Not all input fields need to be protected.

```javascript
hostedFields: {
  cardnumber: {
    selector: "#vin_credit_card_account", // required
    placeholder: "Enter Credit Card Number" // optional field
  },
  expirationDate: {
    selector: "#vin_credit_card_expiration_date", // required
    placeholder: "Expiration Date MM/YY", // optional field
    format: "MM/YY" // optional, defaults to MM/YY
  },
  cvn: {
    selector: "#vin_credit_card_cvn",
    placeholder: "Enter CVV" // optional field
  },
  styles: {
    "input": {
      "width": "100%",
      "font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
      "font-size": "14px"
    }
  }
},
```

Or if you want the month and year separated but still show as input boxes:

```javascript
hostedFields: {
  cardnumber: {
    selector: "#vin_credit_card_account", // required
    placeholder: "Enter Credit Card Number" // optional field
  },
  expirationMonthInput: {
    selector: "#vin_credit_card_expiration_month",
    placeholder: 'Month',
    format: "MM" // only "MM" is supported
  },
  expirationYearInput: {
    selector: "#vin_credit_card_expiration_year",
    placeholder: 'Year',
    format: "YYYY" // "YY" or "YYYY", defaults to YYYY
  },
  cvn: {
    selector: "#vin_credit_card_cvn",
    placeholder: "Enter CVV" // optional field
  }
},
```
Or if you want month and year as dropdown boxes:

```javascript
hostedFields: {
  cardnumber: {
    selector: "#vin_credit_card_account", // required
    placeholder: "Enter Credit Card Number" // optional field
  },
  expirationMonth: { // optional dropdown field or use expirationDate
    selector: "#vin_credit_card_expiration_month",
    (N=numeric month, A=Alphabetic Month)
  },
  expirationYear: { // required
    selector: "#vin_credit_card_expiration_year",
    format: "YYYY" // "YY" or "YYYY", defaults to YYYY
  },
  cvn: {
    selector: "#vin_credit_card_cvn",
    placeholder: "Enter CVV" // optional field
  },
  styles: {
    "input": {
      "width": "100%",
      "font-family": "Helvetica Neue',Helvetica,arial,sans-serif",
      "font-size": "14px"
    }
  }
},
```
Multi-language support for month and year dropdown boxes:

```javascript
hostedFields: {
  cardNumber: { // required
    selector: "#vin_credit_card_account",
    placeholder: "Entrez le numéro de carte de crédit" // optional field
  },
  expirationMonth: { // optional dropdown field or use expiration_date
    selector: "#vin_credit_card_expiration_month",
    language: "fr", // en, es, de, pt, fr, zh, ja only allowed
    (N=numeric month, A=Alphabetic Month)
  },
  expirationYear: { // optional dropdown field or use expiration_date
    selector: "#vin_credit_card_expiration_year",
    language: "fr", // en, es, de, pt, fr, zh, ja only allowed
    format: "YYYY" // or "YYYY", defaults to YYYY
  },
  cvn: {
    selector: "#vin_credit_card_cvn",
    placeholder: "Entrez CVV" // optional field
  },
  styles: {
    "input": {
      "width": "100%",
      "font-family": "'Helvetica Neue',Helvetica,Arial,sans-serif",
      "font-size": "14px"
    }
  }
},
```

**iframeHeightPadding**: Optional, integer

During vindicia.setup() the iframe height is adjusted to be the size of the input field inside of it. If any styles require some extra padding around the input box, this is the way to get that. It defaults to zero.

```
iframeHeightPadding: 3,
```

**onSubmitEvent**: Optional, function

This is where you will define a function to be executed when the submit button is pressed. It can be anonymous or a call to an existing function.

```
onSubmitEvent: function(myform) {
  return merchantValidate(myform);
},
```
onSubmitCompleteEvent:  Optional, function
Us this callback function when the REST server successfully creates a payment method. Status returned is 200.

```javascript
onSubmitCompleteEvent: function(data) {
    $('#message').html('submitted OK');
    return true;
},
```

onSubmitCompleteFailedEvent:  Optional, function
This is where you will define a function to be executed when the submit to the REST server fails. It can be anonymous or a call to an existing function. The most common reasons for failure are:

- OneTimeLogin token is being reused and rejected
- The vin_id specified in the form is already in our system and cannot be reused

```javascript
onSubmitCompleteFailedEvent: function(data) {
    return merchantValidate(myform);
},
```

onVindiciaFieldEvent:  Optional, function
To have access to real time validation of iframe blur events, use this optional handler

```javascript
onVindiciaFieldEvent: function(event) {
    if (event.detail.fieldType == 'expirationDate') {
        if (!event.detail.isValid) {
            console.log('vindiciaEvent expirationDate not valid');
        }
    }
}
```

The following properties are supported in hosted fields:

cardNumber  A required field.

cardNumber: {
    selector: "#vin_credit_card_account",
    placeholder: "Enter Credit Card Number" // optional field
},

© 2019 Vindicia, Inc.  Table of Contents  Payment Method Tokenization  14 - 9
expirationDate

A required field unless you use the optional fields below for separating the month and year as dropdowns or input boxes.

Supported formats include the following:

- 'MM/YY' (the default)
- 'MM-YY'
- 'MMYY'
- 'YY/MM'
- 'YY-MM'
- 'YYMM'
- 'YYYY/MM'
- 'YYYY-MM'
- 'YYYYMM'
- 'MM/YYYY'
- 'MM-YYYY'
- 'MMYYYY'

```javascript
expirationDate: {
  selector: "#vin_credit_card_expiration_date",
  placeholder: "Expiration Date MM/YY" // optional field
  format: "MM/YY" // defaults to MM/YY
},
```

cvn

```javascript
cvn: {
  selector: "#vin_credit_card_cvn",
  placeholder: "Enter CVV" // optional field
},
```

expirationMonth

Optional field to show a dropdown box for the month.

```javascript
expirationMonth: {
  selector: "#vin_credit_card_expiration_month",
  language: "fr" // en, es, de, fr, ja, pt, zh only allowed
  (N=numeric month, A=Alphabetic Month)
},
```

The language is optional and defaults to "en" English. All the month names will display in the chosen language. Currently only en (English), es (Spanish), de (German), fr (French), ja (Japanese), pt (Portuguese), zh (Chinese) are supported.
expirationYear

Optional field to show a dropdown box for the year.

expirationYear: {
  selector: "#vin_credit_card_expiration_year",
  language: "fr", // en, es, de, fr, ja, pt, zh only allowed
  format: "YYYY" // or "YYYY", defaults to YYYY
},

The language is optional and defaults to "en" English. All the month names will display in the chosen language. Currently only en (English), es (Spanish), de (German), fr, (French), ja (Japanese), pt (Portuguese), zh (Chinese) are supported

expirationMonthInput

Optional field to show an input box for the month

expirationMonthInput: {
  selector: "#vin_credit_card_expiration_month",
  placeholder: 'Month',
  format: "MM" // only "MM" is supported
},

expirationYearInput

Optional field to show an input box for the year.

expirationYearInput: {
  selector: "#vin_credit_card_expiration_year",
  placeholder: 'Year',
  format: "YYYY" // "YY" or "YYYY", defaults to YYYY
},

Notes on some parameters

cardNumber: An optional parameter describing the following fields for cardNumber, expirationDate, cvn.

cardNumber: {
  selector: "#vin_credit_card_account",
  autocomplete: "cc-number"
},

expirationDate: {
  selector: "#vin_credit_card_expiration_date", // required
  autocomplete: "cc-exp" // optional field
},

cvn: {
  selector: "#vin_credit_card_cvn",
  autocomplete: "cc-csc" // optional field
},

Set this parameter to off or cc-number. When you set it to cc-number you take advantage of the Chrome Autofill feature. If you store credit cards in your browser, this feature will assist the user when entering the stored credit card number.
formatinput

An optional parameter describing the following fields for cardNumber or expirationDate.

cardNumber: {
  selector: "#vin_credit_card_account",
  formatinput: true // optional field, force spacing
},
expirationDate: {
  selector: "#vin_credit_card_expiration_date", // required
  format: "MM/YYYY", // optional, defaults to MM/YY
  formatinput: true // optional field, force slash in proper location
},

This parameter can be either true or false. If you set it to true, the browser will add spaces, slashes or dashes when the numbers are typed in. This makes for fewer mistakes and is easier to read.

For expirationDate, above, a slash is automatically inserted when the user types the third number—if the user did not type a slash.

maskinput

An optional parameter describing the following fields for cardNumber or cvn.

cardNumber: {
  selector: "#vin_credit_card_account",
  maskinput: false // optional password like field
},
expirationDate: {
  selector: "#vin_credit_card_expiration_date", // required
  maskinput: false // optional password like field
},

This parameter can be true or false. Set it to true to have the browser show asterisks (as in a password field) as the user types.

Understanding onVindiciaFieldEvent

Events happen inside the iframes that the parent window will not be allowed to respond to. The onVindiciaFieldEvent property can be used to call your function when validation events are happening inside the iframes.

onVindiciaFieldEvent: function(event) {
  if (event.detail.fieldType == 'cardNumber') {
    setCardImage(event.detail.cardType); // bright or dim the card logo
  }
  if (event.detail.fieldType == 'expirationDate') {
    if (!event.detail.isValid)
    {
      alert('vindiciaFieldEvent expirationDate not valid');
    }
  }
}
```javascript
if (event.detail.fieldType == 'cvn') {
  if (!event.detail.isValid && event.detail.dataLength > 0) {
    alert('vindiciaFieldEvent cvn not valid');
  }
}
```

event.detail.fieldType  

<table>
<thead>
<tr>
<th>cardNumber, expirationDate, cvn.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>cardNumber: validation by luhn check, forces all numeric characters, returns a cardType if detectable.</td>
</tr>
<tr>
<td>expirationDate: Defaults to mm/yy format for validation. But you may specify another format.</td>
</tr>
<tr>
<td>cvn: Forces all numeric characters, is valid if character count is 3 or 4.</td>
</tr>
</tbody>
</table>

event.detail.cardType  

<table>
<thead>
<tr>
<th>A string property that will hold the short name of the card type that was detected. Only on events with fieldType <strong>cardNumber</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following values are supported:</td>
</tr>
<tr>
<td>• amex</td>
</tr>
<tr>
<td>• dankort</td>
</tr>
<tr>
<td>• diners_club_carte_blanche</td>
</tr>
<tr>
<td>• diners_club_international</td>
</tr>
<tr>
<td>• discover</td>
</tr>
<tr>
<td>• jcb</td>
</tr>
<tr>
<td>• laser</td>
</tr>
<tr>
<td>• visa_electron</td>
</tr>
<tr>
<td>• visa</td>
</tr>
<tr>
<td>• mastercard</td>
</tr>
<tr>
<td>• maestro</td>
</tr>
</tbody>
</table>

event.detail.isValid  

<table>
<thead>
<tr>
<th>A boolean value. True means the data is acceptable and can be submitted. False means that it is illegal or incomplete.</th>
</tr>
</thead>
</table>

event.detail.dataLength  

<table>
<thead>
<tr>
<th>This method will return an integer that is a count of characters inside the input box in the iframe. An blank field returns zero.</th>
</tr>
</thead>
</table>
Merchant Form Validation

When the user clicks the submit button on the form, you will want to validate the form fields before allowing the submit action to complete.

Since the vindicia object took over the submit event when you called vindicia.setup(), you cannot call a validation function directly. Instead your validation function will be called for you. Specify the validation function in vindicia.setup like this:

```javascript
hostedFields: {
  onSubmitEvent: function(event) {
    return merchantValidate();
  },
},
```

Your validation function should look like this:

```javascript
function merchantValidate(theform) {
  if (!vindicia.isValid('vin_account_holder')) {
    alert('Please enter card holders name before submitting');
    return false;
  }
  if (!vindicia.isValid('vin_credit_card_account')) {
    alert('Please enter a valid credit card before submitting');
    return false;
  } else {
    if (!vindicia.isValid('vin_credit_card_expiration_date')) {
      alert('Please enter a valid expiration date YYYYMM before submitting');
      return false;
    }
  }
  if (theform.vin_account_holder.value.length == 0) {
    // non sensitive field
    alert('Please enter the Account Name');
    return false;
  }

  if (vindicia.cardType == "amex" && vindicia.dataLength('vin_credit_card_cvn') != 4) {
    alert("American Express CVV must be 4 digits");
    return false
  }
  return true;
}
```
You must return true or false.

Iframe Validation

Even though access to iframe field data is restricted, you can validate these iframe fields in the following ways:

- Inside your own merchant validation function at submit
- As blur events happen when the user tabs (moves) from field to field in the iframes
- As a call to vindicia.isValid() for all iframes or for a single iframe
- Just let the submit button block naturally if the iframe fields are not filled in with valid data

Methods to help you validate iframe fields

vindicia.cardType A string property that will hold the short name of the card type that was detected.

Supported values include the following:

- amex
- dankort
- diners_club_carte_blanche
- diners_club_international
- discover
- jcb
- laser
- visa_electron
- visa
- mastercard
- maestro

vindicia.dataLength(selector) This method will return a positive integer that is a count of characters inside the input box in the iframe. If no selector is specified or if the selector cannot find the iframe it will return zero.

This is very useful when detecting if the card is an "amex" and in the CVV field four numbers were entered

```javascript
if (vindicia.cardType == "amex" &&
vindicia.dataLength('vin_credit_card_cvn') != 4)
{
    alert("American Express CVV must be 4 numbers");
    return false
}
```
vindicia.isValid(selector)  This method will return true or false if the input box in the iframe is valid. If no selector is specified it will return true if all iframes are valid and false if at least one iframe is not valid.

    if (!vindicia.isValid('vin_credit_card_account'))
    {
        alert('Please enter a valid credit card before submitting');
        return false
    }

Accessing onblur events with vindicia.setup()

onVindiciaFieldEvent: function(event) {
    if (event.detail.fieldType == 'cardNumber') {
        setCardImage(event.detail.cardType); // bright or dim the card logo
    }
    if (event.detail.fieldType == 'expirationDate') {
        if (!event.detail.isValid)
        {
            console.log('vindiciaFieldEvent expirationDate not valid');
        }
    }
},

Credit Card Validation

As of version 23.0.1, PMT will automatically attempt to validate the credit card on submit. To turn off this functionality, place a hidden field in the form as follows:

<input name="vin_validate" value="0" type="hidden" />

As of version 24.0.0, PMT will accept the following additional form fields for validation:

- <input name="vin_ignore_avs_policy" value="1" type="hidden" />
- <input name="vin_ignore_cvn_policy" value="1" type="hidden" />
- <input name="vin_min_chargeback_probability" value="100" type="hidden" />
- <input name="vin_source_ip" value="12.243.28.45" type="hidden" />
- <input name="vin_currency" value="EUR" type="hidden" />
Note that `vin_min_chargeback_probability` is a percentage from 0 to 100. Must be integers, or it will be ignored.

The preferred currency to use for validation is `vin_currency`. If not specified, the default merchant currency will be used. If a merchant currency is not set, defaults to USD.

**Behind The Scenes**

When the PMT form submits, the REST endpoint POST to https://api.vindicia.com/payment_methods sends this JSON snippet:

```json
policy: {
  validate: 0
}
```

The default value is 1. Therefore if you want validation, do not include the hidden field `vin_validate`.

**The vindicia object: properties and methods**

The following properties are supported.

- **vindicia.setup**
  
  The heart of this Hosted Fields system. It is described in more detail on its own page. But basically calling this function will take over the submit event and create iframes on your checkout page. Each iframe represents a single input field such as credit card number or expiration date.

- **vindicia.cardType**
  
  A string property that will hold the short name of the card type that was detected.

  Supported values:
  - `amex`
  - `dankort`
  - `diners_club_carte_blanche`
  - `diners_club_international`
  - `discover`
  - `jcb`
  - `laser`
  - `visa_electron`
  - `visa`
  - `mastercard`
  - `maestro`
vindicia.dataLength(selector)  
This method will return an integer that is a count of characters inside the input box in the iframe. If no selector is specified or if the selector cannot find the iframe it will return zero.

The following is very useful when detecting if the card is an AMEX and if four numbers were entered in the CVV field:

```javascript
if (vindicia.cardType == "amex" && vindicia.dataLength('vin_credit_card_cvn') != 4)
{
    alert("American Express CVV must be 4 numbers");
    return false
}
```

vindicia.isValid(selector)  
This method will return a boolean value that confirms whether the input box in the iframe is valid. If no selector is specified, it checks all the iframe input boxes and returns true if all are valid and false if at least one is not valid.

```javascript
if (!vindicia.isValid('vin_credit_card_account'))
{
    alert('Please enter a valid credit card before submitting');
}
```

vindicia.isSynced()  
This method will return true if all the iframes have reported their data to the master iframe and the notified the parent window its validity status. This method will return false if at least one iframe has not reported its data. The reporting happens normally during an onblur or onchange event. This method was added to help work around a Mobile Safari bug where blur events were not consistently being triggered.

vindicia.clearSyncFlags()  
This method will set all iframe sync values to false. It is usually called right before syncData(). This method is also used on submit to ensure any changes in the form fields are captured.

vindicia.syncData()  
This method will send a message to each iframe to simulate a blur event. This will cause the iframes to validate their form data, send the results to the master iframe, and notify the parent window for validation purposes. This method was added to help work around a Mobile Safari bug where blur events were not consistently being triggered. See also isSynced() and clearSyncFlags(). This method is also used on submit to ensure all changes in the form fields are captured.

```javascript
setInterval(function() { vindicia.syncData(); },300);
```

vindicia.clearData()  
This method clear the data in the iframes input boxes and dropdown boxes. It will also clear the sync flags and isValid flags. It will also set isComplete() to false.
vindicia.isLoaded()  
This method returns true if all the iframes have reported to the parent window that they are loaded.

We use this when dealing with a Chrome bug that allows random focus and blur events occur during iframe loading.

vindicia.resetCompleteStatus()  
This method will set isComplete() to false. This allows the submit button to initiate a POST again.

This is useful in single page apps where you do not want to call clearData().

vindicia.submit()  
This method will cause the form to begin its three phase submit directly to vindicia.com, as long as the data is valid.

Not required for normal operation.

vindicia.isComplete()  
This method will return true if the form has already been submitted to Vindicia.

Not required for normal operation.

vindicia.onSubmitComplete(event)  
This method will indicate that you would like to use AJAX to submit the fields. This method will be called when the POST is finished.

Optional.

onSubmitCompleteEvent: function(event) {
  $('#message').html('submitted OK, vid ' + event.detail.vid);
  return;
},

Allowed Expiration Date Format

When passing in format via the setup() method, we only allow these specific month and year formats:

- MM/YY
- MM-YY
- MMYY
- YY/MM
- YY-MM
- YYMM
- YYYY/MM
- YYYY-MM
- YYYYMM
- MM/YYYY
- MM-YYYY
- MYYYY

The default format is MM/YY. Any other format will cause a browser error.
Allowed Styles in vindicia.setup() iframes

When passing in styles via the `setup()` method, we only allow these specific tags:

- `color`
- `width`
- `height`
- `border`
- `border-color`
- `border-radius`
- `font`
- `font-family`
- `font-size`
- `font-size-adjust`
- `font-stretch`
- `font-style`
- `font-variant`
- `font-variant-alternates`
- `font-variant-caps`
- `font-variant-east-asian`
- `font-variant-ligatures`
- `font-variant-numeric`
- `font-weight`
- `line-height`
- `opacity`
- `outline`
- `padding`
- `margin`
- `text-shadow`
- `box-shadow`
- `-webkit-box-shadow`
- `-moz-osx-font-smoothing`
- `-moz-transition`
- `-webkit-font-smoothing`
- `-webkit-transition`
- `transition`

All other styles will be ignored. Attempts to send script tags in values will also be ignored.
PCI Compliance Notes

SAQ A compliance: "Card-not-present merchants (e-commerce or mail/telephone-order) that have fully outsourced all cardholder data functions to PCI DSS validated third-party service providers, with no electronic storage, processing, or transmission of any cardholder data on the merchant’s systems or premises."

Vindicia Hosted Fields satisfies the above definition of PCI SAQ A compliance through the use of iframes and browser standard security known as same origin policy.

Browser Security Notes

Same Origin Policy dictates that browser windows and iframes cannot share data unless they are loaded from the same domain (origin). This standard security policy in web browsers allows Vindicia to leverage SAQ A PCI compliance for the merchant checkout page.

Sensitive credit card fields are loaded in iframes from a Vindicia web server while the other non-sensitive checkout form fields are loaded in the parent window (from the merchant web server). Each iframe represents one secure input box.

This will cause the browser to block direct access to the data in each of these iframes. However messages (events) are allowed to be passed back and forth between them. This is how Vindicia coordinates the submit button on the parent window to allow iframes to submit their data.

Internal Notes

Custom field Luhn check

If the merchant has set up any custom fields (custom iframes) using the vindicia.setup() method, we must ensure that no credit cards have been entered there. Therefore at each blur event on a custom field, we perform a Luhn check. If the field passes the Luhn check, the field is not valid.

When the Submit button is pressed

A three phase submit has been implemented to coordinate the parent window submit event with the iframes.

Phase 1: Collect iframe data for the last time.
- If the form fields pass validation, let the submit process begin.
- Set submitFormRequest flag to true to trigger phase two when ready.
- Call clearSyncFlags() which resets all iframe sync flags to false.
- Call syncData() which sends events to each iframe to simulate a blur event.
- When the last iframe sends its data to the master iframe, go to phase 2.

Phase 2: AJAX POST to Vindicia REST server from master iframe.
• If all the data in all the iframes is valid, the parent window collects all the non iframe form fields.
• This data is sent to the master iframe with a submitForm event
• The master iframe performs an AJAX POST, with all its collected data in JSON format, back to the Vindicia REST server.

Phase 3: After form submission activity.

• Master iframe sends submitComplete event to parent window after the AJAX POST finishes.
• This triggers the event onSubmitCompleteEvent to invoke merchant application Javascript.

Methods of interest

The vindicia object has a some interesting and useful methods.

vindicia.isValid(tagId) Programmer Ok  
Return boolean value of last reported onblur validation state. If tagId is not provided it returns true if all iframes are holding valid data, false otherwise.

vindicia.isSynced(tagId) Programmer Ok  
Return boolean value about if iframe(s) ever reported in on its data. If tagId is not provided it returns true if all iframes have reported in, false otherwise. Note: if isValid is true then isSynced is true but not vice versa.

vindicia.clearSyncFlags() Programmer Ok  
Set all sync flags to false for every iframe, master iframe is ignored. Use this with syncData()

vindicia.syncData() Programmer Ok  
Send an event ("syncData") to all iframes to simulate a blur event. This causes each iframe to do 3 things: validate its data, send it to the master iframe and notify the parent window ("validationReport" event) with its validation boolean state. The parent window is also given the iframe's data length but not its value.

vindicia.clearData() Programmer Ok  
This method clear the data in the iframes input boxes and dropdown boxes It will also clear the sync flags and isValid flags. It will also set isComplete() to false

vindicia.resetCompleteStatus() Programmer Ok  
This method will set isComplete() to false. This allows the submit button to initiate a POST again. This is useful in single page apps where you do not want to call clearData()

vindicia.dataLength(tagId) Programmer Ok  
Return an integer count of the length of the input field in the tagId iframe.
Using AJAX with PMT, the easy way

If you want AJAX to be used, include the following element `onSubmitCompleteEvent` in your setup method. Control will return to you after the POST.

```javascript
onSubmitCompleteEvent: function(data) {
    $('#message').html('submitted OK, vid ' + data.detail.vid);
    return;
},
```

If this element is missing, the URL returned from the POST will cause the browser to redirect there.

Using AJAX with PMT, the single page app

If you want a single page app, keep in mind that after the POST the One time login string will be invalid. You are allowed only one POST per one-time login. You will have to refresh the one-time login value and the signed value in the hidden fields in the form.

You must then call `vindicia.clearData()` to notify the iframes to reset their data. This also unblocks the submit button.

```javascript
var newOTL = getNewOTL();
$('#vin_session_id').value = newOTL.unsignedValue;
$('#vin_session_hash').value = newOTL.signedValue;
vindicia.clearData();
```

Note that `getNewOTL()` is a Javascript method you will have to write that makes an ajax request back to your merchant server.
This is useful if you want to allow the user to enter more than one payment method. You do not have to refresh the OTL value on failed POSTs to the REST server.

**Basic PMT setup**

Use the following procedure to set up PMT.

1. Include the vindicia javascript file in your page near the bottom.

```html
<script src="https://secure.vindicia.com/pmt/vindicia.js"></script>
```

2. Generate a new one time login string.

Choose a unique string we call a session id and place it into the form as a hidden field. This string will be used in the payment method object that gets created on form submission. This is your unique identifier.

Using your OTL HMAC key that Vindicia provided for you, create a hash using HMAC256 or HMAC512. The format of this string is:

```perl
#!/usr/bin/perl
use Digest::SHA qw(hmac_sha256_hex hmac_sha512_hex);
my $otl_hmac_key = 'Zb7xZDtJ40EHNZ9-Y7IjvPYn4N4';
my $session_id = "CC4930533";
my $session = "$session_id#POST#/payment_methods";
my $session_hash = hmac_sha256_hex($session, $otl_hmac_key);
print "session_id:   $session_id
session_hash: $session_hash";
```

Results of the above Perl program run would be:

```
session_id:   CC4930533
session_hash: 511e8c48bc8b1caa9def400fc11975391440e0c72fc9c630edaf8d46691a5c5
```

Vindicia Customer Service runs `util/one_time_login_admin.pl` to setup the secret key.

3. Create a form with some hidden fields.

Two forms are required.

```html
<h3>Credit/Debit Card Information</h3>
<form id="mainForm" name="mainForm" class="form-horizontal" method="post">
  <input name="vin_session_id" value="CC403930495" type="hidden" />
  <input name="vin_session_hash" value="4812242031705a2413c630edaf8d46691a5c5" type="hidden" />
</form>
```
4. Create some input fields not requiring protection.

```html
<input type="text" id="vin_account_holder" name="vin_account_holder" placeholder="Enter Cardholder Name" value=""/>
<input type="text" id="vin_billing_address_line1" name="vin_billing_address_line1" placeholder="Enter Address Line 1" value=""/>
<input type="text" id="vin_billing_address_line2" name="vin_billing_address_line2" placeholder="Enter Address Line 2" value=""/>
<input type="text" id="vin_billing_address_line3" name="vin_billing_address_line3" placeholder="Enter Address Line 3" value=""/>
<input type="text" id="vin_billing_address_city" name="vin_billing_address_city" placeholder="Enter City" value=""/>
<input type="text" id="vin_billing_address_district" name="vin_billing_address_district" placeholder="Enter State" value=""/>
<input type="text" id="vin_billing_address_postal_code" name="vin_billing_address_postal_code" placeholder="Enter Cardholder Name" value=""/>
<input type="text" id="vin_billing_address_country" name="vin_billing_address_country" placeholder="Enter Country" value=""/>
<input type="text" id="vin_billing_address_phone" name="vin_billing_address_phone" placeholder="Enter Phone Number" value=""/>
```

5. Create some input fields requiring protection as div tags.

```html
<div id="vin_credit_card_account"></div>
<div id="vin_credit_card_expiration_date"></div>
<div id="vin_credit_card_cvn"></div>
```

6. Call vindicia.setup to establish the protected fields inside iframes.

```javascript
vindicia.setup(options);
```

Using Javascript for HMAC hash

See [https://github.com/brix/crypto-js](https://github.com/brix/crypto-js) for more information.

```javascript
var otl_hmac_key = "A39485F85039D394059B948390";
var vin_session_id = "CC403930495";
var vin_session_hash = CryptoJS.HmacSHA512(vin_session_id + "#POST#/payment_methods", otl_hmac_key);
```

**vindicIAuthId: basic auth generation**

Script

Get your login user and password from Vindicia. It must be a special, low privileged user.
vindicia.setup({
    formId: "mainForm",
    vindiciaAuthId: "cWEt21RsLTIwMTgtcTJfc19hcDpaR2FqNU10azAwWHM2dVBJTEVoSGRqYVMzMHJjYWtLdQ==",
    // Authorization: Basic header"
Log in to the Basic Auth Generator, at https://www.blitter.se/utils/basic-authentication-header-generator/

### PMT Fields list

Allowed form field names for Payment Method Tokenization

<table>
<thead>
<tr>
<th>Name in form</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>vin_session_id</td>
<td>input</td>
<td>Required and must be unique on each successful submit.</td>
</tr>
<tr>
<td>vin_session_hash</td>
<td>hidden</td>
<td>Required and must be unique on each successful submit. HMAC256 or HMAC512.</td>
</tr>
<tr>
<td>vin_customer_specified_type</td>
<td>hidden</td>
<td>Optional</td>
</tr>
<tr>
<td>vin_primary</td>
<td>hidden</td>
<td>Optional: true or false.</td>
</tr>
<tr>
<td>vin_active</td>
<td>hidden</td>
<td>Optional: true or false.</td>
</tr>
<tr>
<td>vin_billing_address_line1</td>
<td>input</td>
<td></td>
</tr>
<tr>
<td>vin_billing_address_line2</td>
<td>input</td>
<td></td>
</tr>
<tr>
<td>vin_billing_address_line3</td>
<td>input</td>
<td></td>
</tr>
<tr>
<td>vin_billing_address_city</td>
<td>input</td>
<td></td>
</tr>
<tr>
<td>vin_billing_address_district</td>
<td>input</td>
<td>Also known as state in the US.</td>
</tr>
<tr>
<td>vin_billing_address_postal_code</td>
<td>input</td>
<td></td>
</tr>
<tr>
<td>vin_billing_address_country</td>
<td>input</td>
<td></td>
</tr>
</tbody>
</table>
The callback function onSubmitCompleteFailedEvent is called when the Submit button does not return 200 (success) from the REST server.

```javascript
onSubmitCompleteFailedEvent: function(data) {
  $('#message').html('submitted Failed');
  console.log(data.detail.status); // server return code
  if (data.detail.error) {
    console.log(data.detail.error);
  }
  return true;
},
```

If the vindiciaAuthId used in the vindicia.setup() call is not valid, a 403 Forbidden is returned from the REST server. This might appear as a status code of zero in Javascript, depending on the browser.

You might receive a status code of 400 if:

- The id POSTed is already in use
- The onetime login is reused from a previous successful POST

For example:

```
400 PaymentMethod already exists: id="paymeth_100"
```

would be returned from the REST server if you try to create a payment method with an existing payment method id.
PMT Support for Single Page Application using REACT

Vindicia has created its own open source React.js library for merchant developers to use when integrating PMT into a React.js application. This library is available via GitHub. You can use the package Managers yarn and npm.

Detailed instructions and more information is available at:

https://github.com/Vindicia/vindicia-pmt-react
Push Notifications—also referred to as *callbacks, webhooks or event-driven messaging*—allow your system to receive and act upon CashBox events as they occur, without the need to pull data using the CashBox API. You can subscribe, any number of times, to any number of Event Classes, or individual Events, and receive, when those events occur, Push Notifications as HTTPS POST requests with a JSON message. CashBox Push messages are intended to be actionable on their own, not typically requiring a subsequent API call. As such, they include the full related object or objects, aligned with the Event or Event Class, in JSON format.-
15.1 Setup

Push Notification setup refers to configuring CashBox (subscribing to Push Notifications) to notify you of Events or Classes of Events you want to monitor. Push Notifications are enabled and configured by Vindicia Support.

You can subscribe to receive push notifications of complete or partial Event Classes, and of individual Events. You can subscribe to unlimited merchant push subscriptions for a given Event or Event Class. This allows you to have the same Events or Classes of Events trigger Push Messages to multiple targets, each with its own rules, endpoint, security and retry configuration.

For each subscription, you provide Support with the following:

- Event Class name—or Event name if you are subscribing to individual Events
- A list of Events you want excluded from Event Classes—for example, you might want to receive notifications of only three of the four Events in the Payment Method Event Class. In that case you would provide Support with the name of the Event you want excluded from that Event Class.

  See Section 15.4: Push Event Classes and Events. Endpoints should be URLs, optionally with a port number. For example:

  https://acme.company.com/Entitlements:443

- Format (application/JSON or URL-encoded)
- Retry Options:
  - Count: the number of times you want CashBox to continue retrying HTTP POST calls
  - Interval: the number of seconds between retries
- Error Email Address: the email address to receive optional error notification
- Username and Password if opting for HTTP Basic Authentication

15.2 Testing

All CashBox environments support Push Notifications.

To quickly test or preview what different types of Push event messages will look like after they're triggered, go to:

https://beecreptor.com

15.3 Setting up a Listener

A Listener is an endpoint for Push Notification subscriptions you set up with Vindicia Support. You can set up as many Listeners as you want and have any combination of Push Notification subscriptions sent to them. For example, you might set up three Listeners

- Endpoint-1
- Endpoint-2
- Endpoint-3
and have Support set up four Push Notification subscriptions for you

- Subscription-A
- Subscription-B
- Subscription-C
- Subscription-D

You could then, for example, have Subscriptions A and B sent to Endpoint-1; Subscription-C sent to Endpoint-2; and Subscription-D sent to Endpoint-3. You cannot, however, have a subscription sent to more than one endpoint. If you wanted to also send Subscription-D to Endpoint-2, you would have to create a new subscription, Subscription-E, for example (containing the same Event Classes or Events as Subscription-D) and have it sent to Endpoint-2.

15.3.1 Validating Message Origin and Authenticity

Before processing any message, ensure the message is authentic—from CashBox, and relevant to you.

- You can validate message content and source using a keyed-hash message authentication code (HMAC) approach. Vindicia Support will provide you with an HMAC key to serve as the shared secret key. The HMAC signature of each message will be present in the notification as a separate name-value pair. To verify the message, you can use any standard approach to generate your own HMAC signature to compare to the one provided by Vindicia. The HMAC signature is generated using the JSON message content, the shared HMAC key, and base64 encoding with SHA256 encryption.
- For an added layer of security, CashBox also supports HTTP Basic Authentication, giving you greater assurance of the source of Push Notifications.

15.3.2 Parsing Messages

The Push Notification JSON can be sent in application/JSON, or in URL-encoded form—in which case the message must be decoded before use.

Generally, CashBox Push Notifications will contain

- A standard header including the HMAC signature and primary object VID.
- A JSON rendition of the full object associated with the Event Class (for example, Account class pushes include a full Account object)—this object should contain the same data that would be found if you fetched the object directly via API using the ID (VID).

In some cases, such as when the event is a change to data (for example, a new address), the previous change version is also included as its own JSON object within the message.

15.3.3 Indicating Success

Your listener should return a response with a 202 status code to indicate successful receipt of the message. Bear in mind the following:

- Push Notifications do not follow redirects.
• Any other HTTP status code response will be treated as an error, triggering retry as configured for the subscription. Note - even a 200 is treated as a failure.

Your listener should respond within 30 seconds

15.3.4 Errors and Retries

In the event Vindicia does not receive a response, or the HTTP Basic Authentication fails, or Vindicia receives any status code response other than 202, the message is treated as an error and retried according to the configured rules of the event subscription.

Each event subscription can be configured to retry any number of times with a specified interval (in seconds) between attempts. Each error generates the optional error email notification. When a message exhausts the retry setting, it is logged as a permanent error in CashBox logs.

Vindicia currently caps the overall retry period at 5 minutes (300 seconds); all retries configured for a given Event subscription must complete within this time.

15.3.5 Sequence and Volume Considerations

We strive to send notifications as soon as possible after events occur, generally sending a notification within one (1) second of event completion. This speed typically ensures that you receive events in order of occurrence for a particular Account, Entitlement, or Subscription. However, it is possible that a large number of actions could occur on a particular object within a short period of time, causing their corresponding event notifications to be in transit at approximately the same time and therefore to arrive out of order of their occurrence. Listener design should anticipate this and use message identifiers and event time stamps to ensure that they are processed in the proper order.

Prepare for a volume of notifications commensurate with the size of your customer-subscriber base and the activity of your billing integration. Many events may be triggered by routine batch processing, leading to a large volume of Push Notifications being sent at once (for example routine batch renewal billing for every customer due on the same day).

15.4 Push Event Classes and Events

You can subscribe to any number of Event Classes; you can also subscribe to individual Events within a Class. For example, you might want to be notified of all Transaction events but only want to know when a Payment Method has been activated. In that case, you would subscribe to the Transactions Class but only to the Activated Event of the Payment Methods Event Class. Conversely, you might want to be notified of all Payment Method events except Billing Address Changed. In that case, you could subscribe to the Payment Method Event Class with the Billing Address Changed Event excluded.

Warning: If you subscribe to an entire Event Class, you will potentially see messages for new events (event types) as new events are added to that class over time. Ensure that your listener and parsing logic can ignore event types you don't want to receive, or consider excluding individual new events as they're released (and published in Vindicia CashBox Release Notes), or consider subscribing to individual events rather than classes as a whole.
15.4.1 Event Class: Entitlements

Entitlement Push Notifications proactively notify you when an entitlement starts and stops. Entitlement Push Notifications can be useful, for example, if you set up CashBox to notify a client provisioning system that automatically starts and stops customer subscriptions.

The Entitlement Class currently includes the following events.

Table 15-1 Entitlement Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entitlement Started</td>
<td>An individual Entitlement started service.</td>
</tr>
<tr>
<td>(start)</td>
<td>Message content: entitlement</td>
</tr>
<tr>
<td>Entitlement Stopped</td>
<td>An individual Entitlement ended service.</td>
</tr>
<tr>
<td>(stop)</td>
<td>Message content: entitlement</td>
</tr>
</tbody>
</table>

15.4.2 Event Class: Transactions

Transactions Push Notifications proactively inform you about key transaction processing events. Receipt of near real-time transaction results can assist, for example, if you set up CashBox to notify your customer-facing application to prompt for action, when desired—or to extend your retention/dunning activity.

The Transactions Class currently includes the following events.

Table 15-2 Transaction Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction Succeeded</td>
<td>One-time or Recurring Transaction captured.</td>
</tr>
<tr>
<td>(attempt succeeded)</td>
<td>Message Content: transaction</td>
</tr>
<tr>
<td>Transaction Failed</td>
<td>One-time or Recurring Transaction failed (canceled).</td>
</tr>
<tr>
<td>(attempt failed)</td>
<td>Message Content: transaction</td>
</tr>
<tr>
<td>Renewal Transaction Succeeded</td>
<td>Recurring renewal Transaction captured (active subscription billed beyond initial transaction).</td>
</tr>
<tr>
<td>(renewal succeeded)</td>
<td>Message Content: transaction</td>
</tr>
<tr>
<td>Final Transaction Failed</td>
<td>The ultimate Transaction attempting to collect for a given invoice/billing has failed (canceled).</td>
</tr>
<tr>
<td>(final attempt failed)</td>
<td>Message Content: transaction</td>
</tr>
<tr>
<td>Capture Reversed</td>
<td>Transaction Status changed from Captured to Canceled, or to any status other than Refunded.</td>
</tr>
<tr>
<td></td>
<td>Message Content: Standard Push message header plus full Transaction object, including the new statusLog entry.</td>
</tr>
</tbody>
</table>
15.4.3 Event Class: Subscriptions (AutoBills)

Subscriptions Push Notifications proactively inform you about key subscription events. The Subscriptions (AutoBills) Class currently includes the following events.

Table 15-3 Subscription Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscription Started</td>
<td>Service Start—Subscription Start Date reached.</td>
</tr>
<tr>
<td>(start)</td>
<td>Message Content: subscription (autobill)</td>
</tr>
<tr>
<td>Subscription Stopped</td>
<td>Service End—Subscription End Date reached.</td>
</tr>
<tr>
<td>(stop)</td>
<td>Message Content: subscription (autobill)</td>
</tr>
<tr>
<td>Subscription Canceled</td>
<td>Cancel submitted—Subscription may cancel immediately or be pending cancellation; the push event is the request.</td>
</tr>
<tr>
<td>(cancel)</td>
<td>Message Content: subscription (autobill)</td>
</tr>
<tr>
<td>Subscription Modified</td>
<td>Successful modification of a Subscription.</td>
</tr>
<tr>
<td>(modify)</td>
<td>Message Content: subscription (autobill)</td>
</tr>
<tr>
<td>Subscription Created</td>
<td>Successful creation of a new subscription (AutoBill. This event triggers regardless of the specified Start Date of the AutoBill.</td>
</tr>
<tr>
<td>(create)</td>
<td>Message Content: subscription (autobill)</td>
</tr>
</tbody>
</table>

15.4.4 Event Class: Accounts

Accounts Push Notifications proactively inform you about key Account change events. Receiving near real time account information can assist, for example, if you set up CashBox to notify your customer relations management (CRM) software or customer facing application to prompt for action, when desired—or to update high-touch customer records.
The Accounts Class currently includes the following events.

### Table 15-4 Account Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Created (create)</td>
<td>Initial creation of an Account. Message Content: <code>account</code></td>
</tr>
<tr>
<td>Account Shipping Address Changed (shipping address change)</td>
<td>Any change to the assigned Shipping Address. Message Content: <code>account, old address</code></td>
</tr>
<tr>
<td>Account Data Changed</td>
<td>An Object-level data change to any of the following top Account-level data members:</td>
</tr>
<tr>
<td></td>
<td>• <code>merchantAccountId</code></td>
</tr>
<tr>
<td></td>
<td>• <code>parentMerchantAccountId</code></td>
</tr>
<tr>
<td></td>
<td>• <code>defaultCurrency</code></td>
</tr>
<tr>
<td></td>
<td>• <code>emailAddress</code></td>
</tr>
<tr>
<td></td>
<td>• <code>emailTypePreference</code></td>
</tr>
<tr>
<td></td>
<td>• <code>preferredLanguage</code></td>
</tr>
<tr>
<td></td>
<td>• <code>warnBeforeAutobilling</code></td>
</tr>
<tr>
<td></td>
<td>• <code>company</code></td>
</tr>
<tr>
<td></td>
<td>• <code>name</code></td>
</tr>
<tr>
<td></td>
<td>• <code>taxType</code></td>
</tr>
<tr>
<td></td>
<td>for a given Account.</td>
</tr>
<tr>
<td></td>
<td>Message Content: <code>account</code></td>
</tr>
</tbody>
</table>

### 15.4.5 Event Class: Payment Methods

Payment Methods Push Notifications proactively inform you about key payment method change events. Receipt of near real time changes to on-file payment methods can assist, for example, if you set up CashBox to notify your CRM software or customer facing application to prompt for action, when desired—or to update high-touch customer records.
The Payment Methods Class currently includes the following events:

### Table 15-5 Payment Method Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Updater Change</td>
<td>A payment method is updated due to Account Updater (AU) response.</td>
</tr>
<tr>
<td>(account updater change)</td>
<td>Message Content: <code>payment_method</code></td>
</tr>
<tr>
<td>Payment Method Activated</td>
<td>Any payment method gets stored on an Account in Active status or a previously inactive payment method is moved to Active status.</td>
</tr>
<tr>
<td>(activated)</td>
<td>Message Content: <code>payment_method</code></td>
</tr>
<tr>
<td>Payment Method Deactivated</td>
<td>Any payment method gets removed from an Account or a previously active payment method is moved to Inactive status.</td>
</tr>
<tr>
<td>(deactivated)</td>
<td>Message Content: <code>payment_method</code></td>
</tr>
<tr>
<td>Billing Address Changed</td>
<td>Any change to the assigned Billing Address.</td>
</tr>
<tr>
<td>(address change)</td>
<td>Message Content: <code>payment_method, old address</code></td>
</tr>
</tbody>
</table>

### 15.4.6 Event Class: Adjustments

Adjustments Push Notifications inform you about financial adjustments to payments—specifically about refunds and chargebacks.

The Adjustments Class currently includes the following event:

#### Table 15-6 Adjustments Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refund Requested</td>
<td>Initial request/issue of a refund (against a Transaction).</td>
</tr>
<tr>
<td></td>
<td>Message Content: <code>refund</code></td>
</tr>
</tbody>
</table>

### 15.4.7 Event Class: Invoices

Invoices Push Notifications inform you when key events occur for an Invoice, such as when a payment is recorded.
The Invoice Class currently includes the following event.

Table 15-7 Invoice Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoice Payment</td>
<td>A payment made against a particular Invoice—either through a scheduled batch payment or the result of a makePayment(), modify() or cancel() call. Message Content: The Transaction object of the payment that triggered the Push: the InvoiceID.</td>
</tr>
<tr>
<td>Status Changed</td>
<td>A change in invoice status (including when the invoice is created). Message Content: invoice</td>
</tr>
</tbody>
</table>
16 Common ChargeGuard Programming Tasks

Data must be integrated between Vindicia’s ChargeGuard and your information system, as follows:

• **Integration of your data into ChargeGuard.** This is the collection and integration of your transaction data into ChargeGuard, which enables Vindicia to dispute chargebacks on your behalf.

• **Integration of chargeback data into your system.** This is the collection and integration of the relevant chargeback information back into your system, after which you can update and turn off accounts, as appropriate.

This chapter describes the related processes.

---

**Note**

This method is being deprecated, is no longer supported, and will be removed in a forthcoming release.
16.1 Integrating Data into ChargeGuard

To analyze and process chargeback rebuttals or requests through ChargeGuard, Vindicia requires three types of data:

- **Chargeback data.** Vindicia's technical and operations groups can handle this integration directly with your payment processor and receive the information from the processor. To pass the data to Vindicia yourself, see Section 16.3: Data Reporting to Vindicia.

- **Transaction data.** Examples include the transaction ID and date, stock-keeping unit (SKU) ID, price, quantity, shipping and billing addresses, utility, and credit-card information.

- **Activity data.** Examples include user ID and user activity, such as logins to your site, pages visited, phone or email contacts, and fulfillment information.

Transaction and activity data is usually stored in your system. Extract it and map it to the format accepted by ChargeGuard using the CashBox API, then process the data, and automatically send to Vindicia at regular intervals.

---

**Note**  
Be certain to send Vindicia your transaction and activity data regularly, to guarantee that the ChargeGuard team has the most recent information for chargeback disputes. Most merchants upload batches daily or weekly.
16.2 Integration of Chargeback Data Back into Your System

Chargeback dispute resolution usually takes a minimum of 90 days. When a chargeback occurs, most merchants:

1. Immediately limit any other potential risks associated with the chargeback. Turn off the current, future, and associated account information along with the related credit-card information, email address, or customer ID.

2. Update transaction and activity systems to reflect the latest chargeback status while Vindicia disputes the chargeback.

You have three options by which to accomplish those tasks.

- Receive updates from your payment processor, and manually alter account status in your system.
- Use the CashBox Chargeback Spreadsheet to determine a course of action, then manually update customer Account status.
- Use the CashBox API to automatically manipulate your customer Account objects, based on the CashBox Chargeback Spreadsheet.

16.2.1 Use Payment Processor Data to Alter Account Status

With this option, you receive updates directly from your payment processors, and turn off accounts in your transaction systems, if appropriate.

16.2.2 Use CashBox Data to Alter Account Status

With this option, manually turn off accounts in your transaction systems based on the data in the CashBox Chargeback Spreadsheet, which is a daily extract that shows all changes to your chargebacks.

To download the spreadsheet:

2. Select Manage > Chargebacks > Spreadsheet Download.
3. Specify the date range and download format.
4. Click Download File.

This file contains the latest status of the chargebacks in the CashBox system. Use this information to determine the action to take on customer accounts in question, such as closing them, placing a hold on them, or updating the status of the transactions and activities to which the chargebacks pertain.
16.2.3 Use the CashBox API to Update Account Status.

Use the CashBox API to automatically extract and map the Chargeback Spreadsheet data into your CashBox system.

1. Automatically download the CashBox Chargeback Spreadsheet by creating a script that simulates an HTTP POST operation to pull the spreadsheet from ChargeGuard with the CashBox API.

   Vindicia recommends `cURL` for this process.

2. Extract and map the data in the spreadsheet using a CashBox API integration.

3. Build logic at your end to add a chargeback to the customer ID for which Vindicia received new chargebacks.

4. Determine and perform the action you want to take, for example, such as cancelling or suspending the account in question.
16.3 Data Reporting to Vindicia

You may choose to report transaction and activity data to Vindicia either in real-time, or in batches. To report in real-time, send data to and receive data back from Vindicia one item at a time. To send batch reports, gather the information on multiple items and send it all at the same time. In both cases, you must collect data from your system, and assign it to the appropriate data structures, as defined later in this chapter.

Note: To leverage ChargeGuard’s risk-screening feature, send the data to Vindicia in real time.

16.3.1 Initial Load of Historic Data

Before Vindicia can begin processing your chargebacks, you must send an initial set of transactions to be loaded into ChargeGuard. Because chargebacks are typically issued by the customer within 30 to 90 days after the transaction, ChargeGuard must have at least 90 days’ worth of data to begin.

Note: This data requirement applies to first-time ChargeGuard subscribers only. If you already subscribe to CashBox, Vindicia has your transaction data and you need not resend it. However, we strongly recommend that you send us the historical activity data, which often serves as valuable background information for chargeback disputes.

The CashBox API allows you to report a vast array of information on your transactions and customer activity. Although many data items are optional, providing Vindicia with more information increases the success rate of winning chargeback disputes.
16.3.2 Key ChargeGuard Objects

The data that Vindicia and you exchange for ChargeGuard is represented by objects in the CashBox API. The most important objects for ChargeGuard are:

1. **Transaction**: The Transaction object encapsulates all transaction information, including the amount, payment method, associated customer account, and transaction status. (Most of this information is also provided to your payment processor.)

   The following Transaction information must be sent to Vindicia to provide evidence for disputes:
   - Transaction data fields
   - Item information
   - Rebill information
   - Payment method, including information on the credit card and the bank, if applicable
   - Customer information, including the customer name, billing address, and shipping address

   If post-transaction activity occurs, ChargeGuard can capture it for any subsequent chargeback disputes. Use the Activity object to notify Vindicia of your decision to complete, authorize to capture, or cancel the transaction.

2. **Activity**: The Activity object contains information about your interaction with a customer outside of the monetary transaction, such as a phone or email contact or a login to your site.

3. **Chargeback**: The Chargeback object contains information about a chargeback against a specific transaction, including the chargeback status provided by Vindicia during the dispute process.

4. **Refund**: The Refund object contains information about a refund from you to a customer for a specific Transaction. ChargeGuard applies partial and full refund data to transactions and to chargeback processing through the Refund object by associating the refund with the original transaction ID.
16.3.3 Reporting Transaction Data to Vindicia

The Transaction and MigrationTransaction objects support methods to migrate Transaction information into Vindicia, and to receive a chargeback risk percentage. These classes require that you instantiate your merchant user name and password assigned by Vindicia.

To send transaction information to Vindicia:

1. Collect the information about the transactions.
2. Create either a MigrationTransaction object (for use with Transaction.migrate), or a Transaction object (for a Transaction.score request).

To migrate historic data to CashBox, please see Section 5.4: Importing AutoBills from other Billing Systems to CashBox, or Transaction.migrate in the CashBox API Guide.

To report data in real time (for Transaction.score requests), see Reporting Real-Time Transaction Information for Fraud Screening below.

To report the data in real time, see Reporting Real-Time Transactions for Fraud Screening in the next section.

After you send data to Vindicia, Vindicia returns a Return object with returnCode and returnString to inform you if the communication with the Vindicia server completed successfully. (Codes for the Return object are modeled after the standard HTTP return codes.) If the call succeeds, you receive a code of 200 and the string OK. returnCode and returnString may be used to interpret errors. See The Return Object in the CashBox API Guide, for more information.

Be certain to act upon the Return value.

Reporting Real-Time Transactions for Fraud Screening

To report the transaction information in real time and receive a chargeback probability score, call the score() method on the Transaction object. (Be certain to pass only a single Transaction object to the score() call.) This call not only reports your transaction details to Vindicia but also returns to you a chargeback probability score (also called a risk score).

For the score() call to succeed, your transaction must contain at least the following attributes. If you do not specify any one of them, the call returns a score of -1, which means "no opinion."

- IP address
- Payment method: Billing address: City
- Payment method: Billing address: State ("district")
  
  State is a required attribute: Do not leave it unspecified and do not specify a value of null. If the state is not known or does not exist, set this attribute to Unknown.
- Payment method: Billing address: Country
- Payment method: Billing address: Zip code
  
  For countries with no zip or postal codes, set this attribute to None.
- Credit card BIN (the first six digits of the credit-card number)
Report real-time Transaction data to Vindicia:

```php
// CashBox 25.0.0: Programming Guide

$tx = new Transaction();
$tx->setAmount('29.90');
$tx->setCurrency('USD');
$tx->setMerchantTransactionId('txid-123456');

// IP is one of required attributes for scoring a transaction
$tx->setSourceIp('35.45.123.158');

$account = new Account();
$account->setMerchantAccountId('9876-5432');
$account->setEmailAddress('jdoe@mail.com');
$account->setName('J Doe');

$tx->setAccount($account);

$shippingAddress = new Address();
$shippingAddress->setName('Jane Doe');
$shippingAddress->setAddr1('44 Elm St.');
$shippingAddress->setCity('San Mateo');
$shippingAddress->setDistrict('CA');
$shippingAddress->setPostalCode('94403');
$shippingAddress->setCountry('US');

$tx->setShippingAddress($shippingAddress);

// The line items of the transaction
$tx_item = new TransactionItem();
$tx_item->setSku('sku-1234');
$tx_item->setName('Widget');
$tx_item->setPrice('3.30');
$tx_item->setQuantity('3');
$tx->setTransactionItems(array($tx_item));

$paymentMethod = new PaymentMethod();
$ccCard = new CreditCard();
$ccCard->setAccount('4111111111111111');
$ccCard->setExpirationDate('201109');
$paymentMethod->setType('CreditCard');
$paymentMethod->setCreditCard($ccCard);

// Billing address city, district, country are required for score call to work
$paymentMethod->setBillingAddress($shippingAddress);

$tx->setSourcePaymentMethod($paymentMethod);

$response = $tx->score();
```
if ($response['returnCode'] == 200) {
    if($response['score']->score <= 50) {
        print "Acceptable score, processing transaction";
        // process the transaction further here
    } else {
        print "High risk of chargeback. Reasons are: \n";
        $scoreCodes = $response['scoreCodes'];
        foreach ($scoreCodes as $scoreCode) {
            print("Score code ". $scoreCode['id'] . " : " . $scoreCode['description'] . "\n");
        }
    }
} else {
    // the score call did not succeed, check return code
    // and return string and try to re-submit
}

The `score()` call returns a `Return` object that describes the success or failure of the call, the chargeback probability (`score`), and an array of reason codes (`scoreCodes`) that explain the risk score.

Based on the transaction information provided, the chargeback probability ranges from 0 to 100. A probability of 100 indicates that CashBox is 100 percent certain that this transaction is fraudulent and will result in a chargeback. The score can also be -1, indicating no opinion from Vindicia; or -2, indicating an error condition. Based on the score, you can decide to either proceed with the transaction (by capturing it) or cancel it.

For more information on `scoreCodes` and the `score()` call, see Section 18: The Transaction Object in the `CashBox API Guide`.

**Reporting Activity Information**

To combat fraudulent chargebacks, Vindicia uses your records to build an evidentiary record of your customer's activities, and challenge a chargeback case on your behalf.

Usage data, which usually resides in the commerce server on your site, is not mandatory, but can be key in helping win chargeback disputes. Examples of usage data are logins and logouts, visits to certain Web pages, email or phone communications, and shipping confirmations. This data can help counter customer claims that they did not make a specific purchase. Vindicia strongly suggests that you maintain a record of usage data. If you sell digital goods, most of this information data is required by the issuer in case of chargeback disputes. Be sure to report all the events that are significant or relevant, including email or phone communications, and access to or downloads of for-pay content.

The `Activity` object contains data structures through which you can report the following types of customer activities:

- Logins to a site
- Logouts from a site
- Views, visits, or downloads of a Web resource (URI views)
- Phone contacts with a customer
• Email contacts with a customer
• Fulfillment of an order for physical goods
• Use of quantifiable objects that are meaningful to your business
• Cancellation of a service
• An arbitrary note that contains a maximum of 1,024 characters

Report these activities to Vindicia in batch mode, when your transaction processing system is relatively quiet.

**Record a phone contact with a customer as an Activity:**

```php
$soap_act = new Activity();
// Create an account object
$account = new Account();

// Specify account by the customer id
$account->setMerchantAccountId('9876-5432');

// Now create Activity to report a customer’s phone call
// and corresponding ActivityTypeArgs objects

$activity = new Activity();
$typeArgs = new ActivityTypeArgs();

// fill in the relevant info for this activity record
$activity->setAccount($account); //associate the activity and account
$activity->setActivityType('Phone');
$activity->setTimestamp(getdate());

$phoneArgs = new ActivityPhoneContact();
$phoneArgs->setCidPhoneNumber('1234567890');
$phoneArgs->setDurationSeconds(367)
$phoneArgs->setType('FromCustomerToMerchant');
$phoneArgs->setNote('Customer agreed to be rebilled for services');

$typeArgs->setPhoneArgs($phoneArgs);

// associate typeArgs to the Activity object
$activity->setActivityArgs($typeArgs);

// now record the data
$response = $soap_act->record(array($activity));

if($response['returnCode'] == 200) {
    print "ok\n"; # 200 is HTTP status code for success
}
```

For more information, see Section 2: The Activity Object in the *CashBox API Guide*. 
Reporting Refund Information

If you process transactions and refunds through CashBox, you need not report refunds separately to Vindicia. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.)

Report refunds to Vindicia for transactions processed outside CashBox:

```php
$refundVid = 'MyVindiciaRefundVID';

// Create a refund object
$refund1 = new Refund();
$refund1->setMerchantRefundId('REF101');

$transaction1 = new Transaction();
// merchant ID of a previously reported transaction
$transaction1->setMerchantTransactionId('TX101');

$refund1->setTransaction($transaction1);
$refund1->setAmount(5.99);
$refund1->setNote('Refunded due to service outage');
// Payment Processor's refund id when you processed
// this refund with it directly - if available
$refund1->setReferenceString('2033992');

// Create another refund object
$refund2 = new Refund();
$refund2->setMerchantRefundId('REF102');

$transaction2 = new Transaction();
// merchant ID of a previously reported transaction
$transaction1->setMerchantTransactionId('TX102');

$refund2->setTransaction($transaction2);
$refund2->setAmount(10.99);
$refund2->setNote('Customer did not receive delivery');

$soap_refund = new Refund();
$response = $soap_refund->report(array($refund1, $refund2));
if($response['returnCode'] == 200) {
    print("All refunds submitted successfully");
}
```

If you refund customers outside of your CashBox system, you must report the refunds to Vindicia so that ChargeGuard can use them when disputing chargebacks. To report refunds in batch mode, first construct a batch of Refund objects, as shown above. For more information, see Section 15: The Refund Object in the CashBox API Guide.
16.4 Retrieving Chargeback Updates

The Chargeback object supports a fetchDeltaSince() call with which you can retrieve chargebacks that have changed in status or that have been newly added since the timestamp you specify as an argument for the call.

**Fetch chargebacks that have changed in a specific time frame:**

```php
$cb = new Chargeback();
$page = 0;
$pageSize = 50;

// Here we want to fetch chargebacks that have changed in status or
// have been added since the last time we ran this call.
// Assume we have a function available to us that gives us
// the timestamp for the last time we ran this call

$since = getLastCallTime();
do {
    $ret = $cb->fetchDeltaSince($since, null, $page, $pageSize);
    $count = 0;
    if ($ret['returnCode'] == 200) {
        $fetchedChargebacks = $ret['chargebacks'];
        if ($fetchedChargebacks != null) {
            $count = sizeof($fetchedChargebacks);
            foreach ($fetchedChargebacks as $chargeback) {
                // process a fetched chargeback here …
                $status = $chargeback->getStatus();
                $transactionId = $chargeback->getMerchantTransactionId();
                $amount = $chargeback->getAmount();
            }
            $page++;
        }
    }
} while ($count > 0);
```

To retrieve all the chargebacks that match the search criteria, construct the sample above in a loop by incrementing the page number for each iteration until the returned number of chargebacks in a page is less than the specified page size.

The Chargeback object also supports several other fetch calls to retrieve chargebacks through a variety of search criteria. For details, see Section 7: The Chargeback Object in the CashBox API Guide.

Make this call to Vindicia at periodic intervals with a UNIX daemon, a Microsoft Windows scheduler, or a similar technology. Use this process to automate the tasks of downloading chargebacks, learning their status, and enabling or disabling customer accounts.
Working with Name-Value Pairs

For some objects, such as the PaymentMethod and Transaction objects, CashBox automatically generates certain name-value pairs, designated by the prefix `vin:`. These pairs are listed and defined in the `nameValue` data member table for the specified object.

Cashbox also provides predefined name-value pairs for use within CashBox. For these pairs, CashBox populates the name and you populate the value. These pairs include:

- **vin:Division:** This name-value pair can be populated in an AutoBill, Transaction, or PaymentMethod object for validation. If used in conjunction with the `divisionName` name-value pair in your CashBox setup, it sends Transactions associated with these objects to the specified division (ID) at the processor.
  
  `vin:Division` can be used to route Transactions to different payment processors, or to different merchant IDs configured at your payment processor in cases where you are not already routing by currency. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.) The value you pass must match a value that has been configured in your merchant configuration in CashBox. Work with your Vindicia Client Services representative to configure this option.

- **vin:OriginalDivisionNumber:** This name-value pair is provided for information purposes only. If you set a value for `vin:OriginalDivisionNumber` on a migrationTransaction, that value will be stored in the reference/reporting portion of the `auth` response—it will not affect the Division under which subsequent activities (for example, refunds) are processed. The `vin:OriginalDivisionNumber` name-value pair is useful, therefore, for storing obsolete or legacy Division identifiers for historical purposes.

- **vin:MandateFlag** and **vin:MandateVersion:** When creating an AutoBill with EDD as the Payment Method, use **vin:MandateFlag** and **vin:MandateVersion** to associate a mandate document with the AutoBill. For example, set **vin:MandateFlag** to true, and **vin:MandateVersion** to 1.02 to associate a mandate document version 1.02 with the AutoBill.
- **vin:MandateBankName**: The Bank Name for the EDD/SEPA Direct Debit Payment Method (required only in the Netherlands).
- **vin:ValidateFullAmt**: Use to pass whether full amount authorization needs to be done before charging. This must be enabled if the processor is Global Collect.
Appendix A  Custom Billing Statement Identifier Requirements

The Billing Statement Identifier field enables merchants to define the line of text that will appear on their customers’ credit card statements, in association with the related charge. To enable this field, payment processors require merchants to provide certain information, in a specific format.

(If you work with several payment processors, be sure to take into account their individual requirements when deciding how to populate data on your CashBox objects.)

This appendix describes the data and configuration requirements for creating Payment Processor specific Billing Statements for Chase Paymentech, GlobalCollect, Litle & Co., and Merchant e-Solutions (MeS). While the requirements for these three processors are virtually identical, specific differences are called out, where appropriate.

To comply with Visa transmission rules, the following information must be included with the Billing Statement Identifier field:

- a Visa-issued Merchant Category Code (MCC)
- an associated Merchant Name (if applicable)
- a Customer Service Phone Number
- a Description of the product or purchase
A.1 Billing Statement Identifier

Customize a Billing Statement Identifier in CashBox using either of the following:

- Billing Statement ID on a Billing Plan for an AutoBill in the CashBox UI
- billingStatementIdentifier attribute in the SOAP API

For credit card-based recurring billing, set the attribute for the BillingPlan, Product, or AutoBill object. CashBox will then insert the identifier into every Transaction generated for the AutoBill, and the identifier will appear on your customer’s next billing statement. If you set the attribute on all three objects, the order of precedence is BillingPlan, Product, AutoBill.

For real-time Transactions, set the billingStatementIdentifier attribute for the Transaction object.

Billing Statement Identifier example: website.com|3101231234.

Note: The asterisk is a reserved character that is not allowed in the Billing Statement Identifier.

A.2 MCC-Associated Merchant Name

Work with your payment processor to provide Vindicia Client Services with your MCC (Merchant Category Code) and associated Merchant Name. Obtain your MCC and the associated Merchant Name (set by Visa) from your payment processor account representative. The Merchant Name can be 3, 7, or 12 characters. Send the information to Vindicia Client Services.

Vindicia will add your Merchant Name to your CashBox configuration for the Transactions Vindicia submits on your behalf. Take note of the length of the Merchant Name; it will affect the allowable length of description text (see Section A.4: Billing Description).

Note: The length of the Merchant Name associated with your MCC will directly affect the maximum allowable length of your Description. For more information, see Section A.4: Billing Description.

Do not pass the Merchant Name in the Billing Statement Identifier. Pass only the MCC.
A.3 Default Customer Service Phone Number

Provide Vindicia Client Services with a default customer-service phone number for each Chase Paymentech Division ID, GlobalCollect Billing Descriptor, Litle & Co. Merchant ID, or MeS Profile ID, including the default ID. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Section 1.2.9: Merchant Identifiers for more information.) For Chase or MeS, provide a 10-digit number separated by dashes (NNN-NNN-NNNN or NNN-NNNNNNN) or a three-digit number followed by a 7-digit alphanumeric code (for example, 800-CALLNOW). For Litle, provide a 10 digit phone number for US billing addresses, and up to 13 digits for non-US addresses.

For all listed payment processors, Vindicia will add the information to your CashBox configuration, and enable the default phone number for your Division ID, Merchant ID, or Profile ID.

Note: The Billing Statement ID will not work without this phone number.

Overriding the Default Customer Service Phone Number

To override the default phone number, use the Billing Statement ID field to append a product description with the pipe symbol (|), followed by the desired number. (Non-numeric characters will be stripped from the phone number.)

For example: Product XYZ | 877-555-1212.

In the CashBox UI, enter the Description and override phone number in the Billing Statement ID field of the Billing Plan.

With the CashBox API, provide the Description and override phone number on the billingStatementIdentifier data member of the BillingPlan, Product, AutoBill or Transaction object. Use the symbol "->" to signify "is overridden by, if present." If the override number is provided for several object, the order of precedence is BillingPlan > Product > AutoBill > Transaction.

For Chase or MeS: Chase and MeS will reject the Transaction if the override number exceeds 10 digits. To prevent this, CashBox will automatically use the default number for your Division or Profile ID for any override numbers exceeding 10 digits.

For Litle: Litle will reject the Transaction if your override number exceeds 13 digits. To prevent this, CashBox will automatically use the default number for your Merchant ID for any override numbers exceeding 13 digits.
A.4 Billing Description

The Description is a string, up to 22 characters long, which includes the length of the MCC-associated Merchant Name, and an asterisk (*), leaving 9 to 18 characters for the descriptive text. (CashBox will automatically truncate any Description string exceeding 22 characters.)

The Description should be recognizable to the account holder. It should consist of the company name and/or trade name (Merchant Name), combined with a description of the product or service purchased.

There are three possible formats:

- 3-character Merchant Name, an asterisk (*), and an 18-character description
- 7-character Merchant Name, an asterisk (*), and a 14-character description
- 12-character Merchant Name, an asterisk (*), and a 9-character description

Each description must be validated by your payment processor’s Risk Department before being put in use. Vindicia cannot verify that this step has occurred; you must secure the validation yourself.

Valid characters in the Description string include:

- Numbers
- Letters
- Special characters: ampersand (&), comma (,), dash (-), period (.), pound sign (#)

The asterisk is a reserved character for marking the end of the MCC only. Do not include an asterisk in your descriptor.

Note: ChasePaymentech will reject Transactions which use the following symbols, with Response Reason Code 225 (invalid field data): caret (^), backslash (\), open square bracket ([), closed square bracket (]), tilde (~), or accent (’).

For example, if Vindicia’s MCC-associated Merchant Name were VIN, and our Billing Statement Identifier for CashBox were VIN* CashBox Software, the identifier would appear on the credit-card holder’s statement as

VIN* CashBox Software 650-264-4700.
Appendix B  Handling “Tax Service Not Available” Scenarios

CashBox provides three options for how it handles Transactions when your tax vendor is offline or otherwise unable to calculate taxes. You should consider balancing the risk of losing the customer or the revenue of a specific transaction against the impact of not collecting the appropriate taxes. Best practice suggests allowing the immediate transaction to proceed (see options below) and either filing/paying the uncollected tax or accepting a lower amount by paying taxes out of what was collected as if it were tax-inclusive.

Vindicia can configure your merchant options to react in one of the following ways when a given transaction fails to calculate taxes:

- **Proceed with inclusive taxes (default)—**the transaction will complete authorization, returning a 202 response code, and subsequently capture for the pre-tax subtotal only. The transaction will be posted to the configured tax service as a tax-inclusive event (similar to a VAT) instead of adding the tax to the price, so that the final price charged to the customer does not change, but you record a tax liability from the appropriate tax rate out of the collected amount.
  
  For example, for a single-item charge that would normally incur a 10% tax rate, a $10 charge is made, and taxes on $10 transaction are filed as $9 charge + $1 tax (instead of a $11 transaction filed as $10 + $1 tax). This would be limited to transactions where the configured tax service was unavailable at the time the transaction was authorized.

- **Proceed without taxes—**the transaction will complete authorization, returning a 202 response code, and subsequently capture for the pre-tax subtotal only. The Transaction will not be posted to your configured tax service. You will be responsible for handling tax filing on such charges (using the CashBox report or API data to identify tax that was not collected).

- **Fail with error—**the transaction will fail authorization with a 408 response code.

  **Note:**  The Vindicia Transaction Object will be flagged and reported in the "Tax not collected" field in the Transaction Detail Report to allow you to track when this occurs.

For more information and to enable these options, contact Vindicia Client Technical Support.