vindicia®
An Amdocs Company

Subscribe® Programming Guide

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Subscribe® Programming Guide Preface

Subscribe 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 **Subscribe Programming Guide**, leads you through the process of integrating your application with the Subscribe and ChargeGuard services offered by Vindicia.

Vindicia's Subscribe API allows you to both integrate with Subscribe, and take advantage of Vindicia's ChargeGuard protection services.

1 Subscribe Client Library Setup

The Subscribe API is composed of objects accessed through a SOAP interface. Integrate with the Vindicia service by making SOAP calls supported by the objects. The Subscribe 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 Subscribe API objects and describes the procedure to configure the Subscribe client library.

1.1 Subscribe API

The following table lists and summarizes the Subscribe API objects.

Table 25.

Summary of Subscribe API Objects

Subscribe API Object	Description
`Account`	Encapsulates a customer account.
`Activity`	Records a nontransaction (nonpurchase) activity on your site.
`Address`	Records a customer's address.
`AutoBill`	Describes the terms of a customer's relationship to a product or service and a Billing Plan.
`BillingPlan`	Describes a billing plan which defines how charges are made over time.
`Campaign`	Describes the parameters of a sales Campaign.
`Chargeback`	Details the chargeback information for a customer account. (Works in conjunction with ChargeGuard.)
`Entitlement`	Details the status of a customer's current entitlement to your product or service.
`GiftCard`	Encapsulates details of a gift card redeemed or to be redeemed through Subscribe.
`NameValuePair`	Referenced by several Subscribe objects, the `NameValuePair` object is used to hold attributes not otherwise supported in the object.
`PaymentMethod`	Details a customer's payment method, such as Credit Card, PayPal, or Direct Debit.
`PaymentProvider`	Serves as a wrapper to contain static information required by a payment provider for payment processing.
`Product`	Describes a product or service that you offer.
`RatePlan`	Defines the logic by which the pricing structure for Rated Products will be determined.
`Refund`	Describes a refund on a transaction or account.
`SeasonSet`	Defines a group of time intervals, which may be used with Billing Plans to define both Billing Cycles, and Entitlement grants.
`Token`	Describes a customer account's non-currency balance, such as virtual currency, frequent flier miles, downloads, or storage space.
`Transaction`	Handles the transactions, generated through Subscribe, that relate to a customer

Subscribe API Object	Description
	account. (With ChargeGuard integration, be certain to report transactions to Vindicia.)
`WebSession`	Tracks your Web order form's submission activity in the context of the Hosted Order Automation (HOA) capacity.

The ***Subscribe API Guide*** describes the objects in detail. These objects include data members, and methods that operate on the data members. Write to the Subscribe API with PHP, Perl, Java, .NET with C#, or C++ by using the Subscribe client libraries. You may also implement a native library for other environments with the Subscribe Web Services Description Language (WSDL) files.

> ***Note:*** *Because Vindicia supports multiple programming languages, the descriptions and examples of the Subscribe 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 Subscribe, collect your customer requests, package the data, send it to Vindicia through the Subscribe API, and receive, store, and report the return data from Subscribe 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 Subscribe for processing.

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

1.2.1 Installing and Configuring the Subscribe Library

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

PHP

The Subscribe 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 Subscribe 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 `Prodtest` development server is `soap.prodtest.sj.vindicia.com`.
   - `VIN_SOAP_Version`: The version of Subscribe 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:

`VIN_Base_Dir`	`VIN_Soap_Cache_Dir`
`VIN_Var_Dir`	`VIN_Client_Var_Dir`
`VIN_Tmp_Dir`	`VIN_Log_Cache`
`VIN_Lock_Dir`	

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#):

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

In 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 Subscribe client library for Java is in the Java archive file `vindicia.jar`, which bundles the Subscribe 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`.

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 Subscribe 4.2:

```
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

```
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 Subscribe client library for .NET is in the DLL file `Vindicia.dll`, which bundles the Subscribe 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:

```
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, Subscribe 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 Subscribe 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:

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

Create a new Transaction:

```
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:

```
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:

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

In Java

Create a Transaction in 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 Subscribe 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:

```
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 Subscribe 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 Subscribe 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:

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

In Java

In Java, set the global SOAP timeout for Subscribe 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:

```
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.

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

1.2.4 Checking an Object Method's Return Value

All Subscribe 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 **Subscribe 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 Subscribe 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` 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 the `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 Subscribe 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 Subscribe expects. To generate a timestamp from a VB date, add a VB function to your Subscribe 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:

Data Type	Format	Example
dates	`YYYY-MM-DD`	`2010-10-23`
timestamp	`YYYY-MM-DDTHH:MM:SS(+|-)HH:MM`	`2010-10-23T14:23:12-07:00`

(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 `merchant` *Class* `Id`, 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 Subscribe 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 `merchant` *Class* `Id` 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 Subscribe 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

Subscribe supports the UTF-8 encoded character set. When you construct Subscribe 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 Subscribe WSDL Files

If a Subscribe API client library is not available for your programming language, you can integrate with Subscribe 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 (Subscribe 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 Subscribe. 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 Subscribe WSDL files to make SOAP calls, ensure that you are heeding the input parameter order specified in the* ***Subscribe 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 Subscribe 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 Subscribe, 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 Subscribe SOAP API version you will use.

For example, if you are working with Subscribe SOAP API version 4.2 and want to call in to Subscribe 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 Subscribe 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* ***Subscribe API Guide*** *for the objects and the methods supported by the WSDL files.*

   For Subscribe 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`

For Subscribe API nonproduction releases that are in Vindicia's staging servers for testing prerelease client regression, download from the following sites:

- **WSDL file:** `https://soap.staging.sj.vindicia.com/` *version/object* `.wsdl`
- **Schema file:** `https://soap.staging.sj.vindicia.com/` *version* `/Vindicia.xsd`

2. **Optional.** Update the SOAP endpoint address to reflect the server to which to send your SOAP calls, assuming that you cannot programmatically do so in your client code.
3. Generate local stub or proxy objects with language-specific tools. For example:
   - If you program in Java and are using the Apache Axis library to work with SOAP, generate local stub objects with the utility `WSDL2Java`.
   - If you program in .Net with C#, import the WSDL files into your project to automatically generate local stub objects.
   - If you program in another language, such as Python, for which no appropriate tools are available, consult the language- or package-specific SOAP documentation on how client code can make the SOAP calls as described in the WSDL files.
4. Ensure that your SOAP library supports making SOAP calls to external servers through HTTPS.

   For security, Vindicia does not support HTTP-based SOAP calls. You might need to install additional SSL-specific libraries on your system.

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 Subscribe 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 Subscribe 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 Subscribe 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 Subscribe to facilitate the financial transactions you later pass to Subscribe for processing.

To establish a new customer account, create an `Account` object, populate it with data, and store that data in the Subscribe 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.

```
// 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();

// Check to see that the account was created
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, Subscribe 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 **Subscribe API Guide**.

2.2 Setting Up Account Payment Methods

The `Account` object can store multiple payment methods, defined by `PaymentMethod` objects. Subscribe 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 Subscribe 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.) Subscribe 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 Subscribe. On the Subscribe 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 Subscribe in coordination with the payment processor.
- PayPal: Subscribe supports real-time transactions through PayPal Express Checkout. Subscribe 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 Subscribe objects (`Product`, `BillingPlan`, and `AutoBill`) on the Subscribe Portal or with the Subscribe 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:*** *Subscribe 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:

```
$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 26.

Access Methods for `Account` Object

Method	Description
`fetchByEmail`	Returns the `Account` object with the specified email address.
`fetchByMerchantAccountId`	Returns the `Account` object with the specified `merchantAccountId`.
`fetchByPaymentMethod`	Returns all the `Account` objects with the specified payment method.
`fetchByVid`	Returns the `Account` object with the specified VID.
`fetchByWebSessionVid`	Returns the `Account` object with the specified `WebSession` VID.
`fetchCreatedSince`	Returns `Account` objects based on creation date.

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 The Account Object in the ***Subscribe API Guide*** .

2.4 Creating Account Hierarchies

Subscribe 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:

```
// 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 The Account Object in the Subscribe API Guide.

2.5 Presenting the Reason for Credit (to the customer)

When you grant credit to Accounts and Autobills, the default Subscribe 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 Subscribe implementation will return to the default behavior.

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

```
// 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;
$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.

```
// 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, Subscribe 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 Subscribe Portal allows you to create and manipulate `Product` objects through a user interface. See the **Subscribe 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 `Product`, `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 tokensSubscribe, Subscribe grants those tokens, and associates them with the `Account` object in question.

For more information, see Section 13: The Product Object in the **Subscribe API Guide.** For information on how the `Product` object affects entitlements, see 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.

```
$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 27.

Access Methods for the `Product` Object

Name	Description
`fetchAll`	Returns all the `Product` objects.
`fetchByAccount`	Returns one or more `Product` objects whose `Account` object matches the input.
`fetchByMerchantEntitlementId`	Returns all the `Product` objects whose entitlement ID assigned by you (`merchantEntitlementId`) matches the input.
`fetchByMerchantProductId`	Returns an `Account` object with the specified `merchantAccountId`.
`fetchByVid`	Returns an `Account` object with the specified VID.

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

```
$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 The Product Object in the Subscribe 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* ***Subscribe 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 Subscribe Portal allows you to create and manipulate* `BillingPlan` *objects through a user interface. See the* ***Subscribe 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:

```
// 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')]));
$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
}
```

> ***Note:*** *Once subscriptions have been activated in the system (that is, an* `AutoBill` *object that uses a particular* `BillingPlan` *object becomes active), do not make changes to the underlying* `BillingPlan` *object, other than to change the* `BillingPlan` *Cycle amounts. For all other changes, create a new* `BillingPlan` *object.*

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.

> ***Note:*** *Billing Plans can be processed in currency or tokens, but not in both. For example, you might set up your environment to support several token types (such as downloads and storage) and charge 50 downloads per month for access to the system.*

For details on how the `BillingPlan` object affects entitlements, see 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");

$ss->seasons( [$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 Subscribe 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 Subscribe 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 with early cancel fee:

```
// 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 Subscribe 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`.

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

Create a Product

```
$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.

```
$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,
// Subscribe 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 Subscribe database, a new one will be created.
// The immediateAuthFailurePolicy instructs Subscribe 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 authorizaton.
// putAutoBillInRetryCycleIfPaymentMethodIsValid (recommended)
// Creates AutoBill and retries if Subscribe 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 Subscribe 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 Subscribe

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

if($response['returnCode'] == 200) {
   print "ok\n";
}
```

5.1.1 Creating an AutoBill with Multiple Products

Subscribe 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 Subscribe 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 Subscribe, 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 Subscribe API Guide.

Create an AutoBill with two products

```
$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

Subscribe 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`. Subscribe 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:

```
#--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:

```
#--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

Subscribe allows you to create `AutoBill` subscriptions that start in the future. Such `AutoBill` 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, Subscribe authorizes the full amount immediately. In the event of a failure, Subscribe 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 authorizaton.
  - putAutoBillInRetryCycleIfPaymentMethodIsValid (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, Subscribe 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, Subscribe 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. Subscribe 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 Subscribe 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, Subscribe simply performs `AuthCapture`, saving you the cost of the validation.

If payment authorization fails on the attempted validation method, Subscribe 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.

Subscribe also validates other payment methods, such as ECP, if they are supported by the payment processor. For example, with Chase Paymentech, Subscribe 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 **Subscribe API Guide**, and Section 4.1: AutoBill Data Members in the **Subscribe 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 Subscribe using a name–value pair on the `PaymentMethod` object. In this pair, set the name to `CVN` (the Subscribe 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 **Subscribe 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`.
- Subscribe 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 **Subscribe API Guide**).

  The values of AVS response codes interpreted by Subscribe 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 Subscribe 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.

```
$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');

// populate other address attributes here

// Billing address on payment method is required to
// implement address verification
```

```
$paymentMethod1->setBillingAddress($address);

$paymentMethod1->setType('CreditCard');

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

$paymentMethod1->setCreditCard($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
$paymentMethod1->setNameValues(array($nv));

$account = new Account();
// populate other account attributes here

$account->setPaymentMethods(array($paymentMethod1));

$abill = new AutoBill();
$abill->setAccount($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 authorizaton.
//putAutoBillInRetryCycleIfPaymentMethodIsValid (recommended)

// Now call update to create the autobill on Subscribe servers

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

if($response['returnCode'] == 200) {
   print "Credit card was approved and subscription created. \n";
}
else if ($response['returnCode'] == 402) {
   print "Payment method was not approved "
   $txStatus = $response['authStatus'];
   $authCode = $txStatus->getCreditCardStatus()->getAuthCode();
   print "Auth code received from processor " . $authCode . "\n";
}
```

> ***Note:*** *Use the results from the of credit-card security code verifications to determine whether to create an* `AutoBill` *object, or update one with a new payment method. Once you have created an* `AutoBill` *object and started generating transactions, these verification mechanisms may no longer be used. PCI regulations forbid the storage of credit-card security codes. Because Subscribe does not store these numbers, Subscribe is unable to perform verification for subsequent transactions using the payment method for the* `AutoBill` *object when it was first created.*

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`, Subscribe 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:

(new plan cost - old plan cost) * (number of days on new plan / number of days in period) =

($15 - $10) * (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->setMerchantProductId('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->setMerchantProductId('avataxed-ott-product');
   // Identify the Product by its ID. There is no need to fetch it.

$itemAdded = new AutoBillItem();
$itemAdded->setProduct($productAdded);
$itemAdded->setMerchantAutoBillItemId('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: '
          . $refunds[0]->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: $'
             . $tx->getAmount()
             . ' - see break down below:');
          printTxDetails($tx);
       }
    }
 }
```

5.2.3 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.

```
$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() . '
        . 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()
         . ' - see break down below:');
        printTxDetails(tx);
      }
   }
}
```

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.

```
$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 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{\t},
 (
 $history_item->actionDate,
 $history_item->action,
 $history_item->autoBillItem->merchantAutoBillItemId,
 (q{effective } . $history_item->effectiveDate),
 )
 ),
 qq{\n};
 }
 }
 else
 {
 print STDOUT qq{AutoBill\:\:fetchBillingItemHistory for AutoBill with ID $arg failed.\n};
 }
}
```

5.2.6 Continuous Billing during the 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 Subscribe 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

Subscribe 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 Subscribe to bill on the service period start date (the default).
- `billingRule`: an enumerated string value (`Advance` or `Arrears`), informing Subscribe 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, Subscribe 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.

```
                                // bill on the 25th of each month for a service that started on t
$specified_billing_day = 25;
$billingRule = 'Advance';
$autobill->specifiedBillingDay($specified_billing_day);
$autobill->billingOffset($billingOffset);
```

This would cause Subscribe 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.

```
$rc = $autobill->cancel($autobill, $disentitleFlag, $forceFlag, $settleFlag, $sendCancelNoticeFla
```

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

```
$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 Subscribe API Reference Guide for details.

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

Also, Subscribe 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

Subscribe 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. Subscribe supports three kinds of cancel reasons:

- Subscribe Reserved Codes—codes (0 through 99—currently only 0 through 5 are used) predefined by Vindicia and used by Subscribe 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 `Subscribe Reserved Codes`, `Predefined Merchant Codes`, and the numerical ranges reserved by Vindicia for future use, and for `Custom-Defined Merchant Codes` you create.

Table 28.

AutoBill Cancel Reason Codes

ReasonCode	Description
`0`	Vindicia: Administrative Action.
`1`	CasBox: Unspecified.
`2`	Subscribe: AutoBill Ended.
`3`	Subscribe: Account Updater reports card closed.
`4`	Subscribe: Chargeback received. Policy specifies AutoBill be cancelled.
`5`	Subscribe: Permanently Suspended for Non-Payment. Unable to Collect Payment.
`6 through 99`	Subscribe Reserved Codes, reserved for future extension by Vindicia.
`100`	Merchant: Terminated (Policy or Terms Violation).
`101`	Merchant: Prevent Auto-Renewal.
`102`	Merchant: Refunded, Cancel Service.
`103`	Merchant: Customer Dissatisfied.
`104`	Merchant: Technical Issues with Service.
`105`	Merchant: Unable/Unwilling to Pay (Cost too high).
`106`	Merchant: Generic Cancel (Other).
`107`	Merchant: Cancel Verifi. (Merchant uses Verifi to minimize chargebacks.)
`108 through 999`	Predefined Merchant Codes reserved for future extension by Vindicia.
1000 and above.	Custom-Defined Merchant Codes that you can create.

System-generated AutoBill cancellations are automatically assigned an applicable Subscribe 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 Subscribe Reserved Codes or a Custom-Defined Merchant Code you have created.

```
$reasonCode = "103"; // unhappy user
$rc = $autobill->cancel($autobill, $disentitleFlag, $forceFlag, $settleFlag, $sendCancelNoticeFla
```

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.

```
$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 Subscribe 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 Subscribe

The Subscribe `AutoBill.migrate, Transaction.migrate,` and `Refund.report` calls allow you to import existing subscription and Transaction information from your billing system to Subscribe. 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 Subscribe system,, while preserving their pre-Subscribe history.
- Refund transactions using Subscribe, even if the transaction was not originally from Subscribe, eliminating the need for you to maintain multiple billing systems.
- Perform all customer service functionality (including modify) on existing subscribers before Subscribe 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 Subscribe, 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
- mport 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 Subscribe. 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 Subscribe. Once migrated to Subscribe, you may perform operations on the AutoBill (such as modify, cancel, and update) and expect behaviors that replicate that of an AutoBill created in Subscribe. `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 Subscribe (including `refund` and `fetch` calls).

Subscribe 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 Subscribe 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 Subscribe.
$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 Subscribe 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 Subscribe.
$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->setType('Recurring');
$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->setItemType('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->description()
   . ' - 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.
$mTxTaxItem100 = new MigrationTaxItem();
$mTxTaxItem100->setAmount(7.50);
$mTxTaxItem100->setJurisdiction('STATE_06');
$mTxTaxItem100->setName('CALIFORNIA STATE SALES TAX');
$txTotal = $txTotal + 7.50;

$mTxTaxItem101 = new MigrationTaxItem();
$mTxTaxItem101->setAmount(1.00);
$mTxTaxItem101->setJurisdiction('COUNTY_085');
$mTxTaxItem101->setName('SANTA CLARA COUNTY SALES TAX');
$txTotal = $txTotal + 1.00;

$mTxItem10->setMigrationTaxItems( [ $mTxTaxItem100, $mTxTaxItem101 ] );

$mt1->setMigrationTransactionItems( [ $mTxItem10 ] );

$mt1->setAmount($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);

$mt1->setStatusLog( [ $status10 ] );

// Now construct an array of the Transactions to be migrated.
$migrTxs = [ $mt0, $mt1 ];

// 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 Subscribe 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 '
. vr->getReturnCode()
. ' and return string '
. vr->getReturnString());
print('Soap id ' . $vr->getSoapId());
}
else {
   print('Migration successful. Created autobill id '
. $migrBill->getMerchantAutoBillId()
. ' in Subscribe. Its VID: '
. $migrBill->getVID()
. ' . This autobill is for customer Account ID '
      . $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, Subscribe will begin billing when this trial period has completed.

```
$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 Subscribe 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 Subscribe 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 Subscribe.
$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 Subscribe SOAP API call to migrate the AutoBill
// along with the transactions constructed above.

$vr = $migrBill->migrate('2014-01-25', $migrTxs);

if ($vr->getReturnCode() != 200) {
   print('Migrate call failed - return code '
         . $vr->getReturnCode()
         . ' and return string '
         . $vr->getReturnString());
   print('Soap id ' . $vr->getSoapId());
}
else {
   print('Migration successful. Created autobill id '
         . $migrBill->getMerchantAutoBillId()
         . ' in Subscribe. Its VID: '
         . $migrBill->getVID()
         . ' . This autobill is for customer Account ID '
         . $migrBill->getAccount()->getMerchantAccountId());
   print('Next billing will be on '
         . $migrBill->getNextBilling()
         . ' for $'
         . $migrBill->getNextBilling()->getAmount());

   $transaction_factory = new Transaction();
   $tx_array = $transaction_factory->fetchByAccount($acct, false);
```

```
    // Because we migrated only the $0 transaction,
    // there should be only one transaction.
    $the_tx = $tx_array[0];
    $status_log = $the_tx->getStatusLog();
    $the_status = $status_log[0];

    print('Last transaction for this account was for $'
          . $the_tx->getAmount()
          . ' processed on '
          . $the_status->getTimestamp);
}
```

5.5 Using EDD and UK DD for Recurring Billing

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, Subscribe 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. Subscribe 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 **Subscribe API Guide**.)
   - If the validation fails, Subscribe 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, Subscribe 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, Subscribe considers the transaction `Authorized`, and the funds withdrawal process begins. Subscribe 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 Subscribe. 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. Subscribe sets the transaction status to `Cancelled` and the corresponding `AutoBill` status to `Hard Error`.

- If Subscribe receives *no response* from the processor for four banking days, Subscribe 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 Subscribe, 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 Subscribe 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 Subscribe in The Netherlands, Germany, and Austria: An Overview. When creating an instance of the mandate from the template for a subscription, Subscribe 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 Subscribe 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. The following table lists the flags.

Table 29.

`AutoBill` Object Flags for Mandates

Name of Flag	Value
`vin:MandateFlag`	A value of 1 indicates that you would like to store the mandate for the associated `AutoBill` object.
`vin:MandateVersion`	Specifies the mandate instance to be used for the associated `AutoBill` object. > ***Note:*** *If you do not specify this field, Subscribe 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.

   Subscribe 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.)

```
                                                ...
$autobill->setPaymentMethod($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`, Subscribe 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`, Subscribe defines the language for the mandate using the country specified in the EDD or UK DD payment method.*

Use the Subscribe 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 Subscribe. The passing of the mandate is acheived 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, Subscribe uses that `PaymentMethod`. If the`PaymentMethod` does not exist, or does not contain a Reference ID for PayPal, Subscribe 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 \n";

   $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 Subscribe 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

```
...
$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 Subscribe email notification system.

For more information, see the Using Subscribe with PayPal white paper, available from Vindicia Client Services.

6 Working with One-Time Transactions

Subscribe 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 Subscribe, do not allow recurring transactions, and allow only one-time transactions.

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

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

Subscribe allows you to issue email notifications when these events occur. For more information, see Working with Customer Notifications.

6.1 Setting Up Real-Time Billing for One-Time Purchases

Subscribe supports real-time billing for one-time purchases. In this case, you must explicitly create a `Transaction` and send it to Subscribe for processing. Subscribe 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 Subscribe 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 Subscribe. 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 Subscribe.

6.2 Using Credit Cards for One-Time Transactions

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

```
$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('xxxxxx'); // Use YYYYMM format for date
$paymentMethod->setCreditCard($card);

$tx->setSourcePaymentMethod($paymentMethod);

// Subscribe can send an email notification to the customer
// associated with this transaction, if an email template
// for this is uploaded to the Subscribe 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 Subscribe 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, Subscribe 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 Verifying AVS and CVN for Recurring Billing for details.

The `authCapture()` method authorizes a transaction and marks it for capture by a Subscribe 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()`, Subscribe 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

```
$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, Subscribe 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

```
$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 Subscribe'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 The Transaction Object in the Subscribe API Guide.

6.3 Using Carrier Billing for One-Time Transactions

Subscribe 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 Subscribe 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 Subscribe `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 Subscribe `setMerchantServiceIdentifier` call to pass in the corresponding Service ID.

Create a Transaction using BOKU Static Pricing

```
$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

```
$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

```
                                $criteria = new Criteria();
$criteria->setMerchantServiceIdentifier('140ba94f2c24e44b5cb85730');
$criteria->setStaticSelectionRowRef(1);
$criteria->setCountryCode('NZ');
$criteria->setPaymentProvider($paymentProvider);
```

6.3.3 Using Subscribe to query BOKU

Subscribe 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

```
$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

```
$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.

```
$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

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

Check the status of a BOKU Transaction

```
$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 Subscribe 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 Subscribe, 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

```
$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
$tx->setAccount($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);

$tx->setSourcePaymentMethod($paymentMethod);
$sendEmailNotification=false;

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

if($response['returnCode'] ==200) {
   if($tx->statusLog[0]->status=='AuthorizedPending') {
      print "Successful\n";
      display(print $tx->statusLog[0]->status->boletoStatus->uri);
   }
   else if($tx->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 Subscribe 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. Subscribe 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 Subscribe sets the status to `Captured`. If, during that time, Subscribe receives notice (by a reason code) from the payment processor that the transaction failed, Subscribe 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, Subscribe 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 Subscribe does not receive any decline codes during the six banking days after the retry, Subscribe sets the transaction status to `Captured`.

Create a Transaction with ECP as the payment method

```
$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 Subscribe are inbound, as they originate with your customers, and are inbound to your bank. For the ECP payment method, Subscribe 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.

```
$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. Subscribe assigns the transaction an immediate status of `Authorized`, indicating that both Subscribe 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 Subscribe changes to `AuthorizedPending`, indicating that the deposit process has started.
3. After four banking days have elapsed, Subscribe sets the transaction status to `Captured`. Note that the number of banking days varies between payment processors.

   During the four European banking days:
   - If Subscribe is notified by the payment processor that the transaction failed, that is, received a hard-error reason code from the processor, Subscribe 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 Subscribe a soft-error reason code that indicates that there will be an internal retry of the transaction (for example, due to insufficient funds), Subscribe 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, Subscribe changes the transaction status to `Cancelled`.

If during the four European banking days subsequent to the retry attempt, Subscribe does not receive any hard or soft error codes from the processor, Subscribe 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

```
$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();

$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');

$paymentMethod->setBillingAddress($bill_addr);
$paymentMethod->setType('DirectDebit');

$dd = new DirectDebit();

// specify the account number from which funds will be withdrawn
$dd->setAccount('8888888888');

// specify bank sort code of the bank from which funds will
// be withdrawn
$dd->setBankSortCode('12345678');

$dd->setCountry('DE');
// needed for Vindicia's internal validation

$paymentMethod->setDirectDebit($dd);

// 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 Subscribe Portal, or by calling one of the `Transaction` object's `fetch` methods. For details, see Section 18: The Transaction Object in the **Subscribe 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 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 Subscribe 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 30.

`Transaction` Object Flags

Name of Flag	Value
vin:MandateFlag	A value of 1 indicates that you would like to store the mandate for the associated `Transaction` object.
vin:MandateVersion	Specifies the mandate instance to be used for the associated `Transaction` object. If you do not specify this field, Subscribe 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 `Transaction` object.
4. Add the name–value pairs to the `Transaction` object before calling `authCapture()` on it.

Enable mandate storage for a transaction:

```
$tx->setSourcePaymentMethod($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();
$nv1->setName('vin:MandateVersion');
$nv1->setValue('1.0');

$nv3 = new NameValuePair();
$nv1->setName('vin:MandateBankName');
$nv1->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, Subscribe 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`, Subscribe defines the language for the mandate using the country specified in the EDD or UD DD payment method.*

Use the Subscribe 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 Subscribe. 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 Subscribe and PayPal systems, and that it requires further action from the customer for completion.
3. PayPal notifies Subscribe 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 Subscribe 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 Subscribe 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 Subscribe to finalize the PayPal authorization so that Subscribe 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 object. `PaymentMethod` From this page, finalize the Transaction to update its status in Subscribe.

```
$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";
}
```

Subscribe updates the Transaction status to `Authorized`, which changes to `Captured` after Subscribe 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 Using PayPal for Recurring Billing, and the Using Subscribe 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 Subscribe 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.

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

A merchant-entered payment is applied to outstanding AutoBills with a `PaymentMethod` of "Merchant Recorded Payment." Unless otherwise specified by the Merchant, Subscribe 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

```
$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 Subscribe

Use `Transaction.migrate` to migrate historic Transaction information into Subscribe. 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 Subscribe. 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 Subscribe, Subscribe 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 ***Subscribe API Guide*** .

6.10 Refunding Customers

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

Subscribe automatically creates transactions for recurring billing from `AutoBill` objects. Fetch these transactions from Subscribe by calling `Transaction->fetchDeltaSince()`, or search for them on the Subscribe 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:*** *Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.*

```
// 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');
// 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 The Refund Object in the Subscribe 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 Subscribe.

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

7.1 Creating Entitlements

Entitlement IDs are optional, and are simple strings that are merchant-defined. The example in Creating Billing Plans, defines the `merchantEntitlementId`: "**Standard**", and associates it with the `BillingPlan` object. The example in 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 Subscribe.

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

Subscribe 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, Subscribe 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 Subscribe 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.

> *Tip:*
>
> *Create a descriptive and consistent entitlement ID naming system to prevent confusion due to multiple entitlements linked to a single `AutoBill` or `Account` object.*
>
> *For example, instead of creating entitlements for one `AutoBill` object called **Standard** and **Video Only,** and for another `AutoBill` called **Blog Access** and **Video Only,** name the entitlements for the first AutoBill **Standard Access** and **Video Only,** and the second**Blog Access** and **Blog Video Only**.*
>
> *This allows you to reuse previously defined Entitlement objects in new combinations, without ambiguity. For those customers who wish to access video across your site, you could create an AutoBill which grants **Video Only** and **Blog Video Only** entitlements. For your customers who don't wish to read the Blogs, but do want access to their video content, you could offer an AutoBill that combines **Standard Access** with **Blog Video Only** entitlements.*

7.4 Monitoring 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:

- `$entitlement->fetchByEntitlementIdAndAccount()`
- `$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, Subscribe 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

Subscribe 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 Subscribe GUI, including creating and applying Rate Plans to existing Products. Use the Subscribe 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 Subscribe measures the number of licenses or units of usage for which your customers are billed. Subscribe 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 Subscribe 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 Subscribe 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:*** *Subscribe 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`. Subscribe requires that at least one of the following three data members be specified: `Account`, `AutoBill`, or `AutoBillItem`.

When reporting `Events`, Subscribe 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

```
$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, Subscribe 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`, Subscribe will return an error string saying the input `AutoBillItem` is not unique.

> ***Note:*** *When working with Rate Plans, assign a name to `AutoBillItems`, to facilitate working with `Events`.*

```
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_124');
$event->setMerchantAutoBillId('ab_715');
$event->setAmount(42);

$response = $rateplan->recordEvent(array($event));
```

Record an Event for a specific AutoBill and Product

```
$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

Subscribe 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`. Subscribe does not support negative balances on Rated Units.*

Use `reverseEvent` to credit an Account for previously billed Events.

Deduct Events:

```
$rateplan = new RatePlan;
$event = new Event;

$event->setMerchantEventId('rating_129');
$event->setMerchantAutoBillId('ab_715');
$event->setAmount(2);

$response = $rateplan->deductEvent(array($event));
```

Subscribe 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, Subscribe will not construct a Credit or process a refund for the item.

Reverse Rated Unit Events

```
$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. Subscribe 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

```
$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

```
$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.

1st object	
accountVid	0b69d0...
autoBillItemVid	ae3992...
autoBillVid	60263a...
productVid	8479ce9...
ratePlanVid	b4130b...
merchantAccountId	account_13345386734
merchantAutoBillId	autobill_13345386734
merchantAutoBillItemId	autobillitem_13345386734
merchantProductId	product_13345386734
merchantRatePlanId	rateplan_13345386734
currentTier	basic
currentTotalRatedUnitsBill	4.27
eventCount	1
ratedUnit	'namePlural' => 'minutes' 'nameSingular' => 'minute'
ratedUnitTotal	37

2nd object	
accountVid	0b69d0...
autoBillItemVid	370de7...
autoBillVid	60263a...
productVid	8479ce...
ratePlanVid	496c89...
merchantAccountId	account_13345386734
merchantAutoBillId	autobill_13345386734
merchantAutoBillItemId	autobillitem_23345386734
merchantProductId	product_13345386734
merchantRatePlanId	rateplan_13345386734
currentTier	basic
currentTotalRatedUnitsBill	3.15
eventCount	1
ratedUnit	namePlural' => 'hour' nameSingular' => 'hours’
ratedUnitTotal	21

This example returns two `RatedUnitSummary` objects, because there are two different `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

Subscribe allows you to fetch both billed and unbilled Rated Unit Events, allowing you to compare your customer’s current with previous use patterns.

Calling `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.

`fetchEvents` differs from this call only in that it will return 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 **Subscribe API Guide**.

Note that all optional data members identifying the event (such as the `autoBillVid`) will be entered by Subscribe, 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.modiby() method or through the Subscribe portal. Proration of mid-cycle changes is available using the same proration parameters available for all modifications.

9 Working with Customer Notifications

Subscribe 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 Subscribe 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.*

Subscribe 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, Subscribe will not notify the customer on a soft fail.*
> - *If you do not set a preferred language for any template and an English template exists in the database, Subscribe notifies the customer using the English language template.*

If the `prenotifyDays` setting in a `BillingPlan` object is `0` or is not set, Subscribe sends no prebilling notifications.

9.1 Setting the Preferred Language

Subscribe 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. (Subscribe 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, Subscribe sends the English version. If the English version does not exist, Subscribe sends no notifications.

9.2 Working with Billing Events

Subscribe 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 Subscribe 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 Subscribe Billing Events

Subscribe 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 Subscribe.

The following table lists the Subscribe billing events and suggested email content.

Table 31.

Billing Events

Notice / Event	Suggested Content
Prebilling The billing event is pending.	Product information, AutoBill expiration date, the date on which billing will occur, the amount of the bill, the opt-out procedure, and contact information for your support team. Specify when to send this notification in the `prenotifyDays` data member of the `BillingPlan` object.
Initial Success The first billing event for a new AutoBill has been successful.	Use this email to welcome new customers to the business. 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. (If the payment method is Tokens, replace the currency with the Token type.)
Success A successful billing event has occurred.	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. (If the payment method is Tokens, replace the currency with the Token type.)
Soft Fail The billing attempt has failed. The payment processor's return code indicates that if the card is resubmitted, the billing might succeed. Subscribe will retry.	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.
Hard Fail The billing attempt has failed. The payment processor's return code indicates that no more transactions will be accepted.	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 account information to remain in good standing.
Cancellation The customer has opted out of the AutoBill	Notification that the transaction has been cancelled, and that your customer will not be billed on the next billing date (if a recurring bill.)

Notice / Event	Suggested Content
Subscription, and an upcoming bill has been cancelled. (Sent only if a prebilling notification has already been issued.)	Include contact information for re-subscribing to your service.
Billing Delay Issued upon a billing delay (extension of entitlements, without captured payment), only if the customer has not been pre-notified of the billing event.	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.
Prenotification: No Payment Method Issued as a Prebilling Notification, when no Payment Method is listed for the AutoBill.	Product information, AutoBill expiration date, the date on which billing will occur, the amount of the bill, the opt-out procedure, and contact information for your support team. Include instructions for your customer to update their billing information. Specify when to send this notification in the prenotifyDays data member of the BillingPlan object.
Failure: No Payment Method 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.
Credit Card Expiration Warning 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.
Expiration 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.
End of Trial 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.

Notice / Event	Suggested Content
Real-Time Inbound Failure 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.
Real-Time Inbound Success 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).
Real-Time Outbound Failure 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.
Real-Time Outbound Success 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.
Refund 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.)
Push Initiation A push payment has begun.	Product information, and instructions on how to complete the transaction, including the URL for the payment slip form.
Push Reminder The customer has not completed a push payment transaction within the allotted time.	Product information, and instructions on how to complete the transaction, including the URL for the payment slip form.
Failure: Insufficient Tokens Not enough tokens are available to pay for a recurring Transaction.	Token information, and instructions on how to obtain additional tokens.
Failure: Insufficient Tokens Not enough tokens are available to pay for a one-time Transaction.	Token information, and instructions on how to obtain additional tokens.

9.2.2 Billing Event Settings

The following table lists the customizations available to your notification timing through the Subscribe API.

Table 32.

Settings for Notification Templates

Notification	Settings
Prebilling	`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, Subscribe 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.
Initial Success	None.
Success	None.
Hard Fail	Work with Vindicia to map the payment processor reason codes to hard fails, to define the number of days after the billing attempt fails Subscribe should retry, and to define the number of retries. By default, Subscribe retries hard fails only once, and sends notifications if the first retry fails. (Subscribe 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.)
Soft Fail	Work with Vindicia to map the payment processor reason codes to soft fails, to define the number of days after the billing attempt fails Subscribe should retry, and to define the number of retries. Subscribe retries soft fails until it exhausts the number of retries specified. If the final retry fails, Subscribe sets the Soft Fail to Hard Fail.
Cancellation	None.
End of Trial	`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.
Expiration	`BillingPlan.expireWarningDays`: Sets the number of days before a subscription ends to send a warning email. Whether to send this notification may also be defined at the AutoBill level.
Refund	None.
Real-Time Inbound Success	None.

Notification	Settings
Real-Time Outbound Success	None.
Real-Time Inbound Failure	None.
Push Initiation	None.
Push Reminder	Contact Vindicia Client Services to set the number of days after initiation to send this reminder, and to specify the number of reminders (retry times).
Insufficient Tokens	None.
Tokens Granted	None.

9.2.3 Parent-Child Account Billing Notifications

Subscribe 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
- 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 Subscribe to provide customer- and Account-specific information. Work with Vindicia Client Services to submit your templates for inclusion in your Subscribe 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 Subscribe data will be inserted when the billing event notification is rendered. Subscribe notification templates support looping, to allow for multiple charges, credits, or payments.

The following tags may be used in a Billing Event template:

Table 33.

Billing Event Template Tags (Variables)

Subscribe Tag	Description
<tpl name="address"/>	The billing address (multiple lines). **Note:** This tuple will print the customer's name, as well as all lines included in the billing address.
<tpl name="amount"/>	The total transaction amount. **Note:** This is a deprecated tag. Specify `grand_total` instead.
<tpl name="billing_plan_desc"/>	The Billing Plan's description.
<tpl name="billing_plan_id"/>	The `merchantBillingPlanId`.
<tpl name="ccnum"/>	The credit-card number (the last four digits only).
<tpl name="cctype"/>	The credit-card type, such as Visa or MasterCard.
<tpl name="currency"/>	The currency code, for example, USD, or the description of the token type that serves as payment, for example, Award Points, Downloads, or Transférer.
<tpl name="currency_symbol"/>	The Billing Plan's currency, as indicated by the ISO 4217 currency code entered for the `BillingPlanPrice` object's `currency` data member.
<tpl name="date"/>	The billing date (MM-DD-YYYY).
<tpl name="desc[n]"/>	An array of line-item descriptions that accompany real-time transaction notifications. Specify each item of the array and provide the maximum number of line items expected. For example: <tpl name="desc[0]"/> <tpl name="desc[1]"/> <tpl name="desc[2]"/>
<tpl name="expirationdate"/>	The subscription's expiration date (MM-DD-YYYY).
<tpl name="formaction"/>	The URL for a push payment method slip from the payment processor.
<tpl name="grand_total"/>	The grand total of the transaction. For prebilling and postbilling notifications, this is the total cost (subtotal plus tax). For tokens, this value is the same as `amount`.

Subscribe Tag	Description
<tpl name="interval"/>	The length of the billing period, such as 12 months.
<tpl name="invoiceno"/>	The transaction ID, available only after you have submitted a transaction.
<tpl name="ISOdate"/>	The billing date (YYYY-MM-DD).
<tpl name="ISOexpirationdate"/>	The subscription's expiration date (YYYY-MM-DD).
<tpl name="ISOnextdate"/>	The next billing date, that is, the next retry after failure or the next scheduled billing (YYYY-MM-DD).
<tpl name="length"/>	The length of the current billing period, for example, 2-week or 1-month. Subscribe supports this tag only in the End of Trial and Expiration templates.
<tpl name="merchant"/>	Merchant's name.
<tpl name="merchant_affiliate"/>	The partner or affiliate associated with the Billing event.
<tpl name="name"/>	The customer's first and last names.
<tpl name="name_on_entitlement_account"/>	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.
<tpl name="name_on_payer_account"/>	The name of the payer account. When a child account is sent an email notification, this field will display the parent Account's name.
<tpl name="nextdate"/>	The next billing date, that is, the next retry after failure or the next scheduled billing (MM-DD-YYYY).
<tpl name="payment_provider"/>	The Payment Provider who handled the Billing event.
<tpl name="payment_token_balance"/>	Valid for tokens only, this tag, which supports English only, returns the sentence "Your token-account balance is X," where token-account is the description of the token type and X 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

Subscribe Tag	Description
	use, this tag returns a blank.
<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

Subscribe Tag	Description
	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 Merchant Identifiers for more information.)
<tpl name="refund_note"/>	A note on the refund.
<tpl name="refund_payment_provider"/>	The Payment Processor for the refund.
<tpl name="refund_pp_order_number"/>	The Payment Provider's order number for the refund.
<tpl name="refund_status"/>	The refund's status.
<tpl name="refund_timestamp"/>	The timestamp in the format "2008-09-19 15:20:04."
<tpl name="send_to_email"/>	The email address to which the Billing Event email should be sent.
<tpl name="serialnum"/>	Your identifier for the `AutoBill` object.
<tpl name="sku"/>	Your product identifier.
<tpl name="statementno"/>	The statement number for the Billing event.
<tpl name="subtotal"/>	The pretax amount. For tokens, this value is the same as `amount`.
<tpl name="tax"/>	The applicable tax. If the payment method is tokens, the value is 0.
<tpl name="token_balance"/>	Available remaining Tokens for the Account.
<tpl name="token_change"/>	The change in number of Tokens available to the Account as a result of this Billing event.
<tpl name="token_id"/>	The `merchantTokenId` for the Tokens transferred in this Billing event.
<tpl name="uri"/>	The URL the Payment Processor returned in response to the presentment of a fiscal number (for Boleto Bancario.)
<tpl name="vid"/>	Subscribe'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.

Subscribe 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, Subscribe 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 Subscribe:

- 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.

Subscribe 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, Subscribe recommends that you include appropriate links and phone numbers to contact your Customer Service department to arrange payment.)

As with all Subscribe customer notifications, you must supply Subscribe 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 Subscribe Invoicing Events

Subscribe 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 Subscribe 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.

Subscribe can be configured to render and issue the following emails in relation to the Invoicing cycle:

Table 34.

Invoicing Events

Notice / Event	Suggested Content
Open Invoice 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).
Payment Due (1st dunning Notice) 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.
Overdue (2nd Dunning Notice) 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.

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. Subscribe 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 Subscribe database, as described in Table: Invoice Template Tags (Variables).

Default Invoice Template

Subscribe 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 %] [% cust_name %] [%cust_address %] Previous Balance	Invoice #: [% invoice_num %] Date: [% invoice_date %] [% format_amount(balance_forward) %]
Payments: [% FOR x IN payments %] [% x.amount %] [% x.date %] [% END %]	[% format_amount %]
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 %]	[% format_amount %]
Total Current Charges: Credits: [% FOR x IN credits %] [% x.date %] [% END %]	[% format_amount(total_charges) %] [% format_amount %]
Total Credits: Tax:	[% format_amount(total_credits) %] [% format_amount(tax) %]
Total Amount Due: Pay By:	[% format_amount(balance_due) %] [% payment_due_date %]

Invoice Template Tags

Tags are used to provide a place holder in the template where Subscribe data will be inserted when the Invoice is rendered. Subscribe Invoice templates support looping, to allow for multiple charges, credits,

or payments.

The following tags may be used in an Invoice template:

> *Note: Because Subscribe 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 35.

Invoice Template Tags (Variables)

Subscribe Tag	Description
Invoice Information	
[% date %]	Today's date.
[% merchant %]	Your merchant name as it is currently defined in Subscribe. **Note:** If this value is not as you expect, please work with your Vindicia Client Support contact to change it.
[% invoice_num %]	The auto-generated Invoice Number. This will be based on the Merchant AutoBill Identifier with a sequence number identifying the billing covered, for example: SUBMONTHLYAhd38-00000003. If you do not define Merchant AutoBill Identifiers for subscriptions, the VID will be used in its place.
[% opening_balance %]	The amount after payments have been subtracted from the balance forward.
[% payment_type %]	The payment type (MAP, CC, EDD, etc.) used to make payment of the balance due.
[% balance_forward %]	The balance carried forward from previous invoices.
[% balance_due %]	The balance due after all payments, credits, charges and taxes have been applied to the balance forward.
[% transaction_id %]	Unique identifier, generated by Subscribe for the Invoice. **Note:** This field will be populated only after a payment is made against the Invoice.
[% invoice_date %]	The date the invoice was created and sent.
[% currency %]	The currency used for the transaction.
[% payment_due_date %]	The date the invoice becomes due.
Customer Information	
[% cust_name %]	The customer's name.
[% cust_email_address %]	The customer's email address.
[% cust_address %]	The customer's address. A concatenation of all available customer address information.

Subscribe Tag	Description
	For example: 1820 Gateway St${sep}Apt. A${sep}Foster City, California 94403${sep}US
[% cust_address_street1 %]	The customer's street address (1st line).
[% cust_address_street2 %]	The customer's street address (2nd line).
[% cust_address_street3 %]	The customer's street address (3rd line).
[% cust_address_city %]	The customer's city.
[% cust_address_district %]	The customer's state.
[% cust_address_postal_code %]	The customer's zip code.
[% cust_address_city_dist %]	The customer's city, state, and zip code. For example: Foster City, California 94403
Payments	
[% total_payments %]	Currency value of all the payments.
[% payments %]	An array of payments applied to the AutoBill. [% FOR x IN payments %] [% x.type %] [% x.date %] [% x.amount %] [% END %]
type	Used with the [% payments %] tag to retrieve the type of payment used.
date	Used with the [% payments %] tag to retrieve the date the payment was applied to the account.
amount	Used with the [% payments %] tag to retrieve the payment amount.
Credits	
[% total_credits %]	Currency value total of all credits.

Subscribe Tag	Description
[% credits %]	An array of credits applied to the AutoBill. [% FOR y IN credits %] [% y.credit_date %] [% y.credit_amount %] [% END %]
date	Used with the [% credits %] tag to retrieve the date the credit was made to the account.
amount	Used with the [% credits %] tag to retrieve the credit amount.
Charges	
[% total_charges %]	Currency value total of all charges.
[% charges %]	An array of charges applied to the AutoBill. [% FOR c IN charges %] [% c.product %] [% c.desc %] [% c.price %] [% c.quantity %] [% c.total %] [% c.rate_plan_id %] [% c.rate_plan_description %] [% c.included_units %] [% c.min_fee %] [% c.max_fee %] [% c.unit_name_singular %] [% c.unit_name_plural %] [% c.unit_total_amount %] [% c.unit_amount_and_name %] [% c.rate_plan_tiers %] [% c.rated_unit_events %]

Subscribe Tag	Description
	[% END %]
product	Used with the [% charges %] tag to retrieve the Product's ID.
desc	Used with the [% charges %] tag to retrieve the Product's description.
price	Used with the [% charges %] tag to retrieve the Product's price.
quantity	Used with the [% charges %] tag to retrieve the number of Products.
total	Used with the [% charges %] tag to retrieve the total charge.
rate_plan_id	Your Rate Plan ID.
rate_plan_description	Your description for the Rate Plan.
included_units	The number of Units included with the Rate Plan.
min_fee	The minimum fee for the Rate Plan.
max_fee	The maximum fee for the Rate Plan.
unit_name_singular	The singular version of the Unit name.
unit_name_plural	The plural version of the Unit name.
unit_total_amount	The total number of reported Units.
unit_amount_and_name	The number and name of the reported Units. (Subscribe will automatically return the singular or plural name, dependent upon the reported number of Units.)
[% rate_plan_tiers %]	An array of all the Tiers in the Rate Plan. [% FOR t in c.rate_plan_tiers %] [% t.tier_name %] [% t.tier_begins_at_level %] [% t.tier_ends_at_level %] [% t.tier_rate_price %] [% t.tier_rated_units_tier_total %] [% t.tier_cost_total %]

Subscribe Tag	Description
	[% END %]
tier_name	Used with the [% rate_plan_tiers %] tag to retrieve the name of the Tier.
tier_begins_at_level	Used with the [% rate_plan_tiers %] tag to retrieve the beginsAtLevel for the Tier.
tier_ends_at_level	Used with the [% rate_plan_tiers %] tag to retrieve the endsAtLevel for the Tier.
tier_rate_price	Used with the [% rate_plan_tiers %] tag to retrieve the ratePrice for the Tier.
tier_rated_units_tier_total	Used with the [% rate_plan_tiers %] tag to retrieve the number of Rated Units reported for the Tier.
tier_cost_total	Used with the [% rate_plan_tiers %] tag to retrieve the total charge for the Tier.
[% rated_unit_events %]	An array of all (unbilled) Rated Unit Events applied to the AutoBill. [% FOR e IN c.rated_unit_events %] [% e.event_date %] [% e.received_date %] [% e.amount %] [% e.unit_name %] // singular or plural, based on # of units [% e.description %] [% e.rate_plan_id %] [% e.rate_plan_description %] [% e.product_id %] [% e.product_description %] [% END %]
event_date	Used with the [% rated_unit_events %] tag to retrieve the date the specified Event occurred, or the date the Event was reported to Subscribe.
received_date	Used with the [% rated_unit_events %] tag to retrieve the date the event was received.
amount	Used with the [% rated_unit_events %] tag to retrieve the number of Rated Units included in the Event.
unit_name	Used with the [% rated_unit_events %] tag to retrieve the name for the Unit

Subscribe Tag	Description
	associated with the Event. Subscribe will automatically return the singular or plural version of the name, dependent upon the number of Units reported for the Event.
description	Used with the [% rated_unit_events %] tag to retrieve the description for the Event.
rate_plan_id	Used with the [% rated_unit_events %] tag to retrieve the Rate Plan ID for the Event.
rate_plan_description	Used with the [% rated_unit_events %] tag to retrieve the description for the Rate Plan associated with the Event.
product_id	Used with the [% rated_unit_events %] tag to retrieve the Product ID associated with the Event.
product_description	Used with the [% rated_unit_events %] tag to retrieve the description for the Product associated with the Event.
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 Subscribe 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 Subscribe 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 36.

Token-Related Objects

Subscribe Object	Description
Token	Defines a token of a certain type. It must have a unique ID.
TokenAmount	The number of tokens, of a certain type, used to define a Billing Plan or product price in terms of tokens.
TokenTransaction	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 Subscribe transaction.

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 Subscribe Token Processor, and appear as Transactions in all applicable Subscribe Portal pages, including generated Reports.

10.1 Understanding Subscribe 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 37.

Multiple Language-Specific Token Types

Token ID	Description
01_EN_Downloads	Downloads
01_FR_Downloads	Transférer
04_EN_Storage	Storage
04_FR_Storage	Entreposage

The following Subscribe 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 Subscribe notify the customer with instructions for obtaining additional tokens. For billing plans with multiple token types, Subscribe 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, Subscribe adds the number of tokens to the customer's applicable token balance.

10.2 Understanding Token Activities

View token activities on the Subscribe 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 Subscribe 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 38.

Token Activity Types

Activity Type	Example	Description	Results	Token Balance
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.	▪ 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.	▪ 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** Notification email to the customer on the tokens granted. ▪ page.	Incremented
Grant	Add tokens to a customer's account to compensate for degraded service.	Grant tokens on the Subscribe Portal.	▪ Notification email to the customer on the tokens granted. ▪ New token payment methods, if they do not already exist. ▪ Increased token	Incremented

Activity Type	Example	Description	Results	Token Balance
			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.	
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**	Incremented

Activity Type	Example	Description	Results	Token Balance
			Results page. ▪ Reference of the transaction ID by the activity.	
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 Subscribe 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
Purchase	A customer has an AutoBill subscription for a product associated with a billing plan that is	Transact an AutoBill subscription with a billing-period cycle in tokens.	▪ Prebilling notification to the customer. ▪ A success	Decremented

Activity Type	Example	Description	Results	Token Balance
	transacted in tokens. There are enough tokens in the related account to cover the cycle cost.		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.	
Refund	A customer makes a purchase with tokens and then requests a refund. (Subscribe 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	Incremented

Activity Type	Example	Description	Results	Token Balance
			activity on the customer's **Account Details** page.	
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	Refund of an AutoBill	▪ Refund	Decremented

Activity Type	Example	Description	Results	Token Balance
	AutoBill subscription for a product that has tokens granted and requests a refund.	subscription transacted in currency for a product for which tokens were granted.	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.	

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 Subscribe database.

Define a new Token type:

```
$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 Subscribe 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, Subscribe 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, Subscribe 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 Subscribe 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`, Subscribe 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, Subscribe 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:

```
$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"
. $newTokenBal->token->merchantTokenId; . "\n";
print "Token amount available" . $newTokenBal->amount;
. "\n";
}
}
```

The drawback of incrementing tokens on an `Account` object is that the action is not registered in Subscribe's transaction framework. It is, however, tracked and available on the Subscribe 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 Subscribe Portal (choose **Search** > **Token Activity** .) You may also obtain all token activities with SOAP 3.2 API calls.

Decrement an Account's Token balance:

```
// 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";
print "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 Subscribe'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 Subscribe Portal.

Conduct multiple Token transactions, for multiple Token types, in a single call:

```
/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
// Ensure that the Account set in each TokenTransaction object is
// the same object on which you make the following SOAP call

$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"
. $newTokenBal->token->merchantTokenId; . "\n";
print "Token amount available" . $newTokenBal->amount; . "\n";
}
}
```

10.5.2 Token Transactions in Real Time

To track your customers' token transactions in Subscribe, 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');

// 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:

```
//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, $validateP, $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 Subscribe 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`, Subscribe'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 Subscribe:

```
// 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 = '2009-05-19 T00:00:00Z'; // 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 Subscribe 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:** Subscribe will cancel all previous token transactions. If the cancellation causes the token balance to drop below zero, Subscribe will reset it to zero.
- **CancelNegativeBalance:** Subscribe 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:*** *Use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.*

```
//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 Subscribe 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 39.

Token Processor Reason Codes

Reason Code	Description
000	Approved.
001	Fractional funds.
002	No customer tokens.
003	Insufficient funds.
004	Authorization failed.

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

Subscribe 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 Subscribe Portal to define Campaign parameters, then generate and retrieve Campaign Codes. Use the Subscribe 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.*

Subscribe 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

Subscribe 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:

```
$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 `AutoBill.update` and `AutoBill.addCampaign` may be used to apply a Campaign discount to an existing AutoBill. With these methods, Subscribe 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 Campaigns in the Subscribe 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.

> ***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.*

11.2.1 Applying a Campaign Code to an existing AutoBill

Use `AutoBill.addCampaign` to add a Campaign Code to an existing AutoBill.

Add a Campaign Code to an existing AutoBill:

First, create the AutoBill:

```
$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
);
```

> ***Note:*** *This example neither validates the Payment Method, nor checks the chargeback probability or AVS and CVN returns. The default behavior for* ***duplicateBehavior*** *is used. These parameters must be populated, simply to set a variable for the last in the sequence (****ignoreAvsPolicy****).*

To attach the Campaign Code, use `AutoBill.update`, or `AutoBill.addCampaign`.

(`AutoBill.addCampaign` works similarly to `AutoBill.update` when adding a Campaign Code to an existing AutoBill.)

```
 $response = $autobill->addCampaign(
'promoABC' // promoCode
);// check $response
```

If there is an error with the discount, Subscribe 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.

```
$response = $autobill->modify(
$ab_item // AutoBillItem
false, // addNextPeriod
false, // proRate
'promoABC' // promoCode
);
 // check $response
```

> ***Note:*** *f 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

Subscribe 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, Subscribe 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.

Subscribe 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. Subscribe 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 The Token Object in the Subscribe 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.

Subscribe 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 Subscribe Portal or an API call. All credit activity is marked with a times tamp, 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, Subscribe 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`, Subscribe delays the next billing for the `AutoBill` by the specified amount of time, similar to calling `delayBillingByDays()` on the `AutoBill` object.
- **Credits (currency):** Subscribe 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 **Subscribe 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 Subscribe, to add credit to their `Account`. For more information, see Working with Gift Cards.

12.1.1 Redeeming Credit

Subscribe automatically processes all credit redemption. Neither the Subscribe API, nor the Subscribe Portal allow you to manually redeem Credit. Subscribe 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.

Subscribe processes Credit redemption in the following order:

1. Time Interval credits are redeemed before currency credits.
2. Credits automatically granted by Subscribe are redeemed before those granted through the Subscribe 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`*. Subscribe 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:

```
$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: Subscribe 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 `Account.revokeCredit` to deduct credit from an Account:

```
$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->setMerchantTokenId('UA_FF_MILES');

$tokAmt = new TokenAmount();
$tokAmt->setToken($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->getMerchantTokenId() . " ";
print "Amount: " . $tkAmt->getAmount() . "\n";
}
}
else {

// Error while revoking credit from the account
print $response['returnString'] . "\n";
}
```

> ***Note:*** *If the amount of token-based credit to be revoked results in a negative balance, Subscribe 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, Subscribe 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 Subscribe deducted the credit from the customer's account.

> ***Note:*** *You can also have Subscribe 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:

```
$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 \n";
}
else {
print "Error: Unexpected transaction status\n";
}
}
else {
// Error while conducting transaction
print $response['returnString'] . "\n";
}
```

Fetching `Account` Credit History

Subscribe 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`:

```
$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. Subscribe manages credits available to an `AutoBill` object as follows:

- Subscribe 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, Subscribe uses this credit before redeeming any token-based or currency credits.
- Subscribe 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 Subscribe 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:

```
$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:

```
$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->setMerchantTokenId('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->getMerchantTokenId() . " ";
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, Subscribe sets the balance to 0. Disentitlement (loss of customer access to the product) will occur when Subscribe attempts to process the next billing transaction for the `AutoBill`, and the transaction fails due to insufficient credit.

Fetching AutoBill Credit Transactions

Subscribe stores token- and currency-based periodic transactions in the same way that it stores `AutoBill` 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 Subscribe deducted the credit).

Fetching `AutoBill` Credit History

Subscribe 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. Subscribe. processes Gift Cards much like currency, in that Subscribe contacts a gift card processor company, which notifies Subscribe 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 Subscribe 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 Subscribe should contact for redemption of the gift card. When you make the API call to redeem a gift card, Subscribe 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 The GiftCard Object in the Subscribe API Guide for details.

12.2.2 Determining Redemption Credit Amount

Subscribe redeems Gift Cards for Token credit associated with a Product object.

When a customer offers a Gift Card PIN for redemption, Subscribe 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 Subscribe. 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. Subscribe 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 Subscribe.
4. Subscribe 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 Subscribe.

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:

```
$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['return Code'] == 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:

```
$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:*** *Subscribe 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:

```
// 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

Subscribe 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 Subscribe 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 Subscribe database, where it is permanently saved when the `WebSession.finalize()` method is called. For more information on the WebSession object, see The WebSession Object in the Subscribe 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 Subscribe objects.

> ***Note:*** *If you have already integrated HOA with your Subscribe implementation and just want to set up Hosted Fields, see the User Experience Flow, then skip ahead to 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 Subscribe 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 Subscribe `WebSession` object. You fetch this object and, based on the results, determine the next steps the customer should take on your site.

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, Subscribe always partially masks account numbers.*

13.2 HOA with Hosted Fields Process Flow

The HOA process differs from standard Subscribe processes in that, using HOA, you do not pass customer credit card information directly to the Subscribe 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 Subscribe 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

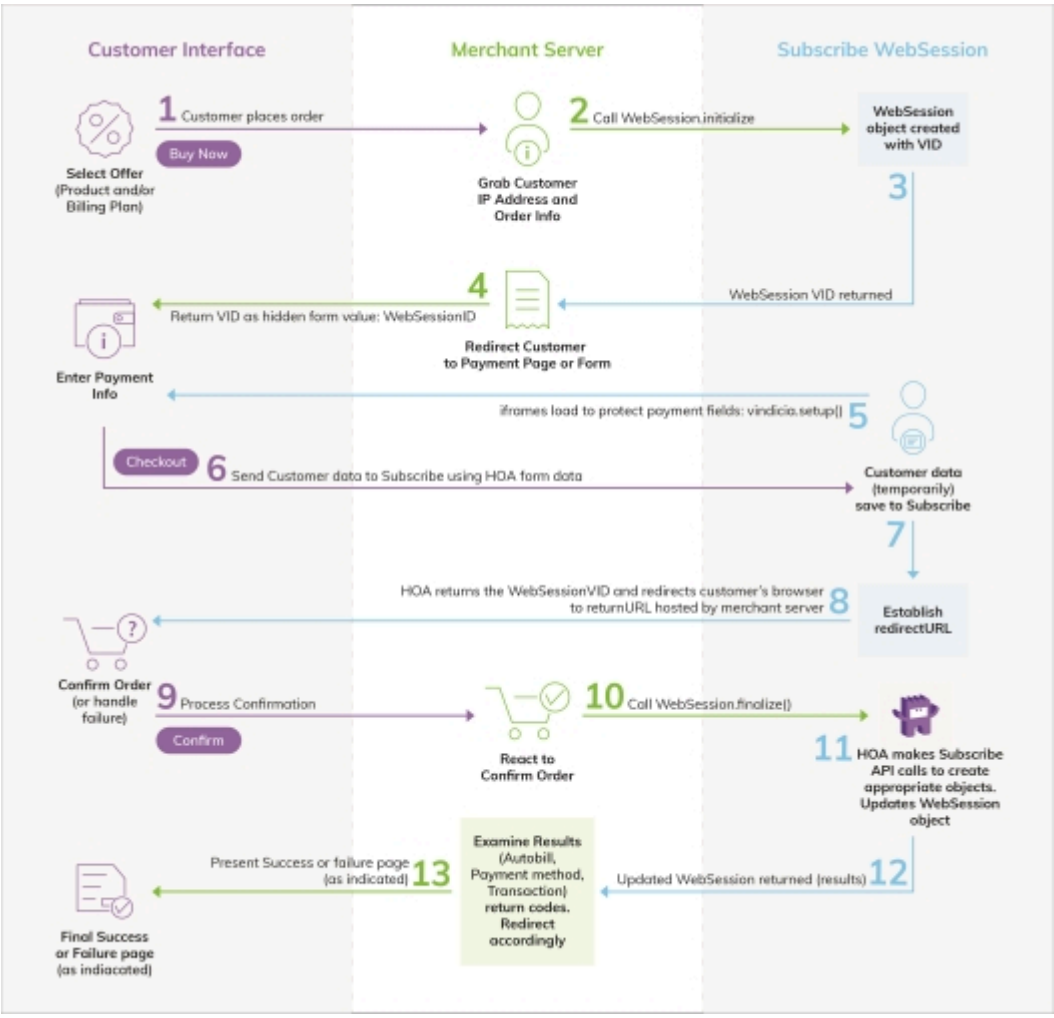
   b. Customer clicks **Submit**.

4. To determine how to route the customer, call `WebSession.finalize()` to confirm the submission, finalize the session, and instruct Subscribe HOA to make the SOAP calls necessary to load the temporary data from the `WebSession` object into the appropriate Subscribe 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 Subscribe `WebSession` servers and the Subscribe database.

Figure 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 Subscribe 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: `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: `<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.

   Subscribe 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 Subscribe marks the* `WebSession` *object expired.*

7. Vindicia saves the form data to Subscribe 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 (Step 10).
8. Subscribe 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 **Subscribe API Guide**.) You can also pass other parameters for the Subscribe method that you did not pass initially.

11. During the Subscribe `finalize`, all temporary session data is converted to objects in the Vindicia database, which Subscribe 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 Subscribe API, you can access objects generated during an HOA process using their `WebSessionVid`, and the `fetchByWebSessionVid` method. Subscribe 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 Subscribe implementation, see Implementing HOA with Hosted Fields . If you have already integrated HOA with your Subscribe implementation and just want to set up Hosted Fields, see Setting Up Hosted Fields .

13.3.1 HOA Naming Schema

Web forms are a flat name space. To accommodate this, Subscribe 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"/>'
```

> *Note: Calling `WebSession.finalize` instructs HOA to take ALL form information gathered through the HOA http POST, and create and populate the appropriate Subscribe objects.*

Naming schema for parameter values

Setting parameter values follows the same structure. For example, to set `minChargebackProbability` to 100:

```
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.

```
"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:

```
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:

```
in_WebSession_version='3.9'
vin_WebSession_method='Account_updatePaymentMethod'
vin_WebSession_vid
vin_PaymentMethod_type='CreditCard'
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_phonev
```

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 Subscribe method, use a name-value pair.

For example, to pass the `minChargebackProbability` attribute to the `Transaction.auth` method:

```
{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 Subscribe 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 Subscribe objects. The `WebSession` object supports the following Subscribe API calls (methods):
  - `Account_Update`
  - `Account_UpdatePaymentMethod`
  - `AutoBill_Update`
  - `PaymentMethod_Update`
  - `PaymentMethod_Validate`
  - `Transaction_Auth`
  - `Transaction_AuthCapture`
- Stores the result of the Subscribe 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 **Subscribe API Guide.)**
- Holds some of the data required to complete the Subscribe 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 Subscribe API Guide.)

  For details on the `WebSession` object's attributes, see Section 19.1: WebSession Data Members in the **Subscribe 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 Subscribe* `NameValuePair` *objects.)*

```
$ws = new WebSession();

// HOA must use Subscribe 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

$ws->setReturnURL("https://merchant.com/subscribe/success.php");

// 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 Subscribe Account object for which HOA should create the
// AutoBill object

$pnv1->setName('vin_Account_merchantAccountId');
$pnv1->setValue('df943');

// The Subscribe 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 Subscribe. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See 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 Subscribe 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 Subscribe, 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:

```
<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 Subscribe 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.

```
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> <br>
Credit card number: <div id="vin_PaymentMethod_creditCard_account"></div> <br>
Expiration Date: <div id="vin_PaymentMethod_creditCard_expirationDate"></div> <br>
CVV Number: <div id="vin_PaymentMethod_nameValues_cvn"></div> <br>
```

> ***Note:*** *You need not embed all the data in the form; feel free to preload some data in the corresponding `WebSession` object. For example, the above form, which results in the creation of an `AutoBill` object, does not include the customer account information, because the customer's `Account` object's `merchantAccountId` attribute is already in the `WebSession` object's `privateFormValues` attribute.*

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):

```
<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 Subscribe 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. (This is generally a dynamically generated page that intersperses Subscribe 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 Subscribe 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 `WebSessionVid` object. Upon finalization, HOA internally makes the call specified in the `method` data member of the corresponding `WebSessionVid` object, creates the desired object or objects on the Vindicia server, and updates the `WebSessionVid` object with the call's results. This updated `WebSessionVid` 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 Subscribe 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 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 Guidef.)

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(1000,999
$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 us
$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
$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
$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_Update_ignoreCvnPolicy');
$nvp16->setValue('true');

$nvp17 = new NameValuePair();
$nvp17->setName('AutoBill_Update_campaignCode');
$nvp17->setValue($coupon);

$websession->setMethodParamValues(array($nvp12,$nvp13,$nvp14,$nvp14,$nvp15));
?>
```

> ***Note:*** *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
$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:*** *Note that SOAP versions 13 and higher use Sparse Response Descriptions (SRD).*

```
<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" />
```

7. Create some input fields that do not require protection (Hosted Fields).

```
<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).

```
<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.

```
<script type="text/javascript">
 vindicia.setup(options);
</script>
```

Proceed to Setting Up Hosted Fields.

13.4.3 Setting Up Hosted Fields

If you are already using HOA with Subscribe 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 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` 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:

   ```
   <input type="text" id="vin_PaymentMethod_creditCard_account"
   name="vin_PaymentMethod_creditCard_account"
   placeholder="Enter Credit Card Number" />
   ```

   to this:

   ```
   <div id="vin_PaymentMethod_creditCard_account"></div>
   ```

2. Include `vindicia.js` on your checkout page.

   ```
   <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.

   ```
   <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.

```
<script>
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: { // required field or use expirationMonth and expirationYear
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: { // 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",
},
"select": {
"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"
}
}
},
},
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);
 }
 }
});

// optional function shown being used above
function setCardImage(type)
{
 // use a sprite to display one credit card logo brightly with JQuery
 if (type == 'visa' || type == 'visa_electron') {
 $('#ccTypeImage').css('background-position', '0 -23px');
 }jhk
+nnbb
 else if (type == 'mastercard' || type == 'maestro') {
 $('#ccTypeImage').css('background-position', '0 -46px');
 }
 else if (type == 'amex') {
 $('#ccTypeImage').css('background-position', '0 -69px');
 }
 else if (type == 'discover') {
 $('#ccTypeImage').css('background-position', '0 -92px');
 }
 else {
 $('#ccTypeImage').css('background-position', '0 0');
 }
}

</script>
```

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`:

```
vindicia.setup(options);
```

Setup options include the following:

`formID:`	**Required**: string	This is the ID of the form as shown below in this sample HTML:
		
		`<form id="mainform">`
		
		and would look like this:
		
		`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:`	**Required**: string	This option has many sub objects, one for each input field that you want protected, and a “styles” sub object.
	`cardNumber`	**Required**: object `cardNumber: { selector: "#vin_PaymentMethod_creditCard_account", placeholder: "Enter Credit Card Number" // optional field },`
	`expirationDate`	**Required**: object Not required if using expirationMonth/expirationYear pair. Creates an input box. Supported formats: 'MM/YY' (the default), 'MM-YY', 'MMYY', 'YY/MM', 'YY-MM', 'YYMM', 'YYYY/MM', 'YYYY-MM', 'YYYYMM', 'MM/YYYY', 'MM-YYYY', 'MMYYYY' `expirationDate: { selector: "#vin_PaymentMethod_creditCard_expirationDate", placeholder: "Expiration Date MM/YY", // optional field format: "MM/YY" // defaults to MM/YY },`
	`expirationMonth`	**Required**: object Not required if using expirationDate. Creates a dropdown box for entering the month. `expirationMonth: { selector: "#vin_PaymentMethod_creditCard_expirationDate_month", format:`

```
"N - A"
   },
```

Default format: `"N"`.

Allowed: `"N", "A", "N A", "N-A", "N - A"`

`expirationYear`

Required: object

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: object

```
cvn: {
   selector:
"#vin_PaymentMethod_nameValues_cvn",
   placeholder:
"Enter CVV"
// optional field
},
```

`styles`

Optional: object

```
styles: {
   "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`: integer	integer	**Optional**. During `vindicia.setup()` the iframe height is adjusted to be the si inside of it. If any styles require some extra padding around the input box, this is the defaults to zero px. `.iframeHei`
`onSubmitEvent`: integer	integer	**Optional**. This is where you will define a function to be executed when the submit bu can be anonymous or a call to an existing function. `onSubmitEvent: function(myform) { return merchantValidate(myform); },`
`onSubmitCompleteEvent`: function	function	**Optional**. If you do not want the browser to redirect to the success or error page, us allows you to perform a purely AJAX interaction. When the submit event to Vindicia function will be called. It can be anonymous or a call to an existing function. `onSubmitCompleteEvent: function(event) { return doAjaxCompletion(event.details.url); },`
`onVindiciaEvent`: function	function	**Optional**. To have access to realtime validation of iframe blur events, use this optio `onVindiciaEvent: function(event) { // optional if (event.detail.fieldType == 'expirationDate') { if (!event.detail.isValid) { console.log('vindiciaEvent expirationDate not valid'`

```
        }
    }
}
```

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:

```
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.

```
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.

```
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.
`event.detail.cardType`	String property to hold the short name of the card type that was detected. It exists only on events with `fieldType cardNumber`. Supported values include: ▪ amex ▪ dankort ▪ diners_club_carte_blanche ▪ diners_club_international ▪ discover ▪ jcb ▪ visa_electron ▪ visa ▪ mastercard ▪ maestro
`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.

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.

```
onSubmitCompleteEvent: function(event) {
  finishCheckout(event.detail.url);
  }
```

event.detail.fieldType	String	Always returns submit at this time.
event.detail.url	String	Contents is the redirect URL. This reflects the WebSession success or error URL that was previously defined.
event.detail.isValid	Boolean	Always returns true at this time.
event.detail.dataLength	Number	Always returns zero at this time.

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:

```
                              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:
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
 }
 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

Table 40.

Methods to validate iframe fields

vindicia.cardType	A string property to hold the short name of the card type that was detected. Supported values include ▪ amex ▪ dankort ▪ diners_club_carte_blanche ▪ diners_club_international ▪ discover ▪ jcb ▪ visa_electron ▪ visa ▪ mastercard ▪ maestro This is available only with the `CardNumber` iframe.

vindicia.dataLength(selector)	This method returns a positive integer that is a count of characters inside the input box in the iframe. selector cannot find the iframe, it returns zero.
	
	This is very useful when detecting if the card is an "amex" and in the CVV field four numbers were ent
	
	`if ( vindicia .cardType == "amex" && vindicia.dataLength('vin_PaymentMe`
	`{`
	`alert("American Express CVV must be 4 numbers");`
	`return false`
	`}`

vindicia.isValid(selector)	This method returns true or false if the input box in the iframe is valid. If no selector is specified, it ret if at least one iframe is not valid.
	
	`if (!vindicia.isValid('vin_PaymentMethod_creditCard_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');
}
}
},
```

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 create 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 cannot find the iframe, it returns zero.
	
	This the following is useful for detecting whether the number entered is an Amex card, and whether field:
	
	`if (vindicia.cardType == "amex" && vindicia.dataLength('vin_PaymentMet`
	`{`
	`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 va method checks all the iframe input boxes and returns true if all are valid, false if at least one is not
	
	`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 me iframe has not reported its data. Reporting is triggered by an `onblur` or `onchange` event. This a Mobile Safari bug (still extant as of this writing) in which blur events are not consistently being tri

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 fiel
vindicia.syncData()	This method sends a message to each iframe to simulate a blur event. This causes each iframe to the master iframe, and notify the parent window for validation purposes. This method is provided to bug (still extant as of this writing) in which blur events are not consistently being triggered. This me Mobile Safari devices, to ensure that blur events are triggered. See also: `noSafariMobileTim` `clearSyncFlags()`. You can also use this method on `vindicia.submit()` to ensure that changes in form fields a `setInterval(function() { vindicia.syncData(); },300);`
vindicia.clearData()	This method clears the data in the iframes input boxes and drop-down boxes. It also clears the `sy` `isComplete()` to `False`.
vindicia.resetCompleteStatus()	This method sets `isComplete()` to `False`, allowing the submit button to initiate another POS 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 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

```
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"`

"YYMM"

"YYYY/MM"

"YYYY-MM"

"YYYYMM"

"MM/YYYY"

"MM-YYYY"

"MMYYYY"

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 expirationDa
   selector: "#vin_PaymentMethod_creditCard_expirationDate_month",
  language: "fr", // en, es, de, pt, fr, zh, ja only allowed
   format: "N - A" // "N", "A", "N A", "N-A", "N - A" where (N=numeric 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 expirationDat
   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
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
$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
if (($return_code=="200") && ($websession->apiReturn->returnCode == "200"))
{
 // All is good to finalize
else
{
 // fetchByVid failed
 $error_message = $websession->apiReturn->returnCode . " " . $websession->apiReturn-
}
?
```

4. Finalize WebSession.

```
<?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
$show_receipt = true;
}
else
{
// finalize failed
$error_message = $websession_final->apiReturn->returnString;
}
}
else
{
// Tried to reuse an old WebSession?
$error_message = $response_final['returnString'];
}
?>
```

5. Show receipt data in the browser from WebSession.

```
<?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 your 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:*** *`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.*

```
<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.

```
<script>
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, MMYYYY
 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
},
styles: { // 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"
}
}
},
},
iframeHeightPadding: 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);
}
return true;
// this method is for your use to interact with the user when the user
   presses the Submit button and the payment method is not created.
},
onVindiciaFieldEvent: function(event) { // optional
if (event.detail.fieldType == 'cardNumber') {
setCardImage(event.detail.cardType);
// bright or dim the card logo.
   This function is just an example of what you can do with this event.
}
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);
 }
 }
});

// optional function shown being used above
function setCardImage(type)
{
 // use a sprite to display one credit card logo brightly with JQuery
 if (type == 'visa' || type == 'visa_electron') {
 $('#ccTypeImage').css('background-position', '0 -23px');
 }
 else if (type == 'mastercard' || type == 'maestro') {
 $('#ccTypeImage').css('background-position', '0 -46px');
 }
 else if (type == 'amex') {
 $('#ccTypeImage').css('background-position', '0 -69px');
 }
 else if (type == 'discover') {
 $('#ccTypeImage').css('background-position', '0 -92px');
 }
 else {
 $('#ccTypeImage').css('background-position', '0 0');
 }
}
</script>
```

vindicia.setup() options explained

This setup method takes one argument.

```
vindicia.setup(options);
```

Table 41.

Top level options

`formId:`	string	**Required**. This is the id of the form as shown below in this sample HTML:
		`<form id="mainform">`
		would look like this:
		`formId: mainform,`

`vindiciaAuthId:`	object	**Required**. This option is for your login. We use it for "Basic Authentication"
		`vindiciaAuthId: "aXdjbF9vbmVfdGltZV9sb2dpbjpBTG5JWnRj`
		`// Authorization: Basic header"`

`vindiciaServer:`	object	**Required**. This option specifies the location of vindicia REST server to create "api.vindicia.com" our production server. `vindiciaServer`
`vindiciaRestServer:`	object	**Required**. This option specifies the location of vindicia REST server to create "api.vindicia.com" our production server. `vindiciaServer`

`hostedFields:`	object	**Required**. This option has many subobjects, one for each input field that you
		need to be protected.
		`hostedFields:`
		`cardnumber: {`
		`selector: "#vin_credit_card_account", // required`
		`placeholder: "Enter Credit Card Number" // optional`
		`},`
		`expirationDate: {`
		`selector: "#vin_credit_card_expiration_date",`
		`// required`
		`placeholder: "Expiration Date MM/YY", // optional fi`
		`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,sar
"font-size": "14px"
}
}
},
```

Or if you want the month and year separated but still show as input boxes:

```
hostedFields: {
cardnumber: {
  selector: "#vin_credit_card_account",
  // required
  placeholder: "Enter Credit Card Number" // optional
  },
  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:

```
                                        hostedFields:
  cardnumber: {
```

```
 selector: "#vin_credit_card_account",
 // required
 placeholder: "Enter Credit Card Number" // optional
},
 expirationMonth: { // optional dropdown field or use
 selector: "#vin_credit_card_expiration_month",
format: "N - A" // "N", "A", "N A", "N-A", "N - A"
where (N=numeric month, A=Alphabetic Month)
 },
 expirationYear: {
 selector: "#vin_credit_card_expiration_year"format:
 // "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,san
 "font-size": "14px"
 }
 }},
```

Multi-language support for month and year dropdown boxes:

```
                                        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
 format: "N - A"
 // "N", "A", "N A", "N-A", "N - A"
 where (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 a
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,san
"font-size": "14px"
}
}
},
```

`iframeHeightPadding:`	Optional, integer	During vindicia.setup() the iframe height is adjusted to be the size of the inpu 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 butto function. `onSubmitEvent: function(myform) { return merchantValidate(myform); },`
`onSubmitCompleteEvent:`	Optional, function	Us this callback function when the REST server successfully creates a payme `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 th 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 `onSubmitEvent: function(myform) { return merchantValidate(myform); },`
`onVindiciaFieldEvent:`	Optional, function	To have access to real time validation of iframe blur events, use this optional `onVindiciaFieldEvent: function(event) { // optional if (event.detail.fieldType == 'expirationDate') { if (!event.detail.isValid) { console.log('vindiciaEvent expirationDate not vali } }`

The following properties are supported in hosted fields:

`cardNumber`	A required field. `cardNumber: { selector: "#vin_credit_card_account", placeholder: "Enter Credit Card Number" // optional fi`
`expirationDate`	A required field unless you use the optional fields below for separating the m 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'

```
expirationDate: {
selector: "#vin_credit_card_expiration_date",
placeholder: "Expiration Date MM/YY", // optional fi
format: "MM/YY" // defaults to MM/YY
},
```

`cvn`

```
cvn: {
selector: "#vin_credit_card_cvn",
placeholder: "Enter CVV" // optional field
 },
```

`expirationMonth`

Optional field to show a dropdown box for the month.

```
expirationMonth: {
selector: "#vin_credit_card_expiration_month",
language: "fr", // en, es, de, fr, ja, pt, zh only a
format: "N - A" // "N", "A", "N A", "N-A", "N - A" w
},
```

The `language` is optional and defaults to “en” English. All the month name
(English),es (Spanish), de (German), fr, (French),ja (Japanese), pt (Portugues

`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 a
format: "YYYY" // or "YYYY", defaults to YYYY
```

```
},
```

The `language` is optional and defaults to “en” English. All the month name
(English), es (Spanish), de (German), fr , (French), ja (Japanese), pt (Portugue

`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.

```
                                                expirationYear
selector: "#vin_credit_card_expiration_year",
placeholder: 'Year',
format: "YYYY" // "YY" or "YYYY", defaults to YYYY
},
```

Notes on some parameters

`autocomplete`

An `optional` parameter describing the following fields for `cardNumber`

```
cardNumber: {
selector: "#vin_credit_card_account",
autocomplete: "cc-number"},expirationDate: {
selector: "#vin_credit_card_expiration_date", // re
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-numbe`
store credit cards in your browser, this feature will assist the user when enter

`formatinput`	An optional parameter describing the following fields for cardNumber or expi
	
	`cardNumber: {`
	`selector: "#vin_credit_card_account",`
	`formatinput: true // optional field, force spacing`
	`},`
	`expirationDate: {`
	`selector: "#vin_credit_card_expiration_date", // requ`
	`format: "MM/YYYY", // optional, defaults to MM/YY`
	`formatinput: true // optional field, force slash in p`
	`},`
	
	This parameter can be either `true` or `false`. If you set it to true, the brows typed in. This makes for fewer mistakes and is easier to read.
	
	For `expirationDate`, above, a slash is automatically inserted when the

`maskinput`	An `optional` parameter describing the following fields for cardNumber or
	
	`cardNumber: {`
	`selector: "#vin_credit_card_account",`
	`maskinput: false // optional password like field`
	`},`
	`expirationDate: {`
	`selector: "#vin_credit_card_expiration_date", // requ`
	`maskinput: false // optional password like field`
	`},`
	
	This parameter can be `true` or `false`. Set it to true to have the browser sh

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');
}
}
```

```
if (event.detail.fieldType == 'cvn') {
if (!event.detail.isValid && event.detail.dataLength > 0)
{
alert('vindiciaFieldEvent cvn not valid');
}
}
}
```

`event.detail.fieldType`	`cardNumber, expirationDate, cvn.`
	
	`cardNumber: validation by luhn check, forces all numeric characters, returns a cardType if detectable.`
	
	`expirationDate: Defaults to mm/yy format for validation. But you may specify another format.`
	
	`cvn: Forces all numeric characters, is valid if character count is 3 or 4.`

`event.detail.cardType`	A string property that will hold the short name of the card type that was detected. Only on events with fieldType `cardNumber`. The following values are supported: ▪ amex ▪ dankort ▪ diners_club_carte_blanche ▪ diners_club_international ▪ discover ▪ jcb ▪ laser ▪ visa_electron ▪ visa ▪ mastercard ▪ maestro
`event.detail.isValid`	`A boolean value. True means the data is acceptable and can be submitted. False means that it 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. An blank field returns zero.`

Merchant FormValidation

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:

```
 hostedFields: {
 onSubmitEvent: function(event) {
 return merchantValidate();
 },
},
```

Your validation function should look like this:

```
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 th`
	
	`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 inpu zero.
	
	This is very useful when detecting if the card is an "amex" and in the CVV field four n
	
	`if (vindicia.c`
	`{`
	`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 select
	
	`if (!vindicia.i`
	`{`
	`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_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:*** *`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:

```
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 checkout page. Each iframe represents a single input field such as credit ca
vindicia.cardType	A string property that will hold the short name of the card type that was det 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 in
	
	The following is very useful when detecting if the card is an AMEX and if fo
	
	`if (vin`
	`{`
	`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 are valid and false if at least one is not valid.
	
	`if (!vi`
	`{`
	`alert('Please enter a valid credit card before subm`
	`}`

vindicia.isSynced()	This method will return true if all the iframes have reported their data to the least one iframe has not reported its data. The reporting happens normally 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 This method is also used on submit to ensure any changes in the form field
vindicia.syncData()	This method will send a message to each iframe to simulate a blur event. T parent window for validation purposes. This method was added to help wo `isSynced()` and `clearSyncFlags()`. This method is also used on submit to ensure all changes in the form fields `setInterval(function() { vindicia.syncData(); }`
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(
vindicia.isLoaded()	This method returns true if all the iframes have reported to the parent wind We use this when dealing with a Chrome bug that allows random focus and
vindicia.resetCompleteStatus()	This method will set `isComplete()` to false. This allows the submit bu This is useful in single page apps where you do not want to call `clearDa`
vindicia.submit()	This method will cause the form to begin its three phase submit directly to Not required for normal operation.
`vindicia.isComplete()`	This method will return true if the form has already been submitted to Vindi Not required for normal operation.

`vindicia.onSubmitComplete(event)`	This method will indicate that you would like to use AJAX to submit the fiel
	Optional.
	onSubmit
	`$('#message').html('submitted OK, vid ' + event.det`
	`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
- MMYYYY

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.
vindicia.getForm()	Programmer Ok	Return string value of the name of the form from parent window that this object has taken over the submit event on.
vindicia.isComplete(tagId)	Programmer Ok	Return boolean value of last reported state of tagId iframe submission. If tagId is not provided it returns true if all iframes have completed submission of their forms, false otherwise. Not typically needed by merchant Javascript programmer.
vindicia.submit()	Internal use only	Begin the three phase submit of the form back to Vindicia. All iframes send data to the master iframe one last time. If not all iframe data is currently valid then just return false.

vindicia.submit2()	Internal use only	If all iframe data is valid, send master iframe the rest of the form fields from parent window and master iframe will perform a POST back to Vindicia with entire set of data.

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.

```
                            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.

```
                            var newOTL = getNewOTL();
$('#vin_session_id').value = newOTL.unsignedValue;
$('#vin_session_hash').value = newOTL.signedValue;
vindicia.clearData();
```

> ***Note:*** *`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.** `<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:

```
session_id#POST#/payment_methods
#! /usr/bin/perl
use Digest::SHA qw(hmac_sha256_hex hmac_sha512_hex);

my $otl_hmac_key = 'Zb7xZDtJ4OEHNZ9-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\n";
print "session_hash: $session_hash\n";
Results of the above Perl program run would be:

session_id: CC4930533
session_hash: 511e8c48bc8b1caa9def400fc11975391440e0c72fc9c630edafb8d46691aec5

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.

```
<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="4812242031705a2413c6363067298bb3023b474084d1161
```

4. Create some input fields not requiring protection.

```
<input type="text" id="vin_account_holder" name="vin_account_holder" placeholder="Ent
<input type="text" id="vin_billing_address_line1" name="vin_billing_address_line1" pl
<input type="text" id="vin_billing_address_line2" name="vin_billing_address_line2" pl
<input type="text" id="vin_billing_address_line3" name="vin_billing_address_line3" pl
<input type="text" id="vin_billing_address_city" name="vin_billing_address_city" plac
<input type="text" id="vin_billing_address_district" name="vin_billing_address_distri
<input type="text" id="vin_billing_address_postal_code" name="vin_billing_address_pos
<input type="text" id="vin_billing_address_country" name="vin_billing_address_country
<input type="text" id="vin_billing_address_phone" name="vin_billing_address_phone" pl
```

5. Create some input fields requiring protection as div tags.

```
<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.

```
<script type="text/javascript">
 vindicia.setup(options);
</script>
```

Using Javascript for HMAC hash

See https://github.com/brix/crypto-js for more information.

```
                              <script>
 var otl_hmac_key = "A39485F85039D394059B948390";
 var vin_session_id = "CC403930495";
 var vin_session_hash = CryptoJS.HmacSHA512(vin_session_id + "#POST#/payment_methods", otl_hmac_k
</script>
```

vindiciaAuthId: 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: "cWEtZ1RsLTIwMTgtcTJfc19hcDpaR2FqNUl0azAwWHM2dVBJTEVoSGRqYVMzMHJjYWtLdQ==", // A
```

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

Name in form	Type	Notes
vin_session_id	input	Required and must be unique on each successful submit.
vin_session_hash	hidden	Required and must be unique on each successful submit. HMAC256 or HMAC512.
vin_customer_specified_type	hidden	Optional
vin_primary	hidden	Optional: true or false.
vin_active	hidden	`Optional: true or false.`
vin_billing_address_line1	input	
vin_billing_address_line2	input	
vin_billing_address_line3	input	
vin_billing_address_city	input	
vin_billing_address_district	input	Also known as state in the US.
vin_billing_address_postal_code	input	
vin_billing_address_country	input	
vin_billing_address_phone	input	
vin_credit_card_account	div	Required. The credit card number.
vin_credit_card_expiration_date	div	Not needed if month and year specified.
vin_credit_card_expiration_month	div	Not needed if date specified. Dropdown and input boxes are supported.
vin_credit_card_expiration_year	div	Not needed if date specified. Dropdown and input boxes are supported.
vin_credit_card_cvn	div	

Notes on onSubmitCompleteFailedEvent

The callback function `onSubmitCompleteFailedEvent` is called when the Submit button does not return 200 (success) from the REST server.

```
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.

Get more information and detailed instructions at: https://github.com/Vindicia/vindicia-pmt-react.

15 Setting up Push Notifications

Push Notifications—also referred to as `callbacks`, `webhooks` or `event-driven messaging`—allow your system to receive and act upon Subscribe events as they occur, without the need to pull data using the Subscribe 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. Subscribe 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 Subscribe (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 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 Subscribe 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 Subscribe 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://beeceptor.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 can not, 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 Subscribe, 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, Subscribe 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, Subscribe 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 Subscribe 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 Subscribe 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 Subscribe to notify a client provisioning system that automatically starts and stops customer subscriptions.

The Entitlement Class currently includes the following events.

Table 42.

Entitlement Events

Event	Trigger
Entitlement Started (`start`)	An individual Entitlement started service. Message content: **entitlement**
Entitlement Stopped (`stop`)	An individual Entitlement ended service. Message content: **entitlement**

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 Subscribe 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 43.

Transaction Events

Event	Trigger
Transaction Succeeded (attempt succeeded)	One-time or Recurring Transaction captured. Message Content: **transaction**
Transaction Failed (attempt failed)	One-time or Recurring Transaction failed (canceled). Message Content: **transaction**
Renewal Transaction Succeeded (renewal succeeded)	Recurring renewal Transaction captured (active subscription billed beyond initial transaction). Message Content: **transaction**
Final Transaction Failed (final attempt failed)	The ultimate Transaction attempting to collect for a given invoice/billing has failed (canceled). Message Content: **transaction**
Capture Reversed	Transaction Status changed from Captured to Canceled, or to any status other than Refunded. Message Content: Standard Push message header plus full Transaction object, including the new `statusLog` entry.

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 44.

Subscription Events

Event	Trigger
Subscription Started (start)	Service Start—Subscription Start Date reached. Message Content: subscription (autobill)
Subscription Stopped (stop)	Service End—Subscription End Date reached. Message Content: subscription (autobill)
Subscription Canceled (cancel)	Cancel submitted—Subscription may cancel immediately or be pending cancellation; the push event is the request. Message Content: subscription (autobill)
Subscription Modified (modify)	Successful modification of a Subscription. Message Content: subscription (autobill)
Subscription Created (create)	Successful creation of a new subscription (AutoBill. This event triggers regardless of the specified Start Date of the AutoBill. Message Content: subscription (autobill)

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 Subscribe 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 45.

Account Events

Event	Trigger
Account Created (create)	Initial creation of an Account. Message Content: account
Account Shipping Address Changed (shipping address change)	Any change to the assigned Shipping Address. Message Content: account, old address
Account Data Changed	An Object-level data change to any of the following top Account-level data members: ▪ `merchantAccountId` ▪ `parentMerchantAccountId` ▪ `defaultCurrency` ▪ `emailAddress` ▪ `emailTypePreference` ▪ `preferredLanguage` ▪ `warnBeforeAutobilling` ▪ `company` ▪ `taxTypename` for a given Account. Message Content: account

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 Subscribe 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 46.

Payment Method Events

Event	Trigger
Account Updater Change (account updater change)	A payment method is updated due to Account Updater (AU) response. Message Content: payment_method
Payment Method Activated (activated)	Any payment method gets stored on an Account in Active status or a previously inactive payment method is moved to Active status. Message Content: payment_method
Payment Method Deactivated (deactivated)	Any payment method gets removed from an Account or a previously active payment method is moved to Inactive status. Message Content: payment_method
Billing Address Changed (address change)	Any change to the assigned Billing Address. Message Content: payment_method, old address

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 47.

Adjustments Events

Event	Trigger
Refund Requested	Initial request/issue of a refund (against a Transaction). Message Content: refund

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 48.

Invoice Events

Event	Trigger
Invoice Payment (payment received)	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`.
Status Changed	A change in invoice status (including when the invoice is created). Message Content: invoice

16 Common ChargeGuard Programming Tasks

> ***Note:*** *This method is being deprecated, is no longer supported, and will be removed in a forthcoming release.*

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.

16.1 Integrating Data into ChargeGuard

To analyze and processes 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 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 Subscribe 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 Subscribe Chargeback Spreadsheet to determine a course of action, then manually update customer Account status.
- Use the Subscribe API to automatically manipulate your customer `Account` objects, based on the Subscribe 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 Subscribe Data to Alter Account Status

With this option, manually turn off accounts in your transaction systems based on the data in the Subscribe Chargeback Spreadsheet, which is a daily extract that shows all changes to your chargebacks.

To download the spreadsheet:

1. Log into the Subscribe Portal at www.vindicia.com.
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 Subscribe 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 Subscribe API to Update Account Status.

Use the Subscribe API to automatically extract and map the Chargeback Spreadsheet data into your Subscribe system.

1. Automatically download the Subscribe Chargeback Spreadsheet by creating a script that simulates an HTTP POST operation to pull the spreadsheet from ChargeGuard with the Subscribe API.

   Vindicia recommends `cURL` for this process.
2. Extract and map the data in the spreadsheet using a Subscribe 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 Subscribe, 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 Subscribe 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 Subscribe 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).
3.

To migrate historic data to Subscribe, please see Importing AutoBills from other Billing Systems to Subscribe, or Transaction.migrate in the ***Subscribe 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 ***Subscribe 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:

```
$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 Subscribe 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 and the `scoreCodes` call, see The Transaction Object in the ***Subscribe 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:

```
$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 The Activity Object in the ***Subscribe API Guide*** .

Reporting Refund Information

If you process transactions and refunds through Subscribe, you need not report refunds separately to Vindicia. (Note that use of the forward slash character (/) in merchant identifiers is not allowed. See Merchant Identifiers for more information.)

Report refunds to Vindicia for transactions processed outside Subscribe:

```
$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 Subscribe 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 The Refund Object in the ***Subscribe 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:

```
$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 The Chargeback Object in the ***Subscribe 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.

17 Working with Name-Value Pairs

For some objects, such as the PaymentMethod and Transaction objects, Subscribe 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.

Subscribe also provides predefined name-value pairs for use within Subscribe. For these pairs, Subscribe 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 Subscribe 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 Merchant Identifiers for more information.) The value you pass must match a value that has been configured in your merchant configuration in Subscribe. 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.

18 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 Subscribe 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

18.1 Billing Statement Identifier

Customize a Billing Statement Identifier in Subscribe using either of the following:

- Billing Statement ID on a Billing Plan for an AutoBill in the Subscribe UI
- `billingStatementIdentifier` attribute in the SOAP API

For credit card-based recurring billing, set the attribute for the `BillingPlan`, `Product`, or `AutoBill` object. Subscribe 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.*

18.2 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 Subscribe 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 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 Billing Description.*

Do not pass the Merchant Name in the Billing Statement Identifier. Pass only the MCC.

18.3 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 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 Subscribe 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 Subscribe UI, enter the Description and override phone number in the **Billing Statement ID** field of the Billing Plan.

With the Subscribe 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, Subscribe 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, Subscribe will automatically use the default number for your Merchant ID for any override numbers exceeding 13 digits.

18.4 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. (Subscribe 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:*** *Chase Paymentech 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 Subscribe were `VIN* Subscribe Software` the identifier would appear on the credit-card holder's statement as

```
VIN* Subscribe Software 650-264-4700.
```

19 Handling “Tax Service Not Available” Scenarios

Subscribe provides three options for how it handles Transactions when your tax vendor is off line 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 pretax 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 Subscribe 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.