Quick start

Implementation guide

Document version 1.5

Contents

1. HISTORY OF THE DOCUMENT

Version	Author	Date	Comment
1.5	Lyra Network	1/23/2019	• Update of the chapter **Identifying yourself during data exchange** • Replacing "Certificate" with "Key" in all menus
1.4	Lyra Network	9/4/2018	• Update of the chapter **Computing the signature**.
1.3	Lyra Network	6/26/2018	• Update of the chapter **Computing the signature**. • New value of the *vads_trans_status* field: **SUSPENDED** • Update of the chapter **Send a payment form via POST**
1.2	Lyra Network	5/23/2018	Ability to choose the signature computation algorithm (SHA-1 or SHA-256)
1.1	Lyra Network	11/14/2017	• Examples updated • Addition of sample code in Java and PHP about how to calculate the signature.
1.0	Lyra Network	3/25/2015	Initial version

2. GETTING IN TOUCH WITH TECHNICAL SUPPORT

Looking for help? Check our FAQ on our website

https://payzen.io/fr-FR/faq/sitemap.html

For technical inquiries or support, you can reach us from Monday to Friday, between 9am and 6pm

by phone at:	0811708709 Service fee 0.06 € / mi + call charge
by e-mail :	*support@payzen.eu*
via your Merchant Back Office:	(Menu: **Help** > **Contact support**

To facilitate the processing of your demands, you will be asked to communicate your shop ID (an 8-digit number) .

This information is available in the "registration of your shop" e-mail or in the Merchant Back Office (**Settings** > **Shop** > **Configuration**).

3. ESTABLISHING INTERACTION WITH THE PAYMENT GATEWAY

The merchant website and the payment gateway interact by exchanging data.

To create a payment, this data is sent in an HTML form via the buyer's browser.

At the end of the payment, the result can be transmitted to the merchant website in two ways

- by the browser when the buyer clicks the button to return to the merchant website.
- automatically by means of a notification called Instant Notification URL (also called IPN), see chapter **Setting up the end of payment notification**.

To guarantee the security of the exchange, the data is signed with a key only known to the merchant and the payment gateway.

3.1. Setting up the payment page URL

The merchant website interacts with the payment gateway by redirecting the buyer to the following URL:

https://secure.payzen.eu/vads-payment/

3.2. Identifying yourself when exchanging with the payment gateway

To be able to interact with the payment gateway, the merchant needs to have:

- **The shop ID** : allows to identify the merchant website during the exchange. Its value is transmitted in the **vads_site_id** field.
- **The key:** allows to compute the alphanumeric signature transmitted in the **signature** field.

To retrieve these values:

1. Sign in to the Merchant Back Office: *https://secure.payzen.eu/vads-merchant/*
2. Enter your login.

   Your login was sent to you in an e-mail entitled **Connection information - [name of your shop]**.
3. Enter your password.

   Your password was sent to you in an e-mail entitled **Connection information - [name of your shop]**.
4. Click **Validate**.

   After 3 password entry errors, the user account is locked. In this case, click **Forgotten password or locked account** to reset the password.
5. Go to **Settings > Shop**.
6. Select the **Keys** tab.

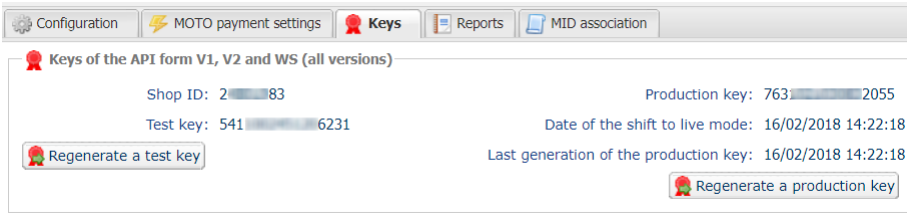


Figure 1: Keys tab

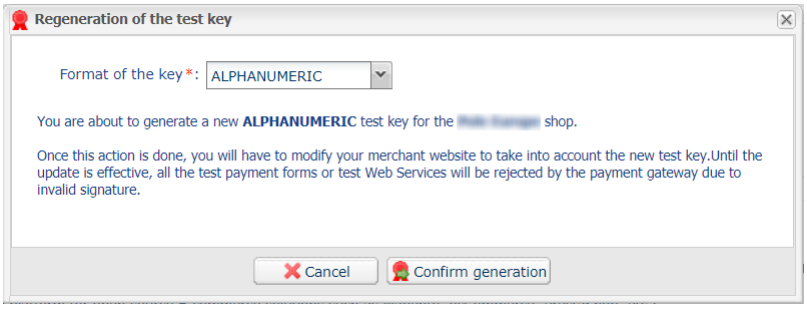
Two types of keys are available:

- The **test key** that allows to generate the form signature in test mode.
- The **production key** that allows to generate the form signature in production mode.

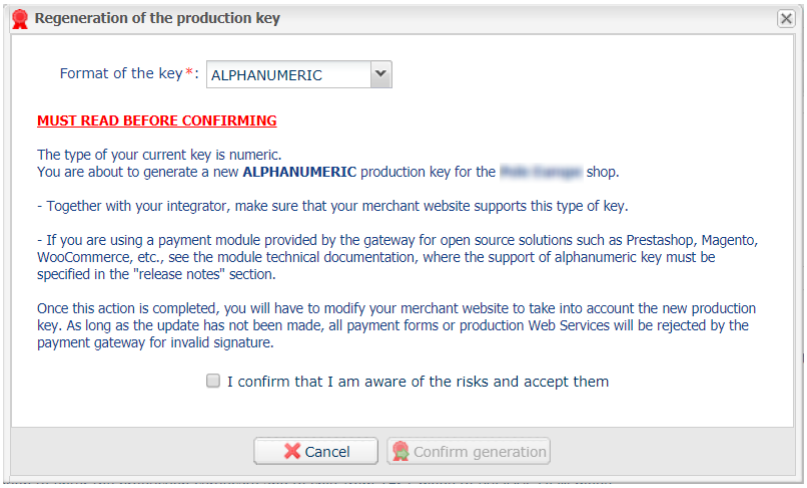
These keys can be numeric or alphanumeric.

For maximum security, it is recommended to use an alphanumeric key.

To change the format of your test key, click the **Regenerate a test key** button and select the format ("ALPHANUMERIC" or "NUMERIC").



To change the format of your production key, click the **Regenerate a production key** button and select the format ("ALPHANUMERIC" or "NUMERIC").



3.3. Managing the interaction with the merchant website

Two types of URL are used to manage dialog with the merchant website:

- **Instant Payment Notification**, also called the IPN,
- **Return URL** to the merchant website.

Instant Payment Notification - IPN

The payment gateway automatically informs the merchant website about the payment result. The data is sent via **POST**.

The gateway is able to contact the websites, regardless of the protocol (http or https) that was used.

Notifications are sent from an IP address in the **194.50.38.0/24** range in Test and Production mode.

To process these notifications, the merchant must **create a page** on its website that:

- analyze the data received via **POST**,
- verifies the integrity of the received information by computing the signature,
- makes sure that the notification is not a duplicate notification (e.g. notification returned via the Merchant Back Office),
- triggers an update of their database (order status, stock, etc.),
- sends e-mails to the buyer (invoice, order tracking, etc.).

The processing time has a direct influence on the time taken to display the payment summary page. The longer the processing takes, the later the summary will be shown.

To receive notifications, the merchant must **set up** the notification rules in his Merchant Back Office (see chapter **Setting up notifications**).

In case of an issue during interaction with the merchant website, the payment gateway sends an e-mail to the shop administrator stating the reason of the error (HTTP error, etc.) and the instructions for returning the notification from the Merchant Back Office.

Return URL to the merchant website

The merchant can configure the "default" return URLs in the Merchant Back Office via the menu **Settings** > **Shop** > **Configuration** tab:

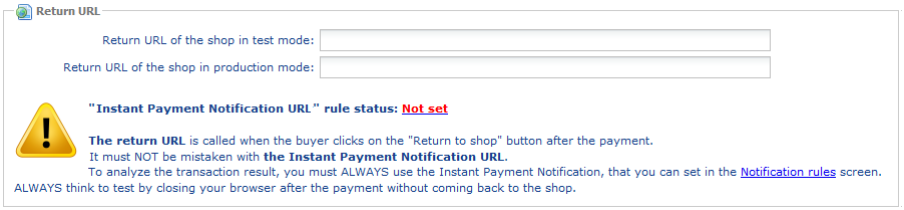


Figure 2: Setting up return URLs

The merchant can set up a different return URL for each mode.

By default, the buyer is redirected to the URL regardless of the payment outcome.

If no URL has been set up, the main URL of the shop will be used for redirection (**URL** parameter defined in the **Details** section of the shop).

The merchant will be able to override this setting in his/her payment form (see chapter **Setting up return URLs**).

Note:

The status of the rule "Instant payment notification at the end of payment" (IPN) is displayed in this view.
If the URL has not been set up, make sure to specify it (see chapter **Setting up notifications**).

3.4. Managing security

There are several ways to guarantee the security of online payments.

Ensuring interaction integrity

The integrity of exchanged information is preserved by the exchange of alphanumeric signatures between the payment platform and the merchant website.

The payment gateway and the merchant website interact via HTML forms.

A form contains a list of specific fields (see chapter **Generating a payment form**) used for generating a chain.

This chain is then converted to a smaller chain using a hash function (SHA-1, HMAC-SHA-256).

*The merchant will be able to choose the hash algorithm in their Merchant Back Office (see chapter **Choosing the hash algorithm**).*

The resulting chain is referred to as the **digest** (*empreinte* in French) of the initial chain.

The digest must be transmitted in the **signature** field (see chapter **Computing the signature**).

Modeling security mechanisms:

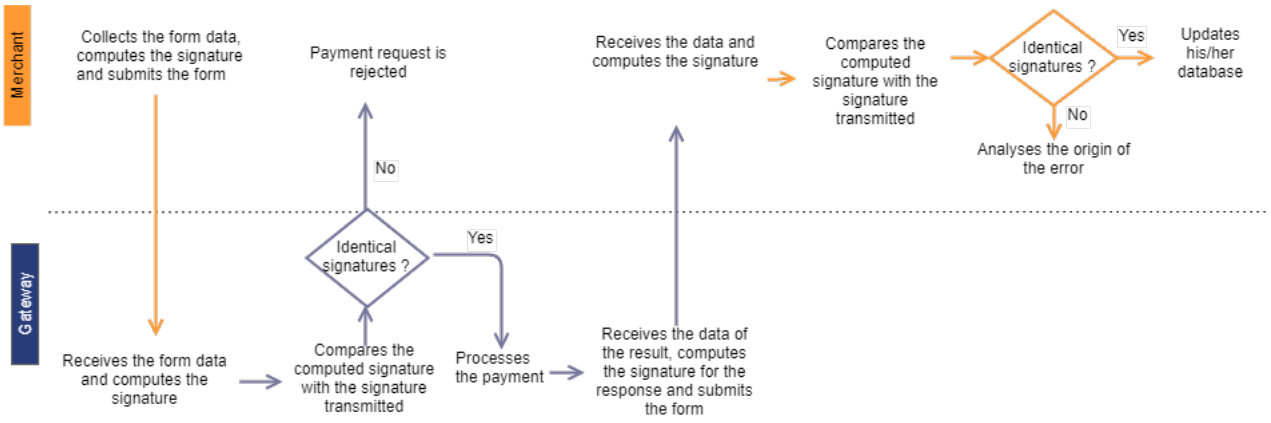


Figure 3: Diagram of a security mechanism

1. The merchant website builds the form data and computes the signature
2. The merchant website submits the form to the gateway
3. The gateway receives the form data and computes the signature
4. The gateway compares the computed signature with the signature that was transmitted by the merchant website
5. If the signatures are different, the payment request is rejected

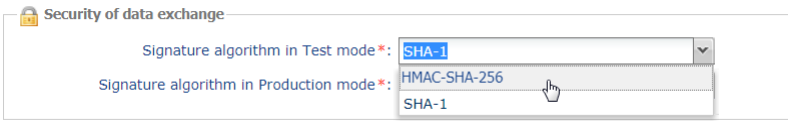
   If not, the gateway proceeds to payment
6. The gateway builds the result data and computes the response signature
7. Depending on the shop configuration (see chapter **Setting up notifications**), the payment gateway submits the payment result to the merchant website
8. The merchant website receives the data and computes the signature It compares the computed signature with the signature that was transmitted by the payment gateway

9. If the signatures are different, the merchant analyses the source of the error (computation error, attempted fraud, etc.)

   If not, the merchant proceeds to update their database (stock status, order status, etc.)

Selecting the hash algorithm

From the Merchant Back Office (**Settings** > **Shop** > **Configuration** menu) the merchant has the possibility to choose the hash function he/she wants to use to generate signatures algorithms.



HMAC-SHA-256 signature algorithm is applied by default.

Important

You can select a different signature algorithm for TEST mode and for PRODUCTION mode.

However, be sure to use the same method to generate your payment forms and to analyze the data transmitted by the gateway during notifications.

In order to facilitate changing the algorithm, the SHA-1 or HMAC-SHA-256 signatures will be accepted without generating rejections due to signature error for 24h.

Storing the production key

For security reasons, the production key will be masked after the first real payment made with a real card.

It is strongly recommended to store the key in a safe place (encrypted file, database etc.).

In case of losing the key, the merchant will be able to regenerate a new one via their Merchant Back Office.

Remember that the production key can be viewed in the Merchant Back Office via **Settings** > **Shop** > **Keys** tab.

Managing sensitive data

Online payment transactions are regulated by strict rules (PCI-DSS certification).

As a merchant, you have to make sure to never openly transcribe data that could resemble a credit card number. Your form will be rejected (code 999 - Sensitive data detected).

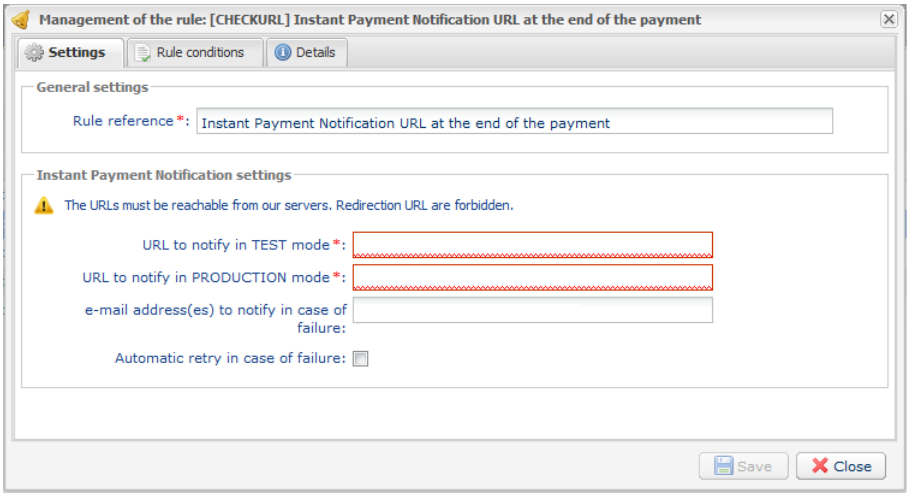
Special attention should be paid to order numbers containing between 13 and 16 numeric characters and beginning with 3, 4 or 5.

3.5. Setting up the Instant Payment Notification

This notification is required to communicate the result of a payment request.

To set up this notification:

1. Right-click **Instant Payment Notification URL at the end of payment**.
2. Select **Enable the rule**.
3. Right-click again **Instant Payment Notification URL at the end of payment**.
4. Select **Manage the rule**.
5. Enter the URL of your page in the fields **URL to call in TEST mode** and **URL to call in PRODUCTION mode.**



6. Enter the **E-mail address(es) to notify in case of failure**.
7. To specify several e-mail addresses, separate them with a semi-colon.
8. Set up the parameters for **Automatic retry in case of failure**.

   This option allows to automatically send notifications to the merchant website in case of failure (up to 4 times).

   For more information, see chapter **Activating the automatic retry**
9. Save the modifications.

If the payment gateway is unable to access the URL of your page, an e-mail will be sent to the shop administrator.

It contains:

- The HTTP code of the encountered error
- Parts of error analysis
- Its consequences
- Instructions to resend from the Merchant Back Office the notification to the URL already specified above.

Other cases of notification

Depending on the subscribed commercial options, the payment gateway will make a call to the notification URL in the following cases :

- abort or cancellation by the buyer on the payment page
- refund from the Merchant Back Office
- cancellation of a transaction from the Merchant Back Office
- validation of a transaction from the Merchant Back Office
- modification of a transaction from the Merchant Back Office

4. SEND AN HTML PAYMENT FORM VIA POST

The merchant website redirects the buyer to the payment gateway using a POST form from HTML to HTTPS.

This form contains :

The following technical elements:

- The `<form>` and `</form>` tags that allow to create an HTML form.
- The `method="POST"` attribute that defines the method used for sending data.
- The `action="https://secure.payzen.eu/vads-payment/"` attribute that defines where to send the form data.

Form data:

All the data in the form must be encoded in **UTF-8.**

Special characters (accents, punctuation marks, etc.) will then be correctly interpreted by the payment gateway. Otherwise, the signature will not be computed correctly and the form will be rejected.

Please, consult the table below that indicates required formats.

Notation	Description
a	Alphabetic characters (from ‘A’ to ‘Z’ and from ‘a’ to ‘z’)
n	Numeric characters
s	Special characters
an	Alphanumeric characters
ans	Alphanumeric and special characters (except "<" and ">")
3	Length fixed to 3 characters
..12	Variable length up to 12 characters
json	JavaScript Object Notation. Object that containing key / value pairs separated by commas. It starts with a left brace " `{` and ends with a right brace " `}`". Each key / value pair contains the name of the key between double-quotes followed by " `:` ", followed by a value. The name of the key must be alphanumeric. The value can be: • a chain of characters (in this case it must be framed by double-quotes) • a number • an object • a table • a boolean • empty Example: `{"name1":45,"name2":"value2", "name3"=false}`
enum	Characterizes a field with a complete list of values. The list of possible values is given in the field definition.
Enum list	List of values separated by a " `;` ". The list of possible values is given in the field definition. Example: `vads_payment_cards=VISA;MASTERCARD`
map	List of key / value pair separated by a " `;` ". Each key / value pair contains the name of the key followed by " `=` ", followed by a value. The value can be: • a chain of characters • a boolean • a json object

Notation	Description
	• an xml object The list of possible values for each key / value pair is given in the field definition. Example: `vads_theme_config=SIMPLIFIED_DISPLAY=true;RESPONSIVE_MODEL=Model_1`

- Mandatory fields :

Field name	Description	Format	Value
signature	Signature guaranteeing the integrity of the requests exchanged between the merchant website and the payment gateway.	ans	E.g.: **ycA5Do5tNvsnKdc/ eP1bj2xa19z9q3iWPy9/rpesfS0=**
vads_action_mode	Card data acquisition mode	enum	**INTERACTIVE**
vads_amount	Payment amount in the smallest currency unit (cents for euro).	n..12	E.g.: 3000 for 30,00 EUR
vads_ctx_mode	Defines the mode of interaction with the payment gateway.	enum	**TEST** or **PRODUCTION**
vads_currency	Numeric currency code to be used for the payment, in compliance with the ISO 4217 standard (numeric code).	n3	E.g.: 978 for euro (EUR)
vads_page_action	Action to perform	enum	**PAYMENT**
vads_payment_config	Payment type	enum	**SINGLE** for an immediate payment **MULTI** for an installment payment
vads_site_id	Shop ID	n8	E.g.: 12345678
vads_trans_date	Date and time of the payment form in UTC format	n14	E.g.: 20170701130025
vads_trans_id	Transaction number	n6	E.g.: 123456
vads_version	Version of the exchange protocol with the payment gateway	enum	**V2**

Table 1: List of mandatories fields

- Recommended fields:
  - Order details

Field name	Description	Format	Value
vads_order_id	Order ID	ans..64	E.g.: 2-XQ001
vads_order_info	Additional order info	an..255	E.g.: Door phone code 3125
vads_order_info2	Additional order info	an..255	E.g.: No elevator
vads_order_info3	Additional order info	an..255	E.g.: Express
vads_nb_products	Number of items in the cart	n..12	E.g.: 2
vads_product_ext_idN	Product barcode in the merchant's website. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	an..100	E.g.: vads_product_ext_id0 = "0123654789123654789" vads_product_ext_id1 = "0223654789123654789" vads_product_ext_id2 = "0323654789123654789"
vads_product_labelN	Item name. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	an..255	E.g.: vads_product_label0 = "tee-shirt" vads_product_label1 = "Biscuit" vads_product_label2 = "sandwich"
vads_product_amountN	Item amount. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	n..12	E.g.: vads_product_amount0 = "1200" vads_product_amount1 = "800" vads_product_amount2 = "950"
vads_product_typeN	Item type. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	enum	E.g.: vads_product_type0 = "CLOTHING_AND_ACCESSORIES"

Field name	Description	Format	Value
			vads_product_type1 = "FOOD_AND_GROCERY" vads_product_type2 = "FOOD_AND_GROCERY"
vads_product_refN	Item reference. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	an..64	E.g.: vads_product_ref0 = "CAA-25-006" vads_product_ref1 = "FAG-B5-112" vads_product_ref2 = "FAG-S9-650"
vads_product_qtyN	Quantity of items. N corresponds to the index of the item (0 for the first one, 1 for the second one, etc.).	n..12	E.g.: vads_product_qty0 = "1" vads_product_qty1 = "2" vads_product_qty2 = "2"

Table 2: Field list - Order details

- Buyer details

Field name	Description
vads_cust_email	Buyer's e-mail address.
vads_cust_id	Buyer reference on the merchant website.
vads_cust_title	Buyer's title.
vads_cust_status	Status (**PRIVATE**: for private clients / **COMPANY** for companies)
vads_cust_first_name	First name.
vads_cust_last_name	Last name
vads_cust_legal_name	Buyer's legal name.
vads_cust_cell_phone	Cell phone number
vads_cust_phone	Phone number.
vads_cust_address_number	Street number.
vads_cust_address	Postal address.
vads_cust_district	District.
vads_cust_zip	Zip code.
vads_cust_city	City.
vads_cust_state	State / Region.
vads_cust_country	Country code according to the ISO 3166 standard.

Table 3: Parameter list - Buyer details

- Shipping details

Field name	Description	Format	Value
vads_ship_to_city	City	an..128	E.g.: Bordeaux
vads_ship_to_country	Country code in compliance with the ISO 3166 standard.	a2	E.g.: FR
vads_ship_to_district	District	ans..127	E.g.: La Bastide
vads_ship_to_first_name	First name	ans..63	E.g.: Albert
vads_ship_to_last_name	Name	ans..63	E.g.: Durant
vads_ship_to_legal_name	Legal name	an..100	E.g.: D. & Cie
vads_ship_to_phone_num	Phone number	ans..32	E.g.: 0460030288
vads_ship_to_state	State / Region	ans..127	E.g.: Nouvelle aquitaine
vads_ship_to_status	Allows to specify the type of the shipping address.	enum	**PRIVATE**: for shipping to a private individual **COMPANY**: for shipping to a company
vads_ship_to_street_number	Street number	ans..64	E.g.: 2
vads_ship_to_street	Postal address	ans..255	E.g.: Rue Sainte Catherine
vads_ship_to_street2	Second line of the address	ans..255	
vads_ship_to_zip	Zip code	an..64	E.g.: 33000

Table 4: Field list - Shipping details

- Optional fields :

The **Payer** button that will allow to send data:

```
<input type="submit" name="pay" value="Pay"/>
```


5. COMPUTING THE SIGNATURE

To be able to compute the signature, you must have:

- all the fields that start with **vads_**
- the signature algorithm chosen in the shop configuration
- the **key**

The value of the key is available in your Merchant Back Office via **Settings** > **Shop** > **Keys** tab.

The signature algorithm is defined in your Merchant Back Office via **Settings** > **Shop** > **Configuration** tab.

For maximum security, it is recommended to use HMAC-SHA-256 algorithm and an alphanumeric key.

To compute the signature:

1. Sort the fields that start with **vads_** alphabetically.
2. Make sure that all the fields are encoded in UTF-8.
3. Concatenate the values of these fields separating them with the "**+**" character.
4. Concatenate the result with the test or production key separating them with a "**+**".
5. According to the signature algorithm defined in your shop configuration:
   a. if your shop is configured to use "SHA-1", apply the **SHA-1** hash function on the chain obtained during the previous step.
   b. if your shop is configured to use "HMAC-SHA-256", compute and encode in Base64 format the message signature using the **HMAC-SHA-256** algorithm with the following parameters:
      - the SHA-256 hash function,
      - the test or production key (depending on the value of the **vads_ctx_mode** field) as a shared key,
      - the result of the previous step as the message to authenticate.
6. Save the result of the previous step in the **signature** field.

Example of parameters sent to the payment gateway:

```
<form method="POST" action="https://secure.payzen.eu/vads-payment/">
<input type="hidden" name="vads_action_mode" value="INTERACTIVE" />
<input type="hidden" name="vads_amount" value="5124" />
<input type="hidden" name="vads_ctx_mode" value="TEST" />
<input type="hidden" name="vads_currency" value="978" />
<input type="hidden" name="vads_page_action" value="PAYMENT" />
<input type="hidden" name="vads_payment_config" value="SINGLE" />
<input type="hidden" name="vads_site_id" value="12345678" />
<input type="hidden" name="vads_trans_date" value="20170129130025" />
<input type="hidden" name="vads_trans_id" value="123456" />
<input type="hidden" name="vads_version" value="V2" />
<input type="hidden" name="signature" value="ycA5Do5tNvsnKdc/eP1bj2xa19z9q3iWPy9/rpesfS0= " />

<input type="submit" name="pay" value="Pay"/>
</form>
```

This sample form is analyzed as follows:

1. The fields which names start with **vads_** are sorted **alphabetically**:
   - vads_action_mode
   - vads_amount
   - vads_ctx_mode
   - vads_currency
   - vads_page_action
   - vads_payment_config
   - vads_site_id
   - vads_trans_date
   - vads_trans_id
   - vads_version
2. The values of these fields are concatenated using the "**+**" character:

   ```
   INTERACTIVE+5124+TEST+978+PAYMENT+SINGLE+12345678+20170129130025+123456+V2
   ```

3. The value of the test key is added at the end of the chain and separated with the "**+**" character. In this example, the test key is **1122334455667788**

   ```
   INTERACTIVE+5124+TEST+978+PAYMENT+SINGLE+12345678+20170129130025+123456+V2+1122334455667788
   ```

4. If you use the SHA-1 algorithm, apply it to the obtained chain.

   The result that must be transmitted in the signature field is: **59c96b34c74b9375c332b0b6a32e6deeec87de2b**

5. If your shop is configured to use "HMAC-SHA-256", compute and encode in Base64 format the message signature using the **HMAC-SHA-256** algorithm with the following parameters:
   - the SHA-256 hash function,
   - the test or production key (depending on the value of the **vads_ctx_mode** field) as a shared key,
   - the result of the previous step as the message to authenticate.

   The result that must be transmitted in the signature field is:

   ycA5Do5tNvsnKdc/eP1bj2xa19z9q3iWPy9/rpesfS0=

5.1. Example of implementation with JAVA

Definition of the utility class SHA that will include the elements required to process the HMAC-SHA-256 algorithm

```
import javax.crypto.Mac;
import javax.crypto.spec.SecretKeySpec;
import java.io.UnsupportedEncodingException;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.util.Base64;
import java.util.TreeMap;

public class VadsSignatureExample {
 /**
  * Build signature (HMAC SHA-256 version) from provided parameters and secret key.
  * Parameters are provided as a TreeMap (with sorted keys).
  */
 public static String buildSignature(TreeMap<String, String> formParameters, String
  secretKey) throws NoSuchAlgorithmException, InvalidKeyException, UnsupportedEncodingException
 {
   // Build message from parameters
   String message = String.join("+", formParameters.values());
   message += "+" + secretKey;
   // Sign
   return hmacSha256Base64(message, secretKey);
  }
    /**
    * Actual signing operation.
    */
 public static String hmacSha256Base64(String message, String secretKey) throws
  NoSuchAlgorithmException, InvalidKeyException, UnsupportedEncodingException {
   // Prepare hmac sha256 cipher algorithm with provided secretKey
   Mac hmacSha256;
   try {
    hmacSha256 = Mac.getInstance("HmacSHA256");
   } catch (NoSuchAlgorithmException nsae) {
    hmacSha256 = Mac.getInstance("HMAC-SHA-256");
   }
   SecretKeySpec secretKeySpec = new SecretKeySpec(secretKey.getBytes("UTF-8"), "HmacSHA256");
   hmacSha256.init(secretKeySpec);
   // Build and return signature
   return Base64.getEncoder().encodeToString(hmacSha256.doFinal(message.getBytes("UTF-8")));
  }
}
```

Definition of the utility class SHA that will include the elements required to process the SHA-1 algorithm

```
import java.security.MessageDigest;
import java.security.SecureRandom;

public class Sha {
    static public final String SEPARATOR = "+" ;
    public static String encode(String src) {
        try {
            MessageDigest md;
            md = MessageDigest.getInstance( "SHA-1" );
            byte bytes[] = src.getBytes( "UTF-8" );
            md.update(bytes, 0, bytes. length );
            byte[] sha1hash = md.digest();
            return convertToHex(sha1hash);
        }
        catch(Exception e){
            throw new RuntimeException(e);
        }
    }
    private static String convertToHex(byte[] sha1hash) {
        StringBuilder builder = new StringBuilder();
            for (int i = 0; i < sha1hash. length ; i++) {
               byte c = sha1hash[i];
               addHex(builder, (c >> 4) & 0xf);
               addHex(builder, c & 0xf);
        }
        return builder.toString();
    }
    private static void addHex(StringBuilder builder, int c) {
        if (c < 10)
            builder.append((char) (c + '0' ));
        else
            builder.append((char) (c + 'a' - 10));
    }
```

```
}
```


Function that computes the signature:

```
public ActionForward performCheck(ActionMapping actionMapping, Basivoirorm form,
    HttpServletRequest request, HttpServletResponse response){
        SortedSet<String> vadsFields = new TreeSet<String>();
        Enumeration<String> paramNames = request.getParameterNames();

        // retrieve and sort the fields starting with vads_* alphabetically
        while (paramNames.hasMoreElements()) {
            String paramName = paramNames.nextElement();
            if (paramName.startsWith( "vads_" )) {
                vadsFields.add(paramName);
            }
        }
// Compute the signature
String sep = Sha.SEPARATOR;
StringBuilder sb = new StringBuilder();
for (String vadsParamName : vadsFields) {
    String vadsParamValue = request.getParameter(vadsParamName);
    if (vadsParamValue != null) {
        sb.append(vadsParamValue);
    }
    sb.append(sep);
}
sb.append( shaKey );
String c_sign = Sha.encode(sb.toString());
return c_sign;}
```

5.2. Example of implementation with PHP

Example of a signature computation using the HMAC-SHA-256 algorithm:

```
function getSignature ($params,$key)
{
    /**
     *Function that computes the signature.
     * $params : table containing the fields to send in the payment form.
     * $key : TEST or PRODUCTION key
     */
    //Initialization of the variable that will contain the string to encrypt
    $contenu_signature = "";

    //sorting fields alphabetically
    ksort($params);
    foreach($params as $name=>$value){

        //Recovery of vads_ fields
        if (substr($nom,0,5)=='vads_'){

            //Concatenation with "+"
            $contenu_signature .= $value."+";
         }
    }
    //Adding the key at the end
    $contenu_signature .= $key;

    //Encoding base64 encoded chain with SHA-256 algorithm
    $signature = base64_encode(hash_hmac('sha256',$contenu_signature, $key, true));
    return $signature;
 }
```

Example of a signature computation using the SHA-1 algorithm:

```
function getSignature($params, $key)
{
    /**
     * Function that computes the signature.
     * $params : table containing the fields to send in the payment form.
     * $key : TEST or  PRODUCTION key
     */
    //Initialization of the variable that will contain the string to encrypt
    $contenu_signature = "" ;

    // Sorting fields alphabetically
    ksort($params);
        foreach ($params as $name =>$value)
    {
    // Recovery of vads_ fields
        if (substr($nom,0,5)=='vads_') {
            // Concatenation with "+"
            $contenu_signature .= $value."+";
        }
    }
    // Adding the key at the end
    $contenu_signature .= $key;

    // Applying SHA-1 algorithm
    $signature = sha1($contenu_signature);
    return $signature ;
}
```


6. ANALYZING THE PAYMENT RESULT

The Instant Payment Notification URL (IPN) allows the payment gateway to notify automatically the merchant website about the payment result.

The payment gateway is able to contact the merchant website regardless of the protocol (http or https) that was used.

6.1. Retrieving data returned in the response

The data returned in the response depends on the parameters sent in the payment form, the payment type and the settings of your shop This data constitutes a field list. Each field contains a response value. The field list can be updated.

The data is always sent by the payment gateway using the **POST** method.

The first step consists in retrieving the contents received via the POST method.

Examples:

- In PHP, data is stored in the super global variable **$_POST**,
- In ASP.NET (C#), you must use the **Form** property of the **HttpRequest** class.
- In Java, you must use the **getParameter** method of the **HttpServletRequest** interface.

  The script will have to create a loop to retrieve all the transmitted fields.

Example of data sent during payment notification :

```
vads_amount = 3000
vads_auth_mode = FULL
vads_auth_number = 3fb0de
vads_auth_result = 00
vads_capture_delay = 0
vads_card_brand = VISA
vads_card_number = 497010XXXXXX0000
vads_payment_certificate = a50d15063b5ec6cb140043138b8d7576470b71a9
vads_ctx_mode = TEST
vads_currency = 978
vads_effective_amount = 3000
vads_site_id = 12345678
vads_trans_date = 20140902094139
vads_trans_id = 454058
vads_validation_mode = 0
vads_version = V2
vads_warranty_result = YES
vads_payment_src = EC
vads_sequence_number = 1
vads_contract_used = 5785350
vads_trans_status = AUTHORISED
vads_expiry_month = 6
vads_expiry_year = 2015
vads_bank_code = 17807
vads_bank_product = A
vads_pays_ip = FR
vads_presentation_date = 20140902094202
vads_effective_creation_date = 20140902094202
vads_operation_type = DEBIT
vads_threeds_enrolled = Y
vads_threeds_cavv = Q2F2dkNhdnZDYXZ2Q2F2dkNhdnY=
vads_threeds_eci = 05
vads_threeds_xid = WXJsVXpHVjFoMktzNmw5dTd1ekQ=
vads_threeds_cavvAlgorithm = 2
vads_threeds_status = Y
vads_threeds_sign_valid = 1
vads_threeds_error_code =
vads_threeds_exit_status = 10
vads_trans_uuid= 1cd9994823334e31bbb579b4d716832d
vads_risk_control = CARD_FRAUD=OK;COMMERCIAL_CARD=OK
vads_result = 00
vads_extra_result = 00
```



```
vads_card_country = FR
vads_language = fr
vads_hash = 299d81f4b175bfb7583d904cd19ef5e38b2b79b2373d9b2b4aab74e5753b10bc
vads_url_check_src = PAY
vads_action_mode = INTERACTIVE
vads_payment_config = SINGLE
vads_page_action = PAYMENT
signature = FxGvazgW0dgqOrVrx6bqKZSXh2y5Dp3bWC9HFn33t+Q=
```

6.2. Computing the signature

The signature is computed by following the same procedure as for creating the payment form.

The data submitted by the payment gateway is encoded in UTF-8.
Any alteration of received data will result in signature computation error.

To compute the signature:

1. Take all the fields whose name starts with **vads_**.
2. Sort these fields alphabetically.
3. Concatenate the values of these fields separating them with the "**+**" character.
4. Concatenate the result with the test or production key separating them with a "**+**".
5. According to the signature algorithm defined in your shop configuration:
   a. if your shop is configured to use "SHA-1", apply the **SHA-1** hash function on the chain obtained during the previous step.
   b. if your shop is configured to use "HMAC-SHA-256", compute and encode in Base64 format the message signature using the **HMAC-SHA-256** algorithm with the following parameters:
      - the SHA-256 hash function,
      - the test or production key (depending on the value of the **vads_ctx_mode** field) as a shared key,
      - the result of the previous step as the message to authenticate.

6.3. Comparing signatures

To ensure the integrity of the response, you must compare the value of the **signature** field received in the response with the one computed previously.

If the signatures match,

- you may consider the response as safe and proceed with the analysis.
- If they don't, the script will have to throw an exception and warn the merchant

The signatures may not match because of :

- an implementation error (error in your calculation, problem with UTF-8 encoding, etc.),
- an error in the value of the key or in the **vads_ctx_mode** (field value (frequent issue when going to live mode),
- a data corruption attempt.

6.4. Processing the response data

Here is an example of analysis to guide you through processing the response data.

1. Identify the mode (TEST or PRODUCTION) that was used for creating the transaction by analyzing the value of the **vads_ctx_mode** field.

2. Identify the order by retrieving the value of the **vads_order_id** field if you have transmitted it to the payment gateway.

   Make sure that the order status has not already been updated.

3. Retrieve the payment result transmitted in the **vads_trans_status** field.

   Its value allows you to define the order status.

Value	Description
ABANDONED	**Abandoned** payment abandoned by the buyer. The transaction has not been created, and **therefore cannot be viewed in the Merchant Back Office.**
ACCEPTED	**Accepted**. Status of a VERIFICATION type transaction for which the authorization request or information request has been successfully completed. This status can not evolve. Transactions with "**ACCEPTED**" will never be captured.
AUTHORISED	**Waiting for capture** The transaction has been accepted and will be automatically captured at the bank on the expected date.
AUTHORISED_TO_VALIDATE	**To be validated** The transaction, created with manual validation, is authorized. The merchant must manually validate the transaction in order for it to be captured. The transaction can be validated as long as the expiration date of the authorization request has not passed. If the authorization validity period has passed, the payment status changes to **EXPIRED**. The **Expired** status is final.
CANCELLED	**Canceled** The transaction has been canceled by the merchant.
CAPTURED	**Sent** The transaction has been captured by the bank.
CAPTURE_FAILED	The transaction capture has failed. Contact the technical support.
EXPIRED	**Expired** The expiry date of the authorization request has passed and the merchant has not validated the transaction. The account of the cardholder will, therefore, not be debited.
INITIAL	**Pending** This status concerns all the payment methods that require integration via a payment form with redirection. This status is returned when: • no response has been returned by the acquirer or • the delay of the response from the acquirer has exceeded the payment session on the payment gateway. This status is temporary. The final status will be displayed in the Merchant Back Office immediately after the synchronization has been completed.
NOT_CREATED	**Transaction not created**

Value	Description
	The transaction has not been created, and therefore cannot be viewed in the Merchant Back Office.
REFUSED	**Declined** Transaction is declined.
SUSPENDED	**Suspended** The capture of the transaction is temporarily blocked by the acquirer (AMEX GLOBAL or SECURE TRADING). Once the transaction has been correctly captured, its status changes to **CAPTURED**.
UNDER_VERIFICATION	For PayPal transactions, this value means that PayPal withholds the transaction for suspected fraud. The payment will remain in the **Transactions in progress** tab until the verification process has been completed. The transaction will then take one of the following statuses: **AUTHORISED** or **CANCELED**. A notification will be sent to the merchant to warn them about the status change (Instant Payment Notification on batch change).
WAITING_AUTHORISATION	**Waiting for authorization** The capture delay exceeds the authorization validity period.
WAITING_AUTHORISATION_TO_VALIDATE	**To be validated and authorized** The capture delay exceeds the authorization validity period. An authorization of 1 EUR (or information request about the CB network if the acquirer supports it) has been accepted. The merchant must manually validate the transaction for the authorization request and the capture to occur.

Table 5: Values associated with the vads_trans_status field

4. Retrieve the payment reference transmitted in the **vads_trans_id** field.

5. Analyze the **vads_payment_config** field to determine whether it is an **immediate payment** or an **installment payment**.

Field name	Value for an immediate payment	Value for an installment payment
vads_payment_config	SINGLE	MULTI (the exact syntax is MULTI:first=X;count=Y;period=Z)

Table 6: vads_payment_config field analysis

For a payment in installments, identify the installment number by retrieving the value of the **vads_sequence_number** field.

Value	Description
1	First installment
2	Second installment
3	Third installment
n	Installment number

Table 7: vads_sequence_number field analysis

6. Analyze the **vads_sequence_number** field to know the number of attempts that have been made to make the payment.

vads_payment_config = SINGLE:

vads_url_check_src	vads_sequence_number	Description
PAY	1	Payment made in 1 attempt
	2	Payment made in 2 attempts
	3	Payment made in 3 attempts
BATCH_AUTO	1	Deferred Payment made in 1 attempt
	2	Deferred Payment made in 2 attempts

vads_url_check_src	vads_sequence_number	Description
	3	Deferred Payment made in 3 attempts

Note

Installment payments are not compatible with the feature of additional attempts in case of a rejected payment.

7. Retrieve the value of the **vads_trans_date** field to identify the payment date.

8. Analyze the **vads_payment_option_code** field to determine whether it is an installment payment:

Value	Description
1	Payment in one installment
2	Payment in two installment
3	Payment in three installment
n	Payment in n installments

Table 8: vads_payment_option_code field analysis

9. Retrieve the value of the **vads_capture_delay** field to identify the number of days before the capture in the bank.

   It will allow you to identify whether the payment is an immediate or a deferred payment.

10. Retrieve the used amount and currency. To do this, retrieve the values of the following fields:

Field name	Description
vads_amount	Payment amount in the smallest currency unit.
vads_currency	Code of the currency used for the payment.
vads_change_rate	Exchange rate used to calculate the effective payment amount (seevads_effective_amount).
vads_effective_amount	Payment amount in the currency used for the capture.
vads_effective_currency	Code of the currency used for the capture.

Table 9: Analysis of the payment amount and currency.

11. Retrieve the value of the **vads_auth_result** field to identify the result of the authorization request.

    The complete list of returned codes can be viewed in the Data Dictionary.

    Here is a list of frequently returned codes that can help you understand the reason of the rejection:

Value	Description
03	**Invalid acceptor** This code is sent by the card issuer. Refers to a problem with settings on authorization servers. (E.g. closed contract, incorrect MCC declared, etc.). **To find out the specific reason for the rejection, the buyer must contact his or her bank.**
05	**Do not honor** This code is sent by the card issuer. This code is used in the following cases: • Invalid expiration date • Invalid CVV • Exceeded credit limit • Insufficient funds (etc.) **To find out the specific reason of the rejection, the buyer must contact his or her bank.**
51	**Insufficient balance or exceeded credit limit** This code is sent by the card issuer. This code appears if the balance on the buyer's account is insufficient to make the purchase. **To find out the specific reason for the rejection, the buyer must contact his or her bank.**
56	**Card absent from the file** This code is sent by the card issuer. The entered card number is incorrect or the combination of the card number + expiration date does not exist.

Value	Description
57	**Transaction not allowed for this cardholder** This code is sent by the card issuer. This code is used in the following cases: • The buyer attempts to make an online payment with a cash withdrawal card, • The authorized payment limit is exceeded. **To find out the specific reason for the rejection, the buyer must contact his or her bank.**
59	**Suspected fraud** This code is sent by the card issuer. This code appears when an incorrect CVV code or expiration date has been entered several times. **To find out the specific reason for the rejection, the buyer must contact his or her bank.**
60	**The acceptor of the card must contact the acquirer** This code is sent by the card issuer. Refers to a problem with settings on authorization servers. Appears usually when the merchant ID does not correspond to the sales channel used. (E.g.: an online transaction with a distant sale contract with - manual entry of contract data). **Contact the customer service to resolve the problem.**

Table 10: Values associated with the vads_auth_result field

12. Retrieve the 3D Secure authentication result. To do this:

    a. Retrieve the value of the **vads_threeds_enrolled** field to identify the status of the card enrollment.

Value	Description
Empty	The 3DS authentication is not accomplished (3DS disabled in the request, the merchant is not enrolled or 3DS is not available for the payment method).
Y	Authentication available, cardholder enrolled.
N	Cardholder not enrolled.
U	Impossible to identify the cardholder or authentication is not available for the card (e.g. corporate or prepaid credit cards).

Table 11: Values of the vads_threeds_enrolled field

    b. Retrieve the result of 3D Secure authentication by retrieving the value of the **vads_threeds_status** field.

Value	Description
Empty	The 3DS authentication is not accomplished (3DS disabled in the request, the cardholder is not enrolled or 3DS is not available for the payment method).
Y	Cardholder successfully authenticated.
N	Cardholder authentication error.
U	Authentication impossible.
A	Authentication attempted but not accomplished.

Table 12: Values of the vads_threeds_status field

13. Retrieve the result of fraud checks by identifying the value of the **vads_risk_control** field. This field is sent only if the merchant has:

    - subscribed to the "**Risk management**" service
    - enabled at least one verification process in the Merchant Back Office (**Settings** > **Risk management** menu).

    It is populated with the list of values separated by ";" with the following syntax: **vads_risk_control = control1=result1;control2=result2**

    the possible values for **control** are:

Value	Description
CARD_FRAUD	Verifies whether the cardholder's card number is in the card greylist.
SUSPECT_COUNTRY	Verifies whether the cardholder's card number is in the list of forbidden countries.
IP_FRAUD	Verifies whether the cardholder's IP address is in the IP greylist.

Value	Description
CREDIT_LIMIT	Verifies the purchase frequency and amounts for the same card number, or the maximum amount of an order.
BIN_FRAUD	Verifies whether the BIN code of the card is in the greylist for BIN codes.
ECB	Verifies whether the buyer's card is an "e-carte bleue".
COMMERCIAL_CARD	Verifies whether the buyer's card is a corporate credit card.
SYSTEMATIC_AUTO	Verifies whether the buyer's card is a MAESTRO or VISA ELECTRON credit card.
INCONSISTENT_COUNTRIES	Verifies whether the country of the IP address, the country of the payment card and the country of residence of the buyer match.
NON_WARRANTY_PAYMENT	Liability shift.
SUSPECT_IP_COUNTRY	Checks whether the buyer's country, identified by their IP address, is on the list of forbidden countries.

Table 13: List of fraud verification processes

The possible values for **result** are:

Value	Description
OK	OK.
WARNING	Informational control failed.
ERROR	Blocking control failed.

Table 14: List of fraud verification processes

14. Retrieve the type of the card used for the payment.

Two scenarios are possible:

- For a payment processed with **only one card**. The fields to process are:

Field name	Description
vads_card_brand	Brand of the card used for the payment. e.g.: CB, VISA, VISA_ELECTRON, MASTERCARD, MAESTRO, VPAY
vads_brand_management	Allows to know the brand used for the payment, the list of available brands as well as whether the buyer has changed the default brand chosen by the merchant.
vads_card_number	Card number used for the payment.
vads_expiry_month	Expiry month between 1 and 12 (e.g.: 3 for March, 10 for October).
vads_expiry_year	Expiry year in 4 digits (e.g.: 2023).
vads_bank_code	Code of the issuing bank
vads_bank_product	Product code of the card
vads_card_country	Country code of the country where the card was issued (alpha ISO 3166-2 code, e.g.: "FR" for France, "PF" for French Polynesia, "NC" for New Caledonia, "US" for the United States).

Table 15: Analysis of the card used for the payment

- For a **split payment** (i.e. a transaction using several payment methods), the following fields must be processed:

Field name	Value	Description
vads_card_brand	MULTI	Several types of payment card are used for the payment.
vads_payment_seq	Json format, see details below.	Details of performed transactions.

The **vads_payment_seq** field (json format) describes the split payment sequence. It contains:

1. "trans_id": global transaction identifier to the payment sequence.
2. "transaction" : transaction table of the sequence. It contains the following elements:

Field name	Description
amount	Amount of the payment sequence.
operation_type	Debit transaction.

<table>
<tr><th>Field name</th><th>Description</th></tr>
<tr><td>auth_number</td><td>Authorization number. Example: 949478</td></tr>
<tr><td>auth_result</td><td>Return code of the authorization request.</td></tr>
<tr><td>capture_delay</td><td>Delay before the capture (in days).
For a payment by card, this parameter is the requested capture date (ISO 8601 format). If not sent in the payment form, the value defined in the Merchant Back Office will be used.</td></tr>
<tr><td>card_brand</td><td>Used payment method.
For a payment by card (e.g. CB or Visa or MasterCard co-branded CB cards), this parameter is set to "CB".
See the Payment Gateway Implementation Guide available in our online documentation archive to see the complete list of card types.</td></tr>
<tr><td>card_number</td><td>Payment method number</td></tr>
<tr><td>expiry_month</td><td>Expiry month of the payment method</td></tr>
<tr><td>expiry_year</td><td>Expiry year of the payment method</td></tr>
<tr><td>payment_certificate</td><td>Payment certificate.</td></tr>
<tr><td>contract_used</td><td>Contract used for the payment</td></tr>
<tr><td>identifier</td><td>Unique identifier (token) associated with a payment method.</td></tr>
<tr><td>identifier_status</td><td>Only present if the requested action is a token creation or update.
Possible values:<table><tr><th>Value</th><th>Description</th></tr><tr><td>CREATED</td><td>The authorization request has been accepted.
Token (or UMR for SEPA payment) has been successfully created.</td></tr><tr><td>NOT_CREATED</td><td>The authorization request has been declined.
The token (or UMR for SEPA payment) has not been created, and therefore cannot be viewed in the Merchant Back Office.</td></tr><tr><td>UPDATED</td><td>Token (or UMR for SEPA payment) has been successfully updated.</td></tr><tr><td>NOT_UPDATED</td><td>The token (or UMR for SEPA payment) has not been updated.</td></tr><tr><td>ABANDONED</td><td>The action has been abandoned by the buyer (debtor).
The token (or UMR for SEPA payment) has not been created, and therefore cannot be viewed in the Merchant Back Office.</td></tr></table></td></tr>
<tr><td>presentation_date</td><td>For a payments by card, this parameter is the requested capture date (ISO 8601 format).</td></tr>
<tr><td>trans_id</td><td>Transaction number.</td></tr>
<tr><td>ext_trans_id</td><td>This field is not sent for payments by credit cards.</td></tr>
<tr><td>trans_uuid</td><td>Unique reference generated by the payment gateway after the creation of a payment transaction.
Guarantees that each transaction is unique.</td></tr>
<tr><td>extra_result</td><td>Numeric code of the risk controls result.<table><tr><th>Code</th><th>Description</th></tr><tr><td>Empty</td><td>No verification completed.</td></tr><tr><td>00</td><td>All the verification processes have been successfully completed.</td></tr><tr><td>02</td><td>Credit card velocity exceeded.</td></tr><tr><td>03</td><td>The card is in the merchant's greylist.</td></tr><tr><td>04</td><td>The country of origin of the card is on the merchant's greylist.</td></tr><tr><td>05</td><td>The IP address is on the merchant's greylist.</td></tr><tr><td>06</td><td>The BIN code is on the merchant's greylist..</td></tr><tr><td>07</td><td>Detection of an e-carte bleue.</td></tr><tr><td>08</td><td>Detection of a national commercial card.</td></tr><tr><td>09</td><td>Detection of a foreign commercial card.</td></tr><tr><td>14</td><td>Detection of a card that requires systematic authorization.</td></tr><tr><td>20</td><td>Relevance verification: countries do not match (country IP address, card country, buyer's country).</td></tr><tr><td>30</td><td>The country of the this IP address belongs to the greylist.</td></tr><tr><td>99</td><td>Technical issue encountered by the server during a local verification process.</td></tr></table></td></tr>
<tr><td>sequence_number</td><td>Sequence number.</td></tr>
</table>

Field name	Description
trans_status	Transaction status.

Table 16: JSON object content

Note : canceled transactions are also displayed in the table.

15. Save the value of the **vads_trans_uuid** field. It will allow you to identify uniquely the transaction if you use the Web Services APIs.

16. Retrieve all the order, buyer and shipping details.

    These details will be provided in the response only of they have been transmitted in the payment form.

    Their values are identical to the ones submitted in the form.

17. Proceed to order update.

7. RETURNING TO THE SHOP

By default, when the buyer returns to the merchant website, no parameter will be transmitted by the buyer's browser.

However, if the **vads_return_mode** field has been transmitted in the payment form (see chapter **Managing the return to the merchant website** of the Hosted Payment Page Implementation Guide available on our web site) it will be possible to retrieve the data:

- either in GET mode: the data is presented in the URL as follows : ?field1=value1&field2=value2
- or in POST: the data is sent in a POST form.

The data transmitted to the browser is the same as during notifications (IPN).

The **vads_url_check_src** and **vads_hash** fields will be sent only in the instant notification.

To analyze this data, see chapter **Analyzing the payment result**.

Note: the return to the shop will allow you to show only the visual context to the buyer. Do not use the received data for processing in the database.

8. PROCEEDING TO TESTING

Before going to live mode it is necessary to run tests to make sure that there are no interaction problems between the merchant website and the payment gateway.

These tests must be done before requesting to go to live mode.

8.1. Making payment tests

The test payment requests submitted via the HTTP POST form must:

- Contain the **vads_ctx_mode** field set to **TEST**.
- Use the **test key** retrieved earlier for signature computation.

In test phase, the merchant can test the 3D Secure configuration (if the merchant is enrolled in 3DS and if this option is not disabled).

Different cases of payments can be simulated by using test card numbers specified on the payment page.

All the transactions completed in test mode can be viewed by all persons authorized to use the Merchant Back Office via the **Management >TEST transactions** menu

8.2. Testing the IPN

First of all, check the status of the IPN URL in the Merchant Back Office.

To do this:

1. Select a transaction with a right-click.
2. Select **Display transaction details**.
3. Check the status of the IPN.
    - In case the status is **Sent**, it means that you have correctly specified the URL in the Merchant Back Office.
    - In case the status is **Undefined URL**, it means that you have not specified the URL in the Merchant Back Office.
        1. Check the address of the IPN URL entered in TEST and PRODUCTION mode.
        2. Click **Settings** > **Notification rules**.
        3. Enter the IPN URL (Instant Payment Notification URL at the end of payment).

           Do not enter an address in "localhost". The call to this URL is made from one server to another.
        4. Click **Save**.
    - In case the status is **Failed**, see chapter **Processing errors** of the Hosted Payment Page Implementation Guide available in our online documentation archive.

9. ACTIVATING THE SHOP IN PRODUCTION MODE

This chapter explains how you can:

- Generate the production key.
- Shift your merchant website to production mode.
- Make a first payment in production mode.
- Generate a new production key (in case of a problem).

9.1. Generating the production key

You can generate the production key via **Settings** > **Shop** > **Keys** tab > **Generate the production key** button.

Once the production key has been generated, its value appears in the **Keys** tab.

An e-mail is sent to the company administrator to confirm that the production key has been generated.

9.2. Shifting your merchant website to production mode

1. Set the **vads_ctx_mode** field to **PRODUCTION**.
2. Edit the value of the test key with the value of your production key to compute the signature.
   You will find this value via **Settings** > **Shop** > **Keys** tab.
3. Enter the correct IPN URL in PRODUCTION mode via **Settings** > **Notification rules**.

9.3. Making a first production payment

We recommend checking the two following points:

- The correct end-to-end functioning of the production environment.

  To do this, make a real transaction.

  This transaction can later be canceled via the Merchant Back Office in**Management** > **Transactions** > **Transactions in progress**. This transaction will not be captured in the bank.

- The correct functioning of the IPN URL (Instant Payment Notification URL at the end of payment) specified in the Merchant Back Office.

  To do this, do not click on **Return to the shop** after a payment.

  View the transaction details in the Merchant Back Office and make sure that the IPN URL status is **Sent.**

