



A hands-on guide to
using and understanding
Instant Payment Notification

The PayPal Instant Payment Notification Manual

Last Updated: 9.26.2002

Table of Contents

Table of Contents.....	1
Introduction to Instant Payment Notification (IPN).....	2
IPN in Action	3
Using IPN	10
Using IPN with Subscriptions	12

Introduction to Instant Payment Notification (IPN)

Automate online payments with back-end server-to-server integration

PayPal's Instant Payment Notification (IPN) allows you to integrate PayPal payments with your website back-end operations. It provides immediate notification and confirmation of PayPal payments you receive, allowing you to:

- Customize your website's response to customer purchases in real-time
- Track customers through the notification's "pass through" variables
- Automate your fulfillment operations
- Store transaction information in your own database

Once you activate IPN, you will receive an IPN when a payment is first sent, which will state the status of the payment (Completed or Pending). If the payment was 'Pending,' you will receive another IPN when the payment clears, fails, or is denied.

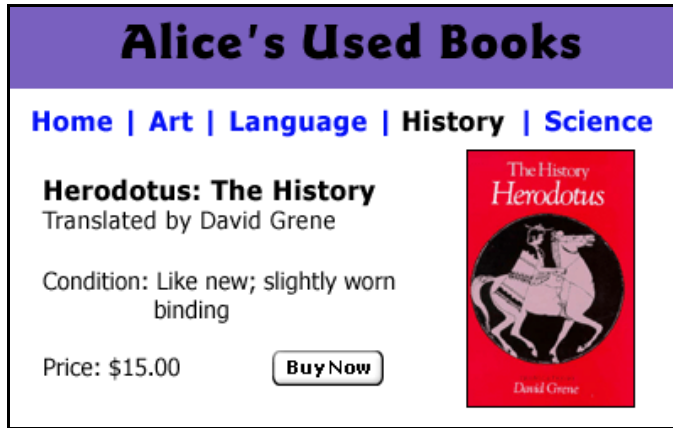
IPN can be seamlessly integrated with each of the PayPal website payment solutions (Single Item Purchases, Shopping Cart, Donations, and Subscriptions), as well as with regular PayPal "Send Money" payments, and lets you focus on selling, not trying to manually track your orders.

Get the most out of your online business today: start using IPN!

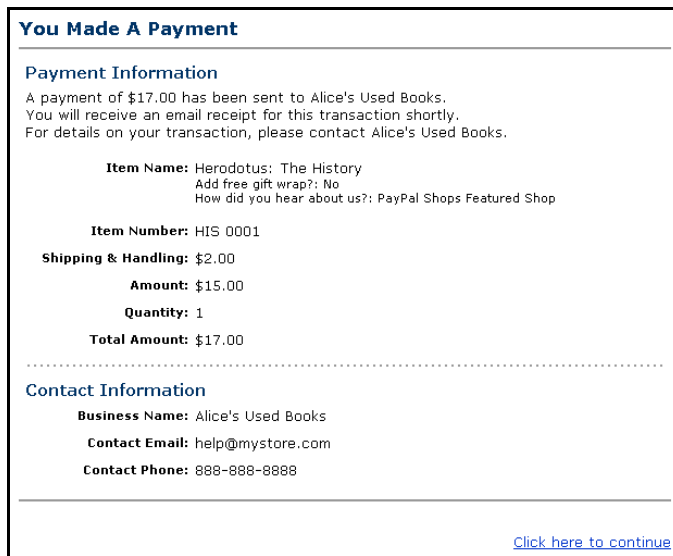
IPN in Action

How IPN Notifications are sent

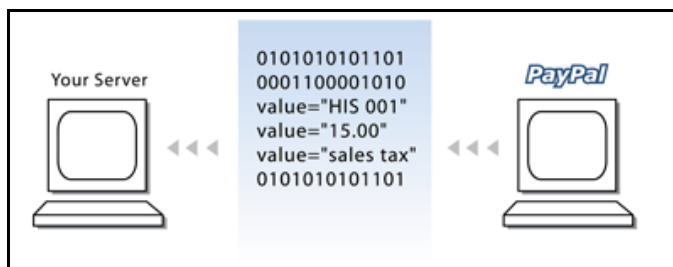
Step 1: Your buyer comes to your website and clicks on a PayPal Buy Now button to make a purchase.



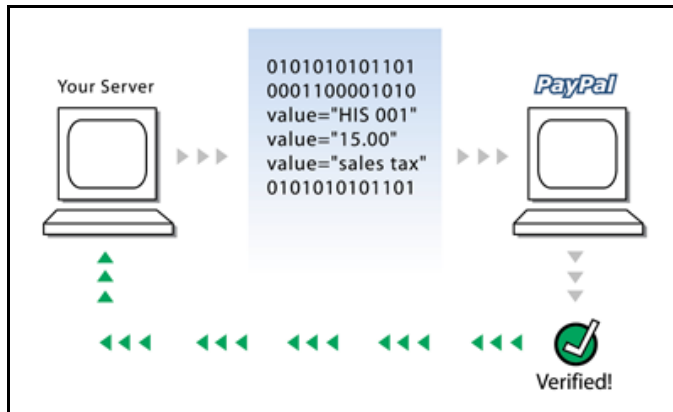
Step 2: After your buyer checks the payment details and sends the payment, he will see a Confirmation page.



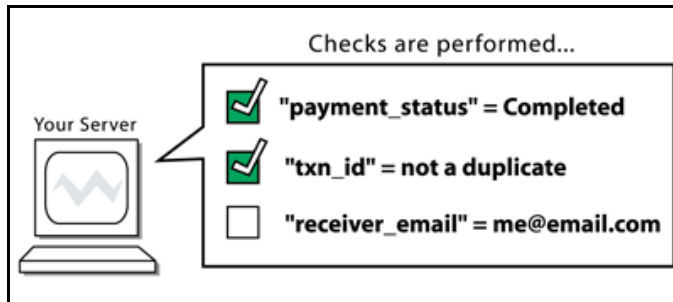
Step 3: At the time the payment is made, PayPal will post a notification to your server at a URL you specified. All of your customer's payment information and a piece of encrypted code will be included in this notification.



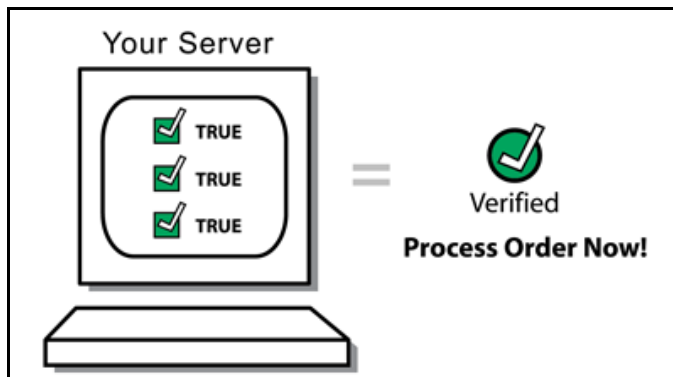
Step 4: On receiving the notification, your server will send the information, including the encrypted code, back to a secure PayPal URL. PayPal will authenticate the transaction and send your server a "VERIFIED" or "INVALID" response.



Step 5: When you receive a VERIFIED response, you need to perform several checks before fulfilling the order (an INVALID response should be treated as suspicious and investigated).



Step 6: After successfully completing the checks, you can update your database process the purchase.



Instant Payment Notification

Back-end server to server integration

Instant Payment Notification allows you to integrate your PayPal payments with your website's back-end operations, so you get immediate notification and authentication of the PayPal payments you receive.

How It Works

When a customer makes a payment to you, PayPal will post a notification to your server at a URL you specify. Included in this notification will be all of your customer's payment information (e.g. customer name, amount) as well as a piece of encrypted code. When your server receives a notification, it will then post the information, including the encrypted code, back to a secure PayPal URL. PayPal will authenticate the transaction and send confirmation of its validity back to your server.

To activate Instant Payment Notification, you will need to enter the URL at which you would like to receive the notification posts from your Profile. See page 9 for more information.

After you have activated Instant Payment Notification, your server will be sent a notification every time you receive a payment, this notification will be sent as a hidden "FORM POST" to the URL you specified, and will include all of the payment information. The FORM variables for the notification are listed below.

IPN Variables

The variables below work for all Send Money, Single Item Purchase, PayPal Donations, and PayPal Shopping Cart IPNs. If you are using IPN to receive Subscription payment notifications, you will need to support additional variables, which are listed on page 11.

Variable	Value	Description
receiver_email	Transaction specific	Primary email address of the payment recipient (i.e., the merchant). If the payment is sent to a non-primary email address on your PayPal account, the receiver_email will still be your primary email
item_name	Transaction specific	Item name as passed by you, the merchant. Or, if not passed by you, as entered by your customer. If this is a shopping cart transaction we will append the number of the item (e.g. item_name1, item_name2)
item_number	Transaction specific	Item number as passed by you, the merchant. If this is a shopping cart transaction we will append the number of the item (e.g. item_number1, item_number2)

Variable	Value	Description
quantity	Transaction specific	Quantity as entered by your customer or as passed by you, the merchant. If this is a shopping cart transaction we will append the number of the item (e.g. quantity1, quantity 2)
invoice	Transaction specific	Invoice number as passed by you, the merchant. Your customer is not able to view or edit this. It must be unique per transaction
custom	Transaction specific	Custom value as passed by you, the merchant. This is a pass-through variable that is never presented to your customer
option_name1	Transaction specific	Option 1 Name as requested by you
option_selection1	Transaction specific	Option 1 Choice as entered by your customer
option_name2	Transaction specific	Option 2 Name as requested by you
option_selection2	Transaction specific	Option 2 Choice as entered by your customer
num_cart_items	Shopping Cart transaction specific	If this is a shopping cart transaction, number of items in cart
payment_status	"Completed"	The payment has been completed and the funds are successfully in your account balance
	"Pending"	The payment is pending - see the "pending_reason" variable below for more information. Note: You will receive another instant payment notification when the payment becomes "completed", "failed", or "denied"
	"Failed"	The payment has failed. This will only happen if the payment was made from your customer's bank account
	"Denied"	You, the merchant, denied the payment. This will only happen if the payment was previously pending due to one of the "pending reasons" below
pending_reason	"echeck"	The payment is pending because it was made by an eCheck, which has not yet cleared
	"multi_currency"	You do not have a balance in the currency sent, and you do not have your Payment Receiving Preferences set to automatically convert and accept this payment. You must manually accept or deny this payment
	"intl"	The payment is pending because you, the merchant, hold an international account and do not have a withdrawal mechanism. You must manually accept or deny this payment from your Account Overview

Variable	Value	Description
	"verify"	The payment is pending because you, the merchant, are not yet verified. You must verify your account before you can accept this payment
	"address"	The payment is pending because your customer did not include a confirmed shipping address and you, the merchant, have your Payment Receiving Preferences set such that you want to manually accept or deny each of these payments. To change your preference, go to the "Preferences" section of your "Profile"
	"upgrade"	The payment is pending because it was made via credit card and you, the merchant, must upgrade your account to Business or Premier status in order to receive the funds
	"unilateral"	The payment is pending because it was made to an email address that is not yet registered or confirmed
	"other"	The payment is pending for an "other" reason. For more information, contact customer service
payment_date	Transaction specific	Time/Date stamp generated by PayPal system [format: "18:30:30 Jan 1, 2000 PST"]
settle_amount†	Transaction specific	Amount that is deposited into the account's primary balance after a currency conversion from automatic conversion through your Payment Receiving Preferences or manual conversion through manually accepting a payment
settle_currency†	Transaction specific	Currency of settle_amount
exchange_rate†	Transaction specific for Multiple Currencies	Exchange rate used if a currency conversion occurred
mc_gross†	Transaction specific for Multiple Currencies	Full amount of the customer's payment, before transaction fee is subtracted. Equivalent to "payment_gross" for USD payments.
mc_fee†	Transaction specific for Multiple Currencies	Transaction fee associated with the payment. "mc_gross" minus "mc_fee" will equal the amount deposited into the "receiver_email" account. Equivalent to "payment_fee" for USD payments.
mc_currency†	"USD"	The currency of the payment is U.S. Dollars
	"GBP"	The currency of the payment is British Pounds Sterling
	"EUR"	The currency of the payment is Euros

Variable	Value	Description
txn_id	Transaction specific	A unique transaction ID generated by the PayPal system
txn_type	"web_accept"	The payment was sent by your customer via Single Item Purchases, or PayPal Donations
	"cart"	This payment was sent by your customer via the Shopping Cart feature
	"send_money"	This payment was sent by your customer from the PayPal website, using the "Send Money" tab
first_name	Transaction specific	Customer's first name
last_name	Transaction specific	Customer's last name
address_street	Transaction specific	Customer's street address
address_city	Transaction specific	City of customer's address
address_state	Transaction specific	State of customer's address
address_zip	Transaction specific	Zip code of customer's address
address_country	Transaction specific	Country of customer's address
address_status	"confirmed"	Customer provided a Confirmed Address
	"unconfirmed"	Customer provided an Unconfirmed Address
payer_email	Transaction specific	Customer's primary email address. Use this email to provide any credits
payer_id	Transaction specific	Unique customer ID
payer_status	"verified"	Customer has a Verified U.S. PayPal account
	"unverified"	Customer has an Unverified U.S. PayPal account
	"intl_verified"	Customer has a Verified International PayPal account
payment_type	"echeck"	This payment was funded with an eCheck
	"instant"	This payment was funded with PayPal balance, credit card, or Instant Transfer
notify_version	"1.4"	The version of the Instant Payment Notification you are using
verify_sign	Transaction specific	An encrypted string used to validate the authenticity of the transaction (page 9)
payment_gross [†]	Transaction specific	Full USD amount of the customer's payment, before transaction fee is subtracted. Will be empty for non-USD payments. This is a legacy field replaced by "mc_gross"
payment_fee [†]	Transaction specific	USD transaction fee associated with the payment. "payment_gross" minus "payment_fee" will equal the amount deposited into the "receiver_email" account. Will be empty for non-USD payments. This is a legacy field replaced by "mc_fee"

[†] These variables are either being added or changed as part of upcoming enhancements to the IPN code related to the Multiple Currencies feature. Please make sure your IPN integration is set up to allow additional variables to be added to the notifications.

Specifying Your Notification URL

If you only need to receive your IPNs at a single URL, you can enter that URL in the “Preferences” section of your Profile.

If you would like to receive payment notifications for different payments at different URLs (i.e. if you need to keep payments made to different websites you run separate), you can manually pass the IPN URL with each payment by including it in that payment’s HTML code. Use the `notify_url` field to pass this information.

The `notify_url` for a specific payment will be saved, and any subsequent updates to that payment (e.g. cleared echeck) will be sent to that `notify_url`. When you pass a `notify_url` in your HTML code, it will override any preferences you set in your Profile.

Using IPN

Getting set-up to use IPN and validate notifications

Setting up IPN

To set up IPN:

1. Log in to your Business or Premier PayPal¹ account
2. Go to the 'Profile' subtab
3. Click on the 'Instant Payment Notification Preferences' link in the 'Selling Preferences' column
4. Click Edit
5. Check the box and enter the URL at which you would like to receive your IPN Notifications
6. Click Save

Notification Validation

To ensure that a payment has been made into your PayPal account, you **must** verify that the email address used as your "receiver_email" has been registered and confirmed in your PayPal account.

Once your server has received the Instant Payment Notification, you will need to confirm it by constructing an HTTP POST to PayPal. Your POST should be sent to **https://www.paypal.com/cgi-bin/webscr**

When you connect to PayPal's secure server (<https://www.paypal.com>) it will present you with a digital certificate, signed by a trusted Certificate Authority (Verisign). To be 100% certain of the authenticity of this transaction, your code should verify PayPal's certificate using Verisign's public key.

If you would like more information about the verification process, it can be found at <http://www.verisign.com/>

You can also review this useful FAQ on digital certificates at <http://digitalid.verisign.com/server/about/aboutFAQ.htm>

You must post **all** of the form variables you received **exactly** as you received them. You will also need to append a variable named "cmd" with the value "_notify-validate" (e.g. cmd=_notify-validate) to the POST string.

¹ If you have a Personal PayPal account you cannot set-up IPN from your Profile. Instead, Log in to your account and go to the 'Sell' tab. Click on the 'Technical Overview' link in the left-hand menu. On the Technical Overview page, click on the 'Start using IPN' link. You will be taken to your Profile IPN page and may then follow steps 4-6 above.

PayPal will respond to the post with a single word, "VERIFIED" or "INVALID", in the body of the response.

When you receive a **VERIFIED** response:

1. Check that the "payment_status" is "completed"
2. If the "payment_status" is "completed", check the "txn_id" against the previous PayPal transaction you have processed to ensure it is not a duplicate.
3. After you have checked the "payment_status" and "txn_id", make sure the "receiver_email" is an email address registered in your PayPal account
4. Once you have completed the above checks, you may update your database based on the information provided.

If you receive an **INVALID** response, it should be treated as suspicious and investigated.

Using IPN with Subscriptions

Additional information if you receive PayPal Subscriptions payments

Subscriptions Variables

In addition to the variables listed on page 5, these variables are included in Subscriptions IPNs:

Variable	Value	Description
txn_type	"subscr_signup"	This IPN is for a subscription sign-up
	"subscr_cancel"	This IPN is for a subscription cancellation
	"subscr_failed"	This IPN is for a subscription payment failure
	"subscr_payment"	This IPN is for a subscription payment
	"subscr_eot"	This IPN is for a subscription's end of term
subscr_date	Transaction specific	Start date or cancellation date depending on whether transaction is "subscr_signup" or "subscr_cancel"
period1	Transaction specific	(optional) Trial subscription interval in days, weeks, months, years (example: a 4 day interval is "period1: 4 d")
period2	Transaction specific	(optional) Trial subscription interval in days, weeks, months, years
period3	Transaction specific	Regular subscription interval in days, weeks, months, years
amount1	Transaction specific	(optional) Amount of payment for trial period1
amount2	Transaction specific	(optional) Amount of payment for trial period2
amount3	Transaction specific	Amount of payment for regular period3
recurring	Transaction specific	Indicates whether regular rate recurs (1 is yes, 0 is no)
reattempt	Transaction specific	Indicates whether reattempts should occur upon payment failures (1 is yes, 0 is no)
retry_at	Transaction specific	Date we will retry failed subscription payment
recur_times	Transaction specific	How many payment installments will occur at the regular rate
username	Transaction specific	(optional) Username generated by PayPal and given to subscriber to access the subscription
password	Transaction specific	(optional) Password generated by PayPal and given to subscriber to access the subscription (password will be hashed).
subscr_id	Transaction specific	(optional) ID generated by PayPal for the subscriber

Variables for each Subscription Type

Below are the variables used for each Subscription transaction type.

Subscription Transactions

txn_type: subscr_signup or txn_type: subscr_cancel

"txn_type"	"address_country"	"period1"
"invoice"	"verify_sign"	"period2"
"payer_email"	"custom"	"period3"
"receiver_email"	"item_name"	"amount1"
"first_name"	"item_number"	"amount2"
"last_name"	"notify_version"	"amount3"
"address_street"	"payer_status"	"recurring"
"address_city"	"address_status"	"reattempt"
"address_state"	"subscr_id"	"username"
"address_zip"	"subscr_date"	"password"

Subscription Payments

txn_type: subscr_payment

"txn_type"	"address_street"	"notify_version"
"txn_id"	"address_city"	"payment_method"
"invoice"	"address_state"	"pending_reason"
"payer_email"	"address_zip"	"payer_status"
"receiver_email"	"address_country"	"address_status"
"payment_gross"	"verify_sign"	"subscr_id"
"payment_fee"	"custom"	"username"
"payment_status"	"item_name"	"password"
"first_name"	"item_number"	
"last_name"	"payment_date"	

Subscription Payments Failed

txn_type: subscr_failed or subscr_eot

"invoice"	"verify_sign"	"subscr_id"
"payer_email"	"custom"	"retry_at"
"receiver_email"	"item_name"	"username"
"payment_gross"	"item_number"	"password"
"first_name"	"notify_version"	
"last_name"	"payer_status"	