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Storefronts, E-commerce and Shopping Carts

Building a storefront or e-commerce enabled website can be a challenging project, since virtually every business model has its own unique requirements. There are many commercial products and online services that will provide various levels of functionality, from simple shopping carts that provide just a way to link to a check-out page that accepts a credit card, to stores that contain a database of products, to high-end applications that will integrate with an inventory control or accounting system.

What does all this mean for you, as a business owner? In this article, I'll try to simplify what I just said in the previous paragraph, and describe several options, along with the advantages and disadvantages of each. Also I'll provide a checklist to help in your decision making process.

How Online Storefronts Work

If you've bought anything online, you know the basics—you browse or search for a product, add it to a "shopping cart" or basket, and then proceed to check-out, in a process that is designed to mimic visiting a real store. What goes on behind the scenes can become quite complex, depending on the type of business. Let's start with a typical small business. In this example, the store owner has a website that contains some or all of the products they sell in their physical store. They accept credit cards and they manage the online orders the same way as orders received by phone or in person.

The customer selects a product from their website and clicks "add" or "buy" and might also select quantity, size, color or some other attribute. For this to happen, the owner must create product categories and add products through an administrative area on the website, and also enter things like available colors, sizes, price, shipping weight, SKU number and product description. Even though they might have all of this information stored in their POS (Point of Sale) system, the POS system doesn't know how to talk to

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the storefront database, so it must be manually entered. Sometimes it's possible to export data from the POS in a format that can be imported directly into the store, but we'll get to that later.

Assuming that all the products are in the store's database, the customer can select them and add them to their shopping cart. This means that the website has created a unique session for that customer and is tracking their browser activity using a "cookie." Cookies are tokens stored in the browser that lets the browser and the web server keep track of sessions. Without this, each click would look to the server like a separate user—it would have no memory of past activity.

The requested products in the shopping cart are stored in the database using the session ID of the potential customer. When the customer displays their shopping cart contents, the data is retrieved from the server and displayed, and the customer can change the quantity, delete items, or continue shopping to add more items.

When the customer is ready to make their purchase, he or she will click "check-out" and will then be asked to fill in their personal information, such as billing and shipping address. If they've made previous purchases, and if the storefront remembers who they are (by the cookie in their browser) or offers them the opportunity to login using a stored name and password, then their personal information can be retained from session to session, so they don't have to re-enter it each time. Generally credit card numbers are not stored in the database, and this is due to new security requirements mandated by the credit card processors.

The next step is to use the shipping address, or possibly multiple shipping addresses (e.g. sending gifts), to calculate the shipping cost. Some merchants use flat-rate shipping, to simplify this process. Others use online calculators provided by UPS and FedEx, and some use lookup tables.

The next step is to calculate sales tax. If shipping in-state, sales tax must be computed, at least by zip code or city, but ideally by street address. This is often problematic. There are several online services that will do the address lookup for a (rather high) monthly fee, or the data can be downloaded for each state and calculated by the storefront.

Sales tax must be calculated based on the recipient's address, even if shipped as a gift. This requires that each destination address be computed separately, along with shipping cost, to produce a grand total.

Next, the customer is asked for a credit card number. The merchant will have to sign up for a "payment gateway" service, which is a connector between their storefront and their credit card merchant account. We recommend Authorize.net, but there are many other choices available, with varying rates and options. Paypal also offers a way to accept credit card transactions and offers two different pricing models, based whether you want to pay a monthly minimum or just pay per transaction.

To securely transfer private information such as a credit card numbers requires an SSL certificate for your domain name. SSL or Secure Sockets Layer provides high-strength encryption between the customer's browser and the web server. An additional feature that is used by Internet Explorer 7 and above is EV SSL or Enhanced Validation certificates. These certificates display a special icon on the browser frame that indicates that the

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owner of the certificate has gone through a much more rigorous validation process, to ensure that they are the rightful owners of the website, domain name and business. The purpose is to reduce the potential for phishing attacks on customers.

When the customer enters their credit card number and completes the transaction, the card number is encrypted and sent to the storefront, where it is briefly decrypted and passed to the component which talks to the payment gateway. The payment gateway talks to the credit card issuer's computer, verifies that the card is valid and that funds are available. At this stage, the merchant can decide to implement transactions in one of two ways. "AUTHORIZE/CAPTURE" means that the transaction is authorized and the funds are captured in one step. "AUTH-ONLY" means that the card is authorized, and the funds are locked, but the capture step will take place later, when the products are shipped.

Depending on your business model, you might be able to perform the capture step immediately, if you don't have to worry about items that could potentially be backordered for weeks or longer.

With AUTH/CAPTURE, the transaction is completed and stored in the payment gateway's system, and all the transactions for the day will automatically be "batched" or processed at the end of the day (usually 5pm). At that time, if you do nothing, the funds will automatically be transferred to your account. Prior to the batch processing step, you could if necessary, login to the payment gateway and void a transaction, if for example a customer canceled the order, or for any other reason.

When the order is processed, the order details will be sent to another table in the storefront database that tracks orders, customers and what was ordered. You can then access this historical data through the admin area of your storefront. Also, in most cases the order details will be emailed immediately to you, so you know that an order has been placed.

Many smaller merchants just reenter the order details from the email message into their POS system or accounting package and process the order as they would any other order placed by phone or in person. In some cases it's possible to interface the storefront with your POS or in-house system, so that the orders flow directly from the store's database to your own, where they can be processed automatically. This step always requires custom programming, unless you purchase an integrated system from a software vendor that supports both your in-house system and the storefront. Most of the time these are hosted applications (such as Quick Books) and are rather expensive, often in the range of several hundred dollars per month.

Some merchants also choose to implement inventory control. The storefront could have a field to store the current inventory, and when an item is ordered, the inventory count would automatically be reduced. This presents some problems in that it must be manually updated as you add inventory or sell items through other means than the website. Again it's possible to build interfaces that would allow the store to accept a daily (or hourly) data dump from your in-house system, to update inventory counts. One scenario would be that orders are placed online, are emailed to you, processed through your in-house POS and then the POS would send updated inventory counts to your storefront every hour (or day). This would provide two-way synchronization, but with a time lag. A more

sophisticated approach would allow for direct two-way synchronization, where the store and the POS would send transaction updates in real-time.

Most storefronts have other features, such as a way to indicate items that are on sale, new or “specials.” Another complication is how to handle attributes like color and size. For example, if selling t-shirts, you might offer a shirt in red, green and blue and in sizes small, medium and large. Large might cost \$2 more than small and medium, and might only be available in blue. To handle this, the easiest way is to add each pair of attributes into the database. For example, small red, small green, small blue, the same for medium and large blue. The large blue shirt would also have a different price associated with it. If all items are available in all colors and sizes, you could easily have two pulldown lists that the customer can select from, instead of having to combine both lists in all combinations.

Special offers can also be challenging. Some merchants want to offer a free item for orders over a specific dollar amount, or some other combination of incentives. Since there are an infinite variety of possible combinations, it might be necessary to modify the storefront to allow for a specific set of options. Only the most complex (and expensive) off-the-shelf storefront applications will support a complex set of rules for such options, and programming them can require the assistance of the software vendor.

Customization

As mentioned earlier, almost every business has unique requirements. No storefront package can accommodate all possible configurations. If they did, they'd be so complex and expensive that no small business could afford to use them. Some commercial storefronts are industry specific, for example they might be oriented toward business-to-business sales, or gift sales where you would need to allow for multiple recipients, or even to the sale of products that are customized on-the-fly by the customer. This would require the development of custom software. The customization process requires a very well-thought out plan for the flow of information and the steps required to process the order. Each and every failure mode must be accounted for. Developing the requirements for a custom storefront requires detailed working knowledge of your business and how orders are fulfilled. In addition, you'll want to consider how you want to handle refunds, declined credit cards, alternate payment mechanisms (Paypal, check, purchase orders) and how you will process returns and refunds. Some storefronts also provide order tracking facilities and even UPS/Fedex tracking numbers.

Storefront Feature Checklist

Required (Yes, No, Add later)	Description
	Products with multiple sizes, colors or other attributes.
	Products where not all combinations of size/color are available, or are priced differently depending on size, etc.
	Shipping weight varies depending on product attributes.
	Gift shipping – allow customer to select a different destination for each item in the cart, with sales tax, shipping calculated per recipient.
	Gift certificates, can be added to the cart like other products.
	Customized products, such as monograms.
	Ability of the storefront to dynamically show item in different colors (mouse rollover of product image).
	Multiple views (images) of each product.
	Some items require sales tax, others don't.
	Sales tax calculation for multiple states.
	Import of products and attributes from another database (first-time load or full periodic reload).
	Product SKU updates that come from another database or POS system.
	Export of orders to an accounting package or POS system in real-time.
	Batched output of daily orders from the database to another system or email.
	Encryption of batched order data.
	Integration of a third-party payment gateway other than Authorize.net, Payfuse or Paypal.
	Authorize/Capture processing, or authorize and capture later?
	Content management for pages other than the catalog itself?

Steps Required to Implement a Storefront/Shopping Cart

	Description	Responsibility
1	Configure web server	Web Hosting Provider
2	Order and install SSL certificate	Web Hosting Provider
3	Acquire Credit Card Merchant Account (or use Paypal)	Client
4	Order Payment Gateway (or Paypal)	Client
5	Send Payment Gateway Account Info and Keys to Web Hosting Provider	Client
6	Determine storefront requirements	Client
7	Configure Storefront, with required custom modifications	Web Hosting Provider
8	Install and test payment gateway	Web Hosting Provider
9	Customize storefront HTML/page design and graphics	Web Designer or Web Hosting Provider
10	Create product categories and enter products	Client (or Web Designer)
11	Finalize website design	Web Designer
12	Perform acceptance testing of the storefront functionality	Client
13	Run test orders according to the agreed upon test plan	Client
14	Client's bank may require PCI security audit	Web Hosting Provider & Client
15	Client's bank may require a review of the site to meet minimum requirements (such as adding pages for return policy, money-back guarantee, etc)	Client / Web Designer
16	Final approval and acceptance testing	Client
17	Site is placed into production mode	Web Hosting Provider
18	Test orders are placed using "live" credit card numbers	Client