

# E-Commerce: Part II Covering Your Back-End

## What You Should Know About Hardware, Software and Security

by Jim Thompson and Mike Woodward  
Illustration by Brian Biggs

In the last issue of *WH Mag*, we introduced you to Alfred Fuller, inventor of door-to-door selling. When a salesman from the Fuller Brush Company arrived at his customers' doors, all they saw was his smiling face, his magnetic personality and his line of brushes. The business model seemed simple: Pack up the products, ring a few door bells and watch the cash roll in. But there was whole lot more going on behind the scenes. The Fuller Brush men depended on the company's back office staff to handle issues such as manufacturing, distribution, accounting, sales support and customer care.

Today's online merchants are in a position similar to Alfred Fuller's. An attractive web site alone does not a profitable business make. Therefore, e-tailers rely on their hosting providers to help orchestrate and automate back-office processes to the point where all that needs to be added is the customer.

A web host's job is to determine what level of service — in terms of capital, technological and staffing resources — it's able to offer customers. To serve as an effective partner to e-tail merchants, a hosting provider must make hardware, software, skill level and service-plan upgrades part of its way of life.

### HARDWARE

Running a web hosting operation takes servers — lots of servers. There are many choices, but essentially, machines come in two flavors: full-fledged servers and appliances.

Although there was a time when each served distinct purposes, the boundaries between servers and appliances are blurring. Major manufacturers such as Sun, IBM, Compaq, Hewlett-Packard and Intel have diversified their focus on high end machines and added lower cost and more compact appliances to their product lines. (Sun has gone as far as acquiring Cobalt Networks, the leading appliance maker.) Meanwhile, newer hardware players Cobalt, NetMachines, Network Engines, StarBox Netsystems and others offer both general purpose server appliances along with appliances that handle specific tasks.

Will a Santa site be able to scale from four hits a day in March to million of simultaneous visitors in December? To a large extent, the answer is found in its hosting provider's hardware. The first thing on a web host's shopping list should be servers that are big enough and powerful enough to handle the incoming load around the clock, during any day of the year.

### IS THERE AN APPLIANCE IN YOUR FUTURE?

Servers or appliances? That's a question with no single right answer. Ultimately, the choice depends on the need.

"We don't use appliances," is the terse reply from the Loop, a small ISP in the Los Angeles area.

"A server can grow with a customer, an appliance can't," is the opinion of Haralds Jass, president and CEO of Superb Internet. "Thus [an appliance] has the potential to greatly impair the growth of a business. Many current appliances on the market are a step backwards in service-provider solutions."

Not everyone feels as strongly on this subject as Jass. Appliance advocates feel that the current generation of products offer immediate cost and time savings. In addition, each new release brings more robust, flexible and scalable machines. Meanwhile, you can stack multiple units in a rack to quickly attain the functionality you need.

But Jass' considerations are of paramount importance. Hardware can make or break a service provider's ability to grow with his customers.

One manufacturer that's won kudos from appliances fans is Starbox

"If my server goes down, a lump of coal will be the least of your worries, punk!"





Netsystems (starbox.net), which offers an Apache-based device aimed specifically at web hosts in three different size categories: 500 users, 1,000 users and 2,000 users. In the works is a name server, a firewall appliance, a web-caching device and an e-commerce appliance. Another appliance maker, Mirapoint (mirapoint.com), offers scalable mail-serving devices. The company recently lured Gene Banman, a former Sun vice president, to be its president and chief operating officer. By voting with his feet, Banman has given quite an endorsement to the functionality of appliances. Yet another manufacturer, Phobos (phobos.com), recently released a rack-mountable device that off-loads all SSL processing, allowing web and e-commerce servers to provide both secure and non-secure services at the same high speeds without becoming overloaded with the additional overhead of security processing.

## CONNECTIVITY

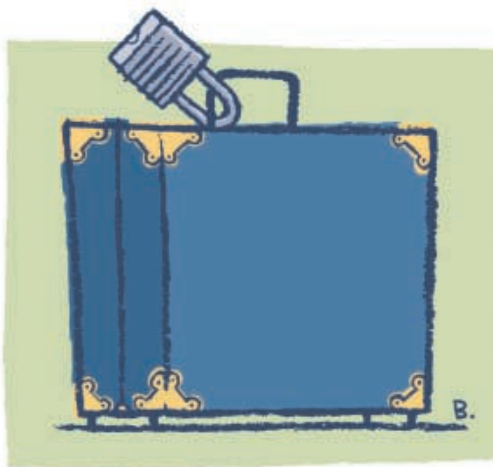
Once you've got a server system that's robust enough to handle the needs of your hosted sites, the next thing to look at is sufficient connectivity. A T-1 line that runs at 1.5-Mbps simply won't cut it for more than one popular site. You will end up falling victim to your customers' success.



T-3 and OC-3 lines run between three and 30 times as fast as a T-1, but at a cost between 10 and 50 times that of the smaller pipe. High bandwidth lines also take a while to get provisioned. In most cases, you will need to place your connectivity order in October or even September, if you want to be ready for the Christmas rush.

Web hosts should also pay attention to other methods of expanding the pipeline. Fast ethernet and soon, gigabit ethernet solutions, may be some of the arrows you'll want to have in your quiver. Look also to solutions such as scalable bandwidth on demand.

One company that provides gigabit Ethernet solutions is Telseon



(telseon.com). It offers scalable bandwidth within and between metropolitan areas to service providers. The amount of bandwidth is controlled by the service provider, eliminating the necessity of buying more equipment and provisioning another T-3 line as demand increases.

Yipes (www.yipes.com) currently offers the same service as Telseon directly to customers with plans to make scalable bandwidth available to service providers in the near future.

## A PLACE FOR EVERYTHING

Another issue hosting providers need to consider is real estate. Some *WH Mag* readers literally started in their basements and garages. As their businesses expand, additional space is needed for their growing collection of equipment.

For many, the solution is to move to a data center, like those run by Exodus or AboveNet. In addition the peace of mind that comes with round-the-clock monitoring and redundant mechanical, electrical, storage and telecommunications systems, these facilities may also offer a wide range of useful services.

"Both new and traditional service providers need to meet the explosive demand for next-generation services," says Pat Russo, executive vice president and CEO, Service Provider Networks, Lucent Technologies. "To do that, they must link high speed data centers with very high-speed optical and wireless networks to eliminate Internet bottlenecks."

One of the ways to meet next-generation demands is through partnering with a

new type of service provider that integrates Internet data centers with high-bandwidth optical backbones, thus eliminating bottlenecks on the Internet. They offer high speed networking and data center services to ASPs, ISPs, and web hosts who can then resell services such as email and e-commerce to both business and residential customers.

Yet another useful tool is caching devices, which are placed between the end user and the main server. By caching frequently accessed data, site visitors enjoy faster response times while service providers benefit from reduced demands on main servers.

## ASSESS YOUR GOALS

What's a web host to do in the face of endless hardware options? The answer depends on its goals.

For mom-and-pop hosting providers targeting local small businesses, appliances may provide the easiest and most economical solution.

"I think there will continue to be a lot of smaller companies that provide hosting services and e-commerce hosting services because smaller companies are able to have that customer service and customer contact through the sales cycle and service cycle," says David Rowe, director of marketing services and strategies for Intel Online Services.

On the other hand, for those of you whose strategy is to build or maintain a large hosting operation for high traffic e-commerce sites, it's a good idea to make a major data center your home base. Developing your own data center is an extremely costly proposition. However, leasing, colocation and partnering are methods a growing hosting provider can use to speed the transition from working next to the 1956 Dodge in the CEO's garage to rolling out operations centers worldwide.



"Sorry! We had to take your site down because my dad needed the garage."

## SOFTWARE

UNIX (or Linux or FreeBSD) or Windows (NT or 2000)? This is the first choice hosting providers are faced with in terms of software.

According to the folks at Uneven Internet (uneven.com), "NT is easier to use than UNIX, but UNIX is usually faster and can run Apache."



A recent survey by Netcraft (netcraft.com/survey/) indicates that Apache is being used on more web servers than all other software combined. Part of the reason is that it's free; another is that it's a reliable, stable platform.

Outside of the open source world, Microsoft is the overwhelming market leader. Some of the most popular e-commerce packages only run under Windows. Hosting providers will either have to make their UNIX-based machines work with NT/2000 or purchase dedicated servers that operate on those systems.

## DATABASE SERVER

The next issue at hand is the database server. While there are many choices, most industry players stick with the tried and true. "There are two database servers that support the majority of the e-commerce world: SQL 7 and Oracle 8," says Intel OnLine's David Rowe.

Microsoft's SQL Server is the database for the Windows family. Oracle 8i, currently in release 3, is Apache compatible. Oracle continues to migrate to hosted solutions with its new Oracle 9i, its philosophy being that software is becoming a hosted service more than a product.

So you've gotten the OS issues and database software packages squared away? These are but the tip of the iceberg in e-commerce solutions. There remains dozen of decisions to be made in terms of software for designing, maintaining and monitoring e-commerce sites.

## E-COMMERCE PACKAGES

E-commerce software can be broken down into these categories: storefront

packages, electronic customer relations management (CRM), supply-chain management and systems management.

Storefront software is just what the name implies — a platform for setting up online what resembles a traditional store. It helps the e-tailer to arrange products by category and allows the shopper to search for, order and pay for merchandise.

The goal of customer-relations software is to enhance and personalize online-shopping experiences with an eye to getting the product through the payment and delivery process. Supply-chain management solutions control production rates and parts ordering to minimize warehouse time and space. Integration between these two systems, plus accounting, marketing and sales, requires a systems-management package.

There are literally thousands of products to choose from in each category, ranging from full-service solutions from the likes of BroadVision (broadvision.com) to specialized packages from Miva (miva.com), for instance, which are designed for a specific purpose.

Customers want to choose, "a fully managed service where the vendor provides all the assets and integration as part of the service," Intel Online's Rowe explains. Finding e-store software you can work with and support is key to helping your clients.

Web hosts who want to be competitive and keep their clients happy must be familiar with many different solutions. Not only should you know about the most popular packages, but the search for better solutions should never end. Every day new, more powerful and more cost effective e-commerce tools are offered.

The key to increasing your client base and your revenues may be in one of those new offerings. You also need to know your software well enough to be able to offer training and support for your customers. Software providers are more than willing to help out by pro-

viding training for service providers in the use of their product.

## FULL E-COMMERCE PACKAGES

BroadVision is well supported in the industry with established B2B and B-2-C packages. Recently allied with Hewlett-Packard and Sun to provide a hardware/software package, the company offers personalized e-business applications as well as CRM. Although it is moving from a proprietary language

toward XML and Java, current analysis reports that

it lags behind some competitors, such as InterShop and IBM in this regard.

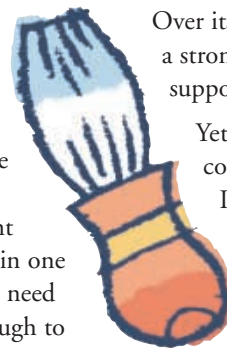
IBM (ibm.com) offers its WebSphere suite in competition to Broadvision. The company has allied with Ariba (ariba.com) to market supply-chain management solutions. As one of the largest companies in the world, it also offer smart cards and application servers, as well as e-commerce solutions. IBM provides advice and training both in its products and for general information about the set up and operations of e-commerce sites.

InterShop (intershop.com) is one of the leaders in online-storefront software. Its package includes InterShop Infinity and InterShop 4.0. The company has traditionally focused on small to medium businesses, but now also offers an enterprise-level product, InterShop Marketplace Tool Kit, which connects sell-side applications to e-marketplaces. Over its history, InterShop has developed a strong track record of allying with and supporting service providers.

Yet another major player in the e-commerce software sphere is InterWorld (interworld.com). Its primary strength lies in B2C software. InterWorld's Commerce Exchange suite offers transaction management, personalization, content management and a variety of merchandising features.



**"No general! Not B2 support!  
We need B2B support!"**



When companies as large as Sun and Netscape (recently assimilated by AOL — resistance was futile) get together, their offering cannot be ignored. IPlanet (iplanet.com) offers, in its own words, e-commerce solutions “from silicon to eyeballs.” As a hardware/software combination of formidable parentage, it brings the advantages of Sun’s hardware and Netscape’s Enterprise Server software.

## STOREFRONT SOFTWARE FOR THE MASSES

The companies listed above offer online storefronts as part of a full e-commerce package. These are the big boys whose solutions meet enterprise-level needs. However, for those not in the business of hosting large numbers of Global 2000 companies, one of the following mass-market players may serve as a more appropriate partner.

Miva (miva.com) offers storefront solutions and credit-card enabled order forms as part of Miva Merchant, its e-commerce package. It also participates in different types of comarketing with hosting partners, according to company spokesperson Sherry Isler.

iHTML from of InLine Internet Systems (inline.com) offers site solutions ranging from database driven e-commerce sites to simple brochureware. “Most of our partners are smaller web hosting companies,” says CEO Russ Cobbe.

Mercantec (mercantec.com), which concentrates on the small to medium businesses, markets its SoftCart package to service providers, as well as individual businesses. “Mercantec considers its channel [service providers] to be key partners and treats them as such,” says the company’s Product Manager, Bob Honn.

## CRM SOFTWARE

CRM software aims to do what old Alfred Fuller aimed to do: know that your Aunt Harriet’s birthday was coming and make you a special offer on a boar-bristle brush. It helps tailor the buying experience to the individual shopper and gives them the feeling that the merchant care about them and their needs.

“While the power of the Internet enables

unlimited integration of product choices, this can be overwhelming to the consumer,” says Online Insight’s Ken Forster. CRM is the attempt to overcome the problem of too much information scaring away the customer. The visitor to a site doesn’t want to look at every pair of brown shoes made, just the ones that interest him.

CRM allows online merchants to customize their offerings to meet the needs of individual customers. There are any number of ways of accomplishing this: visitor surveys, demographic analysis (poor people don’t shop at Neiman-Marcus very



often) and the use of algorithms to personalize the shopping experience.

In simple language, an algorithm is a symbolic formula running through a number of steps that can remember the steps it went through. In practical terms it means that when a visitor signs on to a web site, his past behavior can be recalled and used to present him with customized product offerings, designed specifically for him. What makes an algorithm “intelligent” is its ability to adjust to changing circumstances.

Closely allied with customer-response programs is the idea of data mining, or looking for patterns in data. This is not just a new presentation of existing data. True data mining can find and present previously unknown relationships among and within existing data.

## MANAGING SHOPPING

Again, a great many companies offer e-CRM, the software that manages

shopping from presentation through purchase. A recent report by Ovum (ovum.com) states that consumers expect their online experiences to match or exceeds real-world experiences. Here are a few shopper-pleasing offerings:

In August, Oracle came up with a nice little loss leader — it’s giving away (or was as of press time) its Sales Force Automation (SFA) package online. This package provides pipeline management, which is the funneling of goods from manufacturer to consumer, along with calendaring, expense and travel management. Of course, Oracle is not in business to lose money. The most likely reason behind this giveaway is to attract customers to incorporate more elements of its CRM package.

Siebel (siebel.com) is one of the larger competitor to Oracle in the CRM arena. It offers a full suite of applications for sales force, call centers and marketing, among other solutions. Its field and sales services include online configuration and pricing as well as hand-held voice and wireless software. It also has a full suite of B-B, B2C, auctioning and marketing software.

E.piphany (epiphany.com) offers web-based CRM applications with real-time analysis. The customer’s current behavior is calculated real-time into the interaction he’s having with the site. It offers the E.piphany E.5 system, an “analytical and operational” customer-relations management package that “coordinates and unifies, in real-time,” all interactions with customers.

## A MORE PERSONALIZED EXPERIENCE

Online Insight (onlineinsight.com) offers one of the most innovative ways of personalizing web sites. Its current solution is a two-fold product. On one hand, an intelligent algorithms uses a query-and-response format to guide the consumer to product choices that meet his needs. On the other hand, the aggregate data is collected and analyzed to provide feedback to the merchant. This process allows not only a more efficient shopping experience, but literally improves the site each time it’s accessed.

Another approach to giving the consumer a personalized shopping experience is to put a real person into the equation. Live Person (liveperson.com) does just that. At crucial junctures in the shopping process pop-ups appear that allow the consumer to chat online with a live operator.

The live operator has access to data collected from the shopper, allowing them to answer questions intelligently and accurately. One advantage is that, since this live person interaction is occurring in a chat format, the operator is able to service several customers at a time. The use of ASP technology also means there is no hardware or software to install.



**"Your live operator went to lunch. Say hello to a smooth operator, baby!"**

## CREATING A MARKETPLACE

The next step beyond hosting a single store is to combine individual storefronts into a larger marketplace. Such a collaborative effort can pay big dividends including links between multiple merchants' sites, group buying opportunities and the sharing of software and hardware. Another plus is that shoppers can be kept in-house and not be lost to the competition. For the web host, this translates into more flexibility, higher profits and ease of management.

The focus of Actinic Catalog (actinic.com) is to assist ISPs and web hosts with the set-up and maintenance of multi-store e-commerce sites. It does so by supplying a hosting engine, pre-configured to run on a service provider's servers. Release 3.0 of the product received excellent reviews. Release 4.0 was launched in late September.

## SECURITY CONCERNS

The number-one consumer concern in making purchases over the Internet is security. Buyers want assurances that credit card numbers won't disappear into the Internet cloud, only to reappear in some hacker's computer.

If you're working with one of the major

vendors like IBM, Cisco or Sun, they likely have already familiarized you with their security offerings. If you're a start-up provider, patching together equipment and customers, while trying to keep one step ahead of intruders, some of the first places you should visit are the web sites of these vendors. All of them offer a wide range of services and information to help you better address security concerns.

Firewalls, which are a combination of hardware and software implementing security between two or more networks, are the most basic element of a security system. They come in three basic flavors: Packet filtering routers restrict traffic by looking at the sources and destinations of individual packets. Proxy/circuit level gateways act as an intermediary by requiring each user to first connect to the firewall. Application proxy firewalls extend the proxy/circuit firewall to the application level by inspecting traffic to ensure that it conforms to the particular application's protocol.

A common addition or enhancement to a firewall is called a DMZ (de-militarized zone). In most cases, this is a combination of firewalls and bastion hosts (themselves a gateway between internal and external networks). Generally a DMZ sits outside the main firewall, acting as an additional barrier to intrusion.

The basic function of a firewall is to restrict to the minimum what a service requires to implement an application. In other words, it limits communications. Internal systems may need to initiate connections with a server on a DMZ network, but not the other way around. Access for a database server, for example, should be limited to web servers that retrieve information from the database and internal systems used by database administrators.

Firewalls should also hide internal network architecture and addressing from external users. Finally, the firewall should itself be difficult to scan by limiting what protocols may pass through it.

## INTRUSION DETECTION

Most of the commercially available security systems include some

kind of monitoring for intrusion. Known as IDS (Intrusion Detection Systems), these protocols are either installed on the host machines or on the network. Each system, of course, has its advantages and blind spots, and more complete coverage is provided when the two types are combined.

Host-based IDS are not as fast as network IDS, but their strengths include stronger intrusion analysis. Additionally, they focus on data specific to the host and have a lower entry cost than network systems. IDS operate by examining the system, event and security logs on Windows NT and the syslog in a UNIX environment. Since they are using logs containing actual events, they can verify whether a given attack was successful.

One of the flaws of an IDS is that they cannot detect every type of intrusion, most notably, those that are launched from the keyboard of a critical server and, therefore, don't cross the network.

In such cases, a host-based system can be effective, since they can detect infiltrations that may be unseen by network-based IDS. Also, since the host-based system examines de-encrypted data, it will see attacks that can be missed by a network system. Although host-based systems don't offer true real-time response, when properly implemented, they come very close.

## NETWORK-BASED IDS

While the initial cost of a host-based system is lower than that of a network-based one, network systems can be strategically deployed to monitor traffic destined for multiple systems. On network systems, software only has to be loaded and configured once, instead of on a variety of different systems.

This lowers the total cost of ownership in an enterprise environment.



**"North Korea just called. For a couple of bags of rice, we can put our network in the DMZ."**



Network-based IDS also look at all packet headers. Since many denial of service attacks can only be found by looking at packet headers and host-based systems do not examine packet headers, network-based IDS are the only way to protect a system against this type of attack.

Another major advantage of the network-based systems is that they operate in real-time. Attacks are reported as they occur, allowing faster notification and response. Since any hacker worth his salt knows how to manipulate audit logs, the rapidity of network-based response means that he will not have time to remove the evi-



A hacker's worth of salt.

dence of his visit before being found out.

The bottom line is simply that each of these

intrusion detection systems has strong and weak points. One or the other may work best for the particular environment you are hosting, but it is likely that you will find some combination of the two gives you the overlapping security necessary to protect your clients' businesses.

## WHO'S OUT THERE AND WHAT ARE THEY DOING?

In addition to the large companies, there are many smaller outfits that offer special packages and options. If you think the installation of a firewall between your hosted storefront and your database server is enough, you need to think again. Counterpane (counterpane.com), one of these companies, points out the obvious, "If a firewall was perfect, you wouldn't need an alarm."

Counterpane was started by the man who literally wrote the book on cryptography. Bruce Schneier is the author of *Applied Cryptography* and a recognized expert in the field. The idea behind his company is that security is an on-going process, not a product.

The concept here is that there's no perfect security technology. The analogy Counterpane makes is to the purchase of

a safe — all of which have a rating. That rating tells the purchaser how long a professional with tools will take to get to the contents. If an alarm doesn't alert a guard to come running, the thief makes off with the jewels or, in your case, a client's database.

Those who offer web hosting services must give their clients an assurance that not only are you using the best of current technology to protect them, but that you, or a service you employ, will be there when the alarm sounds.

If you intend to be your own cop on the beat, you should look at some of the companies offering security systems solutions. Among these are @Stake (atstake.com) whose chief science officer is a man named Mudge (and you thought that was Mr. Spock...). In spite of a name that sounds more like a crazed chef who makes candy, Mudge is a highly respected cryptographer whose company offers a rapid ramp-up to secure server architecture. He has also co-authored a number of technical papers and reports with Schneider. The @Stake web site is an excellent source of information.

Also, check out Entrust (entrust.com). Its offerings include security solutions for both web and wireless transactions. Its customers include New York Life, Chase Manhattan and the U.S. Government. It wholly owns a subsidiary called Cygnacom (cygnacom.com), which specializes in public key infrastructure (PKI), information security consulting and security evaluations.

PKI is a system of certificates and other registrations that verify and identify the parties in an Internet transaction. Currently, there's no industry-wide standard for building a PKI or any single PKI. While the industry differs on which PKI will be used and how to make one, there is general agreement that this level of mutual

identification is necessary for e-commerce security.

Another important security player is Internet Security Systems (iss.net). In its own words, "not only does ISS offer market-leading, best-of-breed security management systems for security assessment, policy enforcement and intrusion detection — all built on the company's SAFEsuit™ security-management platform — it also provides superior customer service, consulting and education offerings that significantly reduce the complexity and expense inherent in protecting online assets."

Each of the companies listed above not only sells products or services, but also have web sites full of information. Since, as a web host, you need to be informed to properly service your clients, these sites are an excellent place to begin increasing your knowledge of security.

If you want to take a look at the other side of things, visit *Phrack Magazine*. This is a magazine aimed at "hackers with honor." Like the rogue Samurai or Ronin of medieval Japan, their skills are deadly, but their hearts are in the right place. Though Dogpile lists its URL as phrack.com, this link led nowhere. Back issues were available on world.std.com /-loki/security/phrack.

E-commerce offers many opportunities along with a host of challenges for the web host. It's an area that's changing daily as it struggles to meet the demands of customers. We have looked at only a small percentage of the hardware, software and security solutions available in this crowded field. The one conclusion that can be drawn is that, as a web host, you can't ignore the impor-

tance of e-commerce and what it means to your future. In the words of Ted Turner, you have to "lead, follow, or get out of the way." ☺

