

Keeping online orders flowing

Web-based retail application delivery control

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Whether it is selling books, groceries, gadgets or tickets, the volume of orders being taken online continues to grow. Ensuring that customers receive a prompt and personal experience, whilst remaining assured about security, is essential to the ongoing success of online retail. One of the key challenges for retailers is the management of the applications that provide up-to-date information about what's on offer to customers and handle their orders—especially when there are peaks in demand.

This paper discusses how online retailers can better prepare their applications for a future of increasing, but often irregular, demand. It should be of interest to those tasked with managing online retail applications and those that manage the revenue streams that rely on them.

Bob Tarzey
Quocirca Ltd
Tel : +44 7900 275517
Email: bob.tarzey@quocirca.com

Rob Bamforth
Quocirca Ltd
Tel: +44 7802 175796
Email: rob.bamforth@quocirca.com



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www.quocirca.com

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Executive summary

The rapid growth of online retail puts the applications that drive retail websites under stress, especially at times of peak load, when poor performance can lead to frustrated customers and lost orders. It is also necessary to make sure customers are confident about security and that they receive a service customized to their needs when possible. Application delivery controllers can enable an optimized, secure and personal online retail experience for all.

- **Online retail continues to show strong growth despite the recession, but on the high street demand is not evenly distributed throughout the year**
For many European and US retailers the most obvious shopping peak is before the Christmas holiday. However, there are many others, such as charity fund raising events that lead to surges in online donations or the moment tickets for a particular high profile entertainment event are made available and fans rush to secure their tickets from online agencies.
- **Ensuring an optimal performance at all times for online customer experience minimizes lost transactions and customer churn**
It is easy for online shoppers to go elsewhere. Even when online visitors are forced to persist, for example when donating to charities or transacting with public service providers, if the experience is poor they will leave with a bad impression and may turn to other, less efficient, channels in the future.
- **Even online customers expect to receive a personal experience**
Loyal customers want to be recognized and rewarded; even if it is just through being treated with a high priority. Even new customers can be offered a customized experience by recognizing something about their location in the “real world” and modifying the content they are shown accordingly.
- **The growth in online retail relies on customers remaining confident about security**
The big security issue with online trading is the safe handling of credit card information. The payment card industry data security standard (PCI-DSS) provides the guidelines, but its recommendations are exacting and can be onerous to comply with.
- **Application delivery controllers (ADC) can help address many of the challenges of performance, personalization and security**
Advanced ADCs help overcome all three issues. They ensure sufficient computing resources are available, balance workloads across those resources, manage traffic to minimize bandwidth use, act as local data caches, off-load intensive tasks from web servers, provide geolocation information, act as web application firewalls and allow the scripting of rules as to how transactions should be handled.

Conclusions

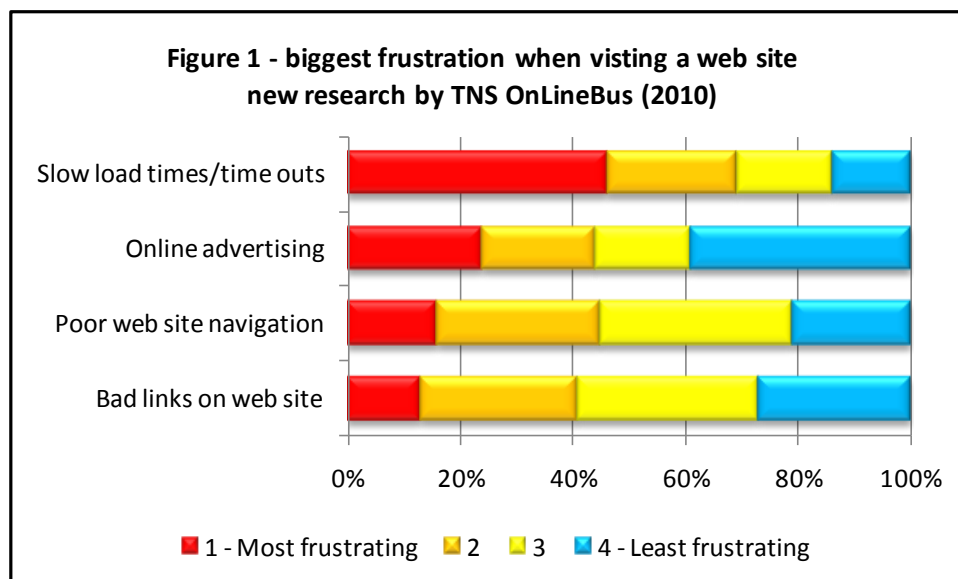
Offering an unreliable or sub-optimal online service is not an option in the 21st century. However, performance and availability are only the start. Those organizations that compete best in the long term will be those with a reputation for secure trading and providing their customers with a personal experience that can exceed that achievable on the high street.

1. The fickle online customer

The convenience of buying a wide range of items on the internet is clearly trumping potential security concerns such as credit card fraud. Figures from the market research firm comScore for December 2009 showed an increase in online retail figures for the USA of 5% over 2008 despite the recession; high street sales in the USA and Europe in 2009 generally fell whilst online sales rose. On one day in particular, so-called “Cyber Monday”, US sales peaked at \$887M, about 300% higher than average across the year. So, just as with high street shopping, online retail sales reflect peaks (and troughs) in demand.

A high street store will cope with expected peaks by bringing in extra staff, making sure all point-of-sale (PoS) devices are manned and adjusting stock levels. For online shopping, coping with peaks and delivering a reliable and fast service is more about making sure there is enough computing power available. For some, such as the world’s largest online retailer, Amazon, and other fast growing ones like iwantoneofthose.com, online is their only route to market, so a poor customer experience at any time is unacceptable.

However, recent research conducted by TNS OnLineBus (TNS-OLB) amongst UK consumers shows that, generally speaking, commercial web sites are not always delivering a satisfactory experience. Web pages taking too long to load or timing out is the most commonly reported frustration (Figure 1). The situation is exacerbated during times of peak loading when the number of consumers trying to transact at the same time is at a maximum. In the worst case of course, performance problems can mean web sites becoming unavailable, as happened with Sainsbury’s, a UK retailer, in 2008. It is thought to have lost sales exceeding £1M in that period and saw customers disappear to competitor sites. The lesson was learnt; no similar failings with its service have been reported since.



Peak loads and lost transactions

The seasonal shopping demand created by Christmas and New Year is an obvious example of a peak but there are many others. One is charity fund raising where a particular event is aimed at creating a frenzy of giving. The UK’s Red Nose Day appeal in 2009 raised a record £82.3M, mostly on March 13th and 14th, the days around the event itself. This money is mostly donated online or over the telephone (where operators access the same systems). Handling a huge peak in demand for just a few days of the year is a big challenge for any online retailer.

In other areas peaks are caused by the sudden availability of an item. Agencies such as See Tickets are trading all year, but the sudden availability of tickets for a particular event leads to a rush as fans clamor to get hold of a limited resource. Handling such surges in demand is important not just for those wanting tickets for the given event, but also to make sure buyers of tickets for other events are not impacted.

For all such organizations the main worry about handling peaks badly is losing transactions. They are right to be worried; 82% of respondents to the TNS-OLB survey reported that they had abandoned transactions on retail web sites at least once in the last 12 months due to poor web site performance, 7% estimated they had done so more than 20 times. Would your organization be happy losing that many transactions just because its web site is too slow?

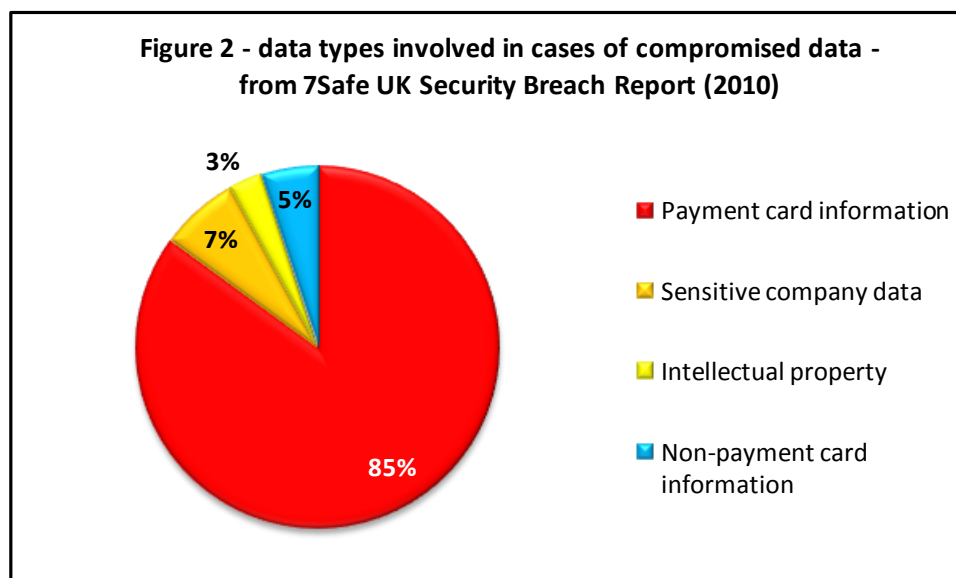
Fans buying tickets may be patient and keep trying, but the TNS-OLB research also shows, unsurprisingly, that poor service is not good for the image. 82% of respondents indicated that when such problems occurred, the poor performance changed their perception of the brand concerned. The ardent fan may persist, but shoppers can go elsewhere—another online store or the high street—and those donating to charity can simply give up; “if you don’t want my money, so be it”.

A personal and secure experience

It also helps if you can determine something about the customers, especially where they are physically located. Shopping sites may not be able to deliver goods to certain countries or regions and therefore politely refuse an order (think sales of alcohol to certain middle-eastern countries). A fan might try and buy tickets to see a band and fail to notice the band is playing on the same tour at a more convenient location. Such personalization is appreciated; location still matters even in the online world. In the TNS-OLB survey, 71% of respondents felt that, as loyal online customers, they should be recognized and given a better experience than first time visitors. How well do you know your online customers?

It may be true for many that the convenience of online shopping has helped them overcome security concerns, especially in relation to using credit cards online. However, this is also down to the fact that using credit cards online has actually become more secure. This is in large part due to the efforts of the PCI-DSS (payment card industry – data security standard) a body that regulates online payment. Organizations that fall short of the standard and let their customers down may not only be subject to fines from data privacy regulators but will suffer ongoing reputational damage and consequent lost custom. The lengths to which some will go to steal credit card data should not be overlooked; figures given by 7Safe from its *UK Security Breach Investigations Report (2010)*, show that 85% of compromised data cases involve credit card information (Figure 2).

How do those responsible for building online transaction platforms ensure they handle the challenges of performance, especially during peak loading, and ensure a personalized and secure online experience?



2. Online retail application delivery control

Comic Relief, the charity behind Red Nose Day, has just 6 virtual servers running its infrastructure. Most of the year this is fine to handle the day-to-day work of the charity but, at its peak load, at the time of the event itself, this requirement leaps to 200 servers. How can Comic Relief handle this?

Scalability and availability

In 2008, to ensure it could support the increasing size of ongoing events, Comic Relief did three things. First it virtualized its infrastructure; this makes it far easier to increase the number of instances of servers running at any one time—when load grows above a certain point another one can be invoked. Second, this allowed it to make use of additional infrastructure from its hosting partner. When the physical servers dedicated to Comic Relief were fully loaded it could start making use of temporarily allocated additional resources, paying for them on a capacity/time used basis, mitigating the need to invest in rarely used hardware and software.

The third action it took was to introduce application delivery controllers (ADC). ADCs serve a range of needs. One is to recognize that levels of demand have exceeded the current allocation of resources and deploy new ones dynamically. It is the ADC that actually invokes additional servers and balances the work load across them. In many cases, even when virtualized, the underlying physical infrastructure will be geographically distributed. So another benefit of some ADCs is that, through the use of geolocation services, they can direct a given customer to their nearest physical servers, for instance recognizing US and European shoppers and directing them to local infrastructure to minimize trans-Atlantic traffic.

Performance

Through invoking new resources and balancing workloads ADCs have an indirect impact on application performance. They also have a direct role to play too, in three main ways; traffic shaping, caching and offloading.

Traffic shaping involves compressing data before sending it back to the end-users. This is useful when there is no choice but to transmit over long distances and respond to requests from users on restricted bandwidth connections. This will speed up the download of web pages and therefore the speed at which they load for the user.

Better still, ADCs can cache commonly used static web pages nearer to the user, meaning they rarely have to be downloaded from the web server itself. Some ADCs can themselves be delivered as virtual applications (softADC), which means they can be installed anywhere, acting as a local point of presence.

ADCs can also handle resource-intensive tasks such as encryption; taking some of the burden from the back-end servers (handling encrypted traffic can be as much as twenty times more intensive than unencrypted traffic). This latter point is essential; for transacting online, where credit cards are the medium of choice (over 90% of online transactions in Europe are handled by credit card), encryption is part of the standard laid down by PCI-DSS.

The five core benefits of ADCs for transacting online

1. Scalability: ensuring the resources are available at all times, however large peaks in demand might be
2. Availability: directing customers to failover facilities when the primary service is unavailable for some reason
3. Performance: traffic shaping, content caching and offloading compute-intensive tasks
4. Security and compliance: making sure credit card transactions are handled in line with PCI-DSS guidelines
5. Customization: the use of scripting and geolocation to provide a personal experience for every customer

Security and compliance

As well as requiring the use of strong encryption (e.g. secure sockets layer/SSL) PCI-DSS section 6.6 states that applications handling credit card transactions online must either have been subject to a code review or protected by a web application firewall (WAF).

The first option requires the use of a series of manual and automated processes to ensure a given application is free of vulnerabilities that may be exploited by hackers wanting to steal credit card information; this can be resource intensive and may be unachievable if the organization running the application does not own all the code involved. The second option is to address the problem by assuming there may be vulnerabilities and inspecting application-level traffic instead using a WAF. Some advanced ADCs are certified as WAFs.

Credit card information is the highest profile issue regarding customer information stored and processed by online retailers. However, it goes without saying that all personally identifiable information should be handled with care; data protection regulations demand this and the fines that can be imposed for compromises are increasing rapidly. Many cases involving leakage of personal data have made headlines—make sure your organization is not the next.

Customization

A final benefit of an ADC is to recognize something about the customer and tailor their experience using this knowledge. Customer relationship management (CRM) systems can tell if a given customer has been a previous big spender and, if so, the ADC can ensure their transaction is prioritized at the application level. The same can be done for a new customer that has an overflowing virtual shopping basket. To do this requires that the ADC has a scripting language. See Tickets used such scripting capabilities to ensure a “fair queue” system on its website, making sure allocations of tickets were dealt with on a first-come, first-served basis.

Geolocation techniques further help with customization. Local language can be displayed if the country from which a given visitor originates is known. They can also be informed of other locally relevant events: *“here are your tickets for Glastonbury, but did you know about the following event at your local venue?”* Retailers with both an online and high street presence can link the two: *“this item can be collected today from your local store if you require”*.

3. Conclusions and recommendations

“If you are not online you are not in business” one CEO said to Quocirca recently. For organizations that transact online this is patently true and for an increasing number of retailers, charities and agencies (including public sector ones) the internet is now their primary or only way of dealing with their customers. Offering an unreliable or sub-optimal online service is not an option in the 21st century. However, performance and availability are only the start. Those organizations that compete best in the long term will be those with a reputation for secure trading and providing their customers with a customized experience that can exceed that achievable on the high street.

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About Zeus

Zeus software enables our customers to create, manage and deliver exceptional online services in Physical, Virtual and Cloud environments. Implementing a Zeus solution allows organizations to control and manage the flow of traffic to their web-enabled applications, ensuring a consistently robust application delivery infrastructure.

Zeus Traffic Manager and Zeus Load Balancer software is used by thousands of customers worldwide. It actively manages network traffic to and from applications:

- It improves performance by load balancing and optimizing the traffic, caching and offloading to allow the application to run at the most efficient level possible,
... thus improving customer experience and your ROI on your infrastructure;
- It improves reliability of services by actively monitoring the health of each server, detecting server errors or imminent overload and routing traffic away,
... thus improving the availability of your services;
- It improves security of services using anti-denial-of-service and filtering measures. The 'Application Firewall Module' adds a full Web Application Firewall to secure an application to the requirements of PCI-DSS and beyond,
... thus protecting services and data from malicious attacks;
- It contains a wide range of capabilities to control, shape and monitor traffic—compression, bandwidth and rate shaping, advanced session persistence, service level monitoring, advanced traffic visualization and diagnostics, allowing you to
... create powerful, innovative solutions to application delivery challenges.

Zeus powers over one million website infrastructures across the world including Comic Relief, Domino's Pizza, Gilt Groupe, I Want One Of Those, Play.com, See Tickets, and WhitePages.

Zeus is in a unique position to assist any business looking to enhance their mission-critical Internet service infrastructure.

For further information, please email: info@zeus.com or visit www.zeus.com.



REPORT NOTE:

This report has been written independently by Quocirca Ltd to provide an overview of some of the issues facing mobile network operators as they deploy more and more data applications.

The report draws on Quocirca's extensive knowledge of the technology and business arenas, and provides advice on the approach that organizations should take to create a more effective and efficient environment for future growth.

Quocirca would like to thank Zeus for its sponsorship of this report.

About Quocirca

Quocirca is a primary research and analysis company specializing in the business impact of information technology and communications (ITC). With world-wide, native language reach, Quocirca provides in-depth insights into the views of buyers and influencers in large, mid-sized and small organizations. Its analyst team is made up of real-world practitioners with firsthand experience of ITC delivery who continuously research and track the industry and its real usage in the markets.

Through researching perceptions, Quocirca uncovers the real hurdles to technology adoption—the personal and political aspects of an organization's environment and the pressures of the need for demonstrable business value in any implementation. This capability to uncover and report back on the end-user perceptions in the market enables Quocirca to advise on the realities of technology adoption, not the promises.

Quocirca research is always pragmatic, business orientated and conducted in the context of the bigger picture. ITC has the ability to transform businesses and the processes that drive them, but often fails to do so. Quocirca's mission is to help organizations improve their success rate in process enablement through better levels of understanding and the adoption of the correct technologies at the correct time.

Quocirca has a pro-active primary research program, regularly surveying users, purchasers and resellers of ITC products and services on emerging, evolving and maturing technologies. Over time, Quocirca has built a picture of long term investment trends, providing invaluable information for the whole of the ITC community.

Quocirca works with global and local providers of ITC products and services to help them deliver on the promise that ITC holds for business. Quocirca's clients include Oracle, Microsoft, IBM, O2, T-Mobile, HP, Xerox, EMC, Symantec and Cisco, along with other large and medium sized vendors, service providers and more specialist firms.

Details of Quocirca's work and the services it offers can be found at <http://www.quocirca.com>