Case Study:

With Help from Applied Innovations, a Replica Weapons Website Stays Ahead of the Hoards

The Phone Call that Started It All

Before he received the telephone call on Thursday, it had been a regular October work week for Les Atkins, the senior Web developer for Atlanta Cutlery Corp.

Originally founded in 1971 as a mail order catalog business, Atlanta sells hunting supplies and hard to find knives and knife making supplies from all over the world. Today it conducts the majority of its business directly over the Internet on several internally managed and branded Web sites.

Through its subsidiary Museum Replicas, Ltd., the company also sells an extensive line of historical replica weapons, clothing and accessories from the Greek, Roman, Viking and Medieval time periods. A year ago, Museum Replicas began marketing its replica gear to Live Action Role Playing (LARP) enthusiasts. Dating back to the days of Dungeons & Dragons in the 1970s, LARP is a form of a role-playing game where the participants physically act out their characters' actions, usually in battles. Doing so, of course, requires the finest in battle gear. So this was a perfect target audience for Museum Replicas.

Atlanta Cutlery Corp had long hosted its critically important e-commerce Web sites — including MuseumReplicas.com — with Applied Innovations Corp., based in Boca Raton, Florida. Applied Innovations is an industry-leader in Microsoft Windows Web hosting. Its customer base is diverse and includes many small businesses like Atlanta Cutlery, as well as much larger firms requiring enterprise-level infrastructure and support. Applied Innovations also specializes in providing complex application hosting solutions for a diverse collection of online merchants and other small to medium sized businesses.

Applied Innovations' ability to provide scalable, stable, and affordable Microsoft Windows hosting solutions has long been the source of its competitive advantage. And these qualities were the reason Atlanta Cutlery originally selected Applied Innovations as its hosting service provider.

"It's going live next week," said the voice on the other end of the telephone. It was a member of Atlanta Cutlery's marketing team, who had just informed Atkins that Blizzard Entertainment, publisher of the uber-popular World of Warcraft game, would be launching an advertisement for Museum Replicas' battle gear on WOW's North American and European Web sites.

Atkins gasped. He knew exactly what this meant. World of Warcraft was one of the most phenomenally successful online role playing games ever created, with nearly 12,000,000 monthly subscribers. Even a minimal surge of traffic from WOW customers would surely cripple

the Museum Replicas Web site and its underlying infrastructure. The site would likely just stop functioning. This meant that not only would Museum Replicas be unable to service the sudden surge of valuable traffic, but its existing bread-and-butter customers would also be locked out of the site.

Atkins quickly went into crisis-management-mode.

"What kind of traffic can we expect?" he asked the caller. There wasn't a definitive answer. Blizzard had stated the ad would run for three days, and that the Museum Replicas site should be prepared to receive anywhere between 100,000 and 1,000,000 visitors per day. Although the site traffic was growing, MuseumReplicas.com typically only received around 3,000 visitors per day, or about 90,000 per month. Blizzard was projecting it would send a minimum of one month's worth of traffic in a single day… for three days in a row.

Applied Innovations' Creative Solution

Working within Atlanta Cutlery's budget, Applied Innovations had originally provisioned MuseumReplicas.com on a mid-range dedicated server, with a separate virtual MS SQL database server running in a shared environment. (The dedicated server contained every aspect of the site, except for SQL.) The site itself was built with ASP.NET and utilized the AspDotNetStorefront e-commerce solution.

The hosting infrastructure had proved itself stable and flexible enough to allow the site to grow over the years. But Atkins knew there was no way the current hosting solution at Applied Innovations could handle the traffic anticipated.

After he was off the phone with his colleague, Atkins made his first call to Applied Innovations, noting that he had just over a week to prepare for the onslaught of traffic. His call was quickly transferred to Wayne Lansdowne, chief systems architect.

At Applied Innovations, Lansdowne, oversaw several million dollars worth of server and network infrastructure. He had been on the engineering team at Applied Innovations for more than seven years, and had earned a reputation as the company's top hardware expert. In essence, say his colleagues, Lansdowne is the one person who can solve just about any technical challenge.

Atkins described the predicament to Lansdowne. He explained that he didn't know exactly what would be needed in terms of infrastructure to accommodate the expected surge in Web traffic. He requested a quote for a traditional all-hardware based solution, in which additional physical servers would be provisioned to provide the necessary system resources. Atkins also set forth the timetable: it had to be ready in just over a week.

Lansdowne, as he listened carefully to Atkins' dilemma, was skeptical.

"We get these phone calls at all of the time at Applied Innovations – a customer calls and says, 'I'm going to get this surge of traffic.' It's as if they're going to be on *Oprah* and expect a 10-

fold bump of hits," Lansdowne recalled. "Very rarely does it work out that way. But in fact, he was the 1 out of 100 customers that did end up receiving an incredible amount of traffic."

Lansdowne and the Applied Innovations team considered a variety of options, noting the differences in each in terms of scalability, setup time needed, and cost.

The key challenge was that provisioning new physical servers—the traditional way of approaching a traffic increase—for only three days of increased traffic would be extraordinarily expensive and inefficient. Typically, Applied Innovations would provision new high-performance server hardware only for clients who were prepared to sign a multi-month lease. But Atlanta Cutlery simply could not afford to do that, and would have no use for the excess capacity after the Blizzard promotion ended.

After assessing the situation, Lansdowne recommended a creative, cutting-edge solution, which would shave more than 70% off the price of Atkins' original request. Instead of adding physical infrastructure, Lansdowne explained, Applied Innovations could create a fleet of virtual Web servers and host them on existing virtual server nodes that Applied Innovations already operated.

This alternative offered two primary advantages:

- First, since Applied Innovations had the hardware in place, costs would be minimal, and no long-term commitments would be needed. So Atlanta Cutlery would pay only for what it needed, for only as long as it needed it.

- Second, since provisioning virtual Web servers required no new hardware inventory, additional virtual Web servers could be provisioned in under an hour if needed. Given the range of Blizzard's traffic estimation – anywhere from 90,000 to 900,000 hits in 3 days – scalability was critical.

A Little History Lesson

Prior to 2008, the Windows Server platform had not been known for its strength in virtualization capabilities. In fact, this deficiency represented a serious weakness that ultimately drove a large number of hosting providers and businesses away from the platform as the virtualization boom began to proliferate in 2005.

But in 2008 and 2009, Microsoft made two major updates to Windows Server that changed the entire landscape.

> **Hyper-V**
> First, Microsoft released the first version of Hyper-V in 2008: a hypervisor-based virtualization platform for x86 and x64 Windows Server systems. For the first time, Hyper-V enabled hosting providers to create logical partitions within a Windows Server environment, and leverage previously underutilized processing capacity. This essentially shattered the prevailing paradigm for Windows Server, and created a whole new business

advantage for Applied Innovations. In fact, without Hyper-V, Lansdowne's solution wouldn't have been a possibility.

Application Request Routing (ARR)
Having satisfied its virtualization needs, the Windows Server platform still lacked an effective, native load balancing solution. Load balancing is a technique to distribute workload evenly across multiple servers, in order to optimize resource utilization and prevent individual servers from receiving more requests than they can handle. Although hardware-based load balancers have existed for years, they are significantly more expensive than software-based solutions.

Recognizing this need, Microsoft released its inaugural version of Application Request Routing (ARR) for IIS7 in mid-2009. ARR was designed as a proxy-based routing module that forwards HTTP requests to content servers based on HTTP headers, server variables, and load balance algorithms. Microsoft targeted this solution specifically for hosting providers, as it would enable maximum resource utilization on application servers and reduced management costs for server farms.

As a Microsoft Gold Partner, Applied Innovations works directly with Microsoft to help it shape its line of hosting-related software. This unique collaboration has enabled Applied Innovations to secure pre-release software and have direct access to Microsoft's world-renowned software developers. So Applied Innovations was in the perfect position to be able to put these solutions to use in short order.

Putting the Solution to Work… and to the Test

Atkins was intrigued with Lansdowne's recommendation, and asked for more details. Lansdowne explained how a virtualized solution, powered by the latest in Microsoft technologies, would work:
- First, to handle the expected increase in database utilization, Applied Innovations would move the Museum Replicas database from a shared MS SQL server to a dedicated MS SQL server.
- Next, to enable the solution to include multiple Web servers, Applied Innovations would deploy Microsoft's Application Request Routing (ARR) for IIS7 on a virtual machine with two CPUs and 4GB of memory. ARR would turn this normal Microsoft Windows Server 2008 box into a sophisticated load balancer – without adding to the cost.
- Finally, to satisfy all incoming HTTP requests, Applied Innovations would leave the existing dedicated Web server for MuseumReplicas.com in place, and provision two additional virtual Web servers.

Atkins gave Lansdowne the go-ahead. Lansdowne, in return, promised to have it ready by the next Saturday morning, 7 working days later. The Applied Innovations team spent the week provisioning the new servers, and by Friday – with one day to spare – all that remained was routine performance testing to ensure the solution would hold up.

Back in Atlanta, Atkins was at his desk early. He was preparing himself for the next day, when the Museum Replicas Web site would face its biggest test yet. But D-Day came a day early. On Friday morning, one day before the advertisement was supposed to go live, Blizzard opened the floodgates:

"We were being dragged to our knees—it was a big hit from the get-go," recounted Atkins, noting that although the site never went offline, performance became sluggish the instant the advertisement went live.

Lansdowne himself was out of the office Friday, but received a call on his cell phone without any forewarning.

"Atkins said, 'Wayne, it's happening now! Flip the switch!'"

In Boca Raton, the Applied Innovations team took action immediately. After enabling the load balancer, they noticed the existing dedicated Web server was becoming overwhelmed. The team also tried tweaking the server and network configuration. When that wasn't enough, they removed the dedicated Web server from the ARR pool, and provisioned three additional Web servers on virtual machines, telling Atkins that even more virtual machines could be provisioned in less than hour each, if needed. In the end, the fix worked and no additional servers were added.

"The site was faster than it has ever been, despite the circumstances. We didn't have an infrastructure team, so Applied Innovations took over that function," said Atkins. "I was very impressed with the speed of the Applied Innovations team and how ARR did exactly what it was supposed to do. Wayne's solution of using Microsoft's technology to create these load-balanced Web servers was very cost effective and was extremely fast, both in the time it took to bring them online, and in performance."

After the Battle Was Over

Three days later, when Blizzard pulled the advertisement as scheduled, Atkins assessed the aftermath.

MuseumReplicas.com had averaged 150,000 visitors per day – not the million he had been warned about, but still a huge jump – and product sales were up significantly. What's more, even after the advertisements terminated, there was a trail of residual traffic which Atlanta Cutlery hoped would boost sales in the months ahead.

But to Atkins, the most important takeaway was knowing that with just a week's notice—the first time in his career—he was able to scale a site by a factor of more than 50.

"To say the least, I had some 'concerted worry' when I heard this ad was going to happen. When I called Applied Innovations, I wasn't sure they were going to have a solution," Atkins recalled. "I didn't know much about ARR, and I had my doubts. But Wayne got it done. It was a huge load off my shoulders. I thought, 'these guys know what they are doing.'"