



Hall & Foreman, Inc Irvine, California

Civil engineering firm meets rising business demands by leveraging Packeteer's system to produce efficient, reliable performance of key applications – from VoIP and video to Citrix and CAD programs – and compression gains of as much as 30 percent

For more than 40 years, the landscape of Hall & Foreman, Inc's (HFI) business has been cultivated in arid communities throughout Southern California. The civil engineering firm, established in 1961, provides numerous services like municipal and public works, land planning and development, surveying, mapping, entitlement coordination, infrastructure funding, investigative engineering, and landscape architecture.

The effectiveness of these services is rooted in HFI's IT infrastructure. Like most distributed organizations, HFI depends on a wide-area network to ensure enterprise-wide communication. The company's offices are located in Los Angeles and the surrounding Inland Empire, and all of them are connected via T1 frame links. A main PVC at HFI's corporate headquarters carries Internet traffic as well. HFI's dependence on the WAN represents a key contingency to the company's operational efficiency. How well critical applications perform over its network dictates how effectively the company's operations perform in support of client projects.

There have been many projects over the years. In just the past two alone, the company's size has nearly doubled. Business is good. It's growing rapidly. And as a result, IT's charter has assumed a heightened sense of urgency. Because the department is viewed as a strategic asset, the company acknowledges the need to align IT's infrastructure with its business priorities. As the company's operations expand, the WAN will need to scale. More recently, this has entailed consolidating various networks in an effort to eliminate extraneous costs, reduce administrative overhead, and simplify communications across streamlined channels. It involves converging mission-critical applications like CAD, VoIP, Citrix, and videoconferencing over one network.

Despite the perceived benefits, there was a time when WAN consolidation and convergence were the subjects of HFI's most troubling IT challenges. Until recently, these challenges threatened the company's growth. How HFI overcame application performance problems and sudden bouts of congestion to leverage its existing WAN without adding significant expenses – all in the face of rapid growth – is

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IT director

a testament to the company's WAN management approach. This approach, called application traffic management, is administered via a solution from Packeteer, Inc., the global leader in the space. Packeteer delivers application-layer visibility, policy control, and compression gains of up to 30 percent, enabling HFI to manage WAN traffic efficiently and reliably. Without Packeteer, HFI acknowledges that its business continuity would be far different than it is now.

THE PROBLEM: Unmanaged Bandwidth Threatens WAN Convergence Project

HFI's growth triggered an increase in users and applications, all of which produced an overwhelming amount of traffic on the WAN. The company eagerly embraced the notion of network consolidation and traffic convergence. Conceptually, it made sense. Managing traffic over a converged network would be much easier than establishing more and more lines for individual applications like VoIP, video, and Citrix. HFI feared that the more lines they implemented, the more administrative headaches they would incur. As the company continued to grow, the issues of juggling various links, lines, and networks would become impossible to resolve efficiently, let alone effectively.

However, convergence brought its own pitfalls, and it wasn't until the company had begun its consolidation project that they were unearthed. Because critical applications were no longer isolated in mutually exclusive environments, they were subjected to the ever-changing traffic trends of a multi-service WAN environment. Aggressive peer-to-peer applications, large CAD files, and unauthorized Internet downloads could bring down the network instantly, ruining the performance of every business application in the process. This was especially true for latency-sensitive applications like VoIP and videoconferencing, two sizable investments that HFI was banking on to enhance enterprise-wide communication without major cost implications.

"We generate CAD files from 10 to 200MB or more and transfer them back and forth over the company's frame-relay circuits," said HFI's IT director Joe Ortiz. "Files of this type can really monopolize bandwidth. When we deployed VoIP over our converged network, voice quality suffered during high traffic loads. This was especially notable during large Internet downloads or CAD interoffice file transfers. During these high-intensity periods, our WAN would be brought to a standstill."

In addition to VoIP and video, HFI's accounting application, which runs over Citrix MetaFrame, struggled to perform. Cumbersome CAD files as well as Lotus Domino, a messaging and collaboration application, were suspected of causing the disruption.

And that was just business-level traffic. Ortiz and the IT team were suspect of non-business traffic like chat programs and peer-to-peer file-sharing running rampant across the network. The company tried to configure its routers to control the appli-

Executive Overview

INDUSTRY

- Civil Engineering

CHALLENGE

- Ensure efficient, reliable performance of VoIP, video, Citrix, Lotus Domino, CAD programs, and other key applications
- Scale existing bandwidth amid rising traffic demands
- Gain visibility into WAN traffic, bandwidth utilization
- Control non-business traffic like P2P downloads, chat programs, streaming media, etc.

SOLUTION

- Deploy Packeteer's application traffic management system to monitor, control, and compress application traffic, aligning WAN resources with business priorities

BENEFITS

- Enhances performance of all business applications, most notably VoIP, video, Citrix, Lotus, and CAD
- Provides constant application-layer visibility into network traffic
- Avoids costly bandwidth upgrades
- Generates compression gains of as much as 30 percent

cations, but their deceptive port-hopping tendencies made it extremely difficult for the company to track, let alone suppress. In addition, malicious denial-of-service attacks pounded the network, raising the stakes on HFI's convergence decision. Consolidation was not supposed to be such a gamble, but uncontrolled traffic convergence was putting the project at risk.

Ortiz and his team were caught off guard. They had implemented T1 frame links at every office to avoid this very problem. Faced with the realization that the investment was jeopardized, HFI reconsidered its capacity planning practices. Understandably, the company was hesitant to invest any more money in widening the links. Cost was an obvious concern, but so was the fact that upgraded links would provide no guarantee that bandwidth would be utilized more appropriately. Any further investment would dig a deeper hole for the company.

"The task before me was, 'How am I going to maximize our current infrastructure without having to incur additional bandwidth costs, which may not be the solution to the problem?'" Ortiz said.

THE CHALLENGE: Manage WAN Traffic Effectively – Without Increasing Bandwidth Costs

Instead of adding bandwidth blindly, HFI wanted to employ a more intelligent and cost-effective approach to managing WAN traffic. That mentality – optimizing existing resources instead of purchasing more – prompted IT to outline various requirements for a WAN management solution.

The company needed visibility into its network traffic. It needed to know what applications were utilizing the company's bandwidth. It needed to control bandwidth allocation to align utilization with business priorities. And it needed to compress traffic loads to create greater bandwidth availability and extend the lifespan of its existing links. Finding a solution that could satisfy all of these requirements would enable the company to contain costs and improve operational efficiency. Just as important, the solution would generate consistent ROI on a range of IT investments – from the network infrastructure to the applications that depend on it.

At the time, HFI lacked the ability to bring these requirements to fruition. Ortiz and the IT team knew bandwidth utilization was misaligned with business priorities, and as a result, business applications were performing poorly. The user complaints provided more than enough evidence of that. Yet the IT team was unable to validate the source of the problems. And even if they could, they had no control or compression capabilities to take corrective action. Of all the performance problems, VoIP's was the most pressing.

"I lacked the tools to produce a thorough traffic analysis of the company's network," Ortiz said. "We were unsuccessful in achieving QoS for our voice traffic. Employees would constantly ask, 'Why is our voice so garbled between the offices?' Our phone system was a sizable investment. I discovered, from our many unsuccessful attempts, that Layer 3 QoS on the router wasn't going to be effective. Voice quality is critical and very sensitive to network latency. I knew we needed to do something. That's when I began my investigation on packet-shaping and traffic management technology."

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THE SOLUTION: An All-in-One System – Visibility, Control, and Compression

HFI embraced a solution that could manage traffic at the application layer. That solution, an application traffic management system from Packeteer, provides the visibility, control, and compression HFI needs to ensure that business applications perform efficiently and reliably across the WAN.

Visibility

The Packeteer system is deployed on the LAN side of the company's WAN links. From this vantage point, Packeteer provides application-layer visibility into the traffic utilizing HFI's network. The company sees everything it was missing with its routers, through Layer-7 – from VoIP to Citrix to the elusive chat and P2P programs.

"Before we deployed Packeteer, I felt certain that company employees only utilized authorized applications," Ortiz said. "They were not authorized to stream media from the Internet, but I found that some did anyway. I also found additional applications like Napster, KaZaA, and other peer-to-peer applications. There were chat programs and all sorts of non-business traffic that I was able to discover."

Packeteer's automatic traffic discovery allows the IT team to analyze each application's performance and validate findings via onboard reporting. Packeteer measures and reports on a number of performance metrics, including application response times, network efficiency, link utilization, peak utilization, compression gains, user and server delays, top-performing applications, worst-performing applications, top bandwidth consumers, and more.

Control

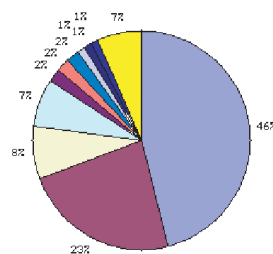
This intelligence provides the information HFI needs to administer necessary policy controls. Packeteer allocates bandwidth to applications based on their relative business importance. It establishes appropriately sized partitions (i.e. advanced PVCs) for business applications to prevent performance disruptions and ensure that investments in key applications pay off. For example, prior to Packeteer's deployment, large CAD file transfers clogged WAN links and impaired the performance of other business applica-

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Bandwidth Utilization – The Top 10 Applications

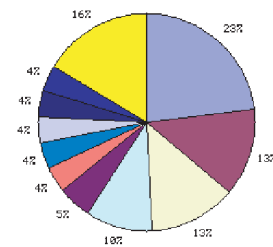
Inbound



Class Name	Average Rate (bps)	(%)
1. /Inbound/Invine-Se0_0/Internet/HTTP	58k	46%
2. /Inbound/Invine-Se0_0/Rancho/LotusNotes	29k	23%
3. /Inbound/Invine-Se0_0/Internet/SHTP	18k	8%
4. /Inbound/Invine-Se0_0/Chatsworth/LotusNotes	9523	7%
5. /Inbound/Invine-Se0_0/Rancho/Voice_Traffic	2959	2%
6. /Inbound/Invine-Se0_0/Internet/Shoutcast	2595	2%
7. /Inbound/Invine-Se0_0/Chatsworth/Voice_Traffic	2572	2%
8. /Inbound/Invine-Se0_0/Chatsworth/NetBIOS-IP	1882	1%
9. /Inbound/Invine-Se0_0/Internet/SSL	1567	1%
10. /Inbound/Invine-Se0_0/Rancho/NetBIOS-IP	1218	1%
All other classes	8799	7%

period: 1-week, 23-Apr-2004 09:19 to 30-Apr-2004 09:19

Outbound



Class Name	Average Rate (bps)	(%)
1. /Outbound/Invine-Se0_0/Internet/SHTP	14k	28%
2. /Outbound/Invine-Se0_0/Internet/HTTP	9316	13%
3. /Outbound/Invine-Se0_0/Rancho/HTTP	8242	13%
4. /Outbound/Invine-Se0_0/Chatsworth/HTTP	6228	10%
5. /Outbound/Invine-Se0_0/Rancho/LotusNotes	2895	5%
6. /Outbound/Localhost	2669	4%
7. /Outbound/Invine-Se0_0/Rancho/Voice_Traffic	2655	4%
8. /Outbound/Invine-Se0_0/Internet/NetBIOS-IP	2678	4%
9. /Outbound/Invine-Se0_0/Chatsworth/LotusNotes	2492	4%
10. /Outbound/Invine-Se0_0/Chatsworth/Voice_Traffic	2459	4%
All other classes	18k	16%

period: 1-week, 23-Apr-2004 09:19 to 30-Apr-2004 09:19

By using Packeteer, Hall & Foreman can verify which applications are utilizing the greatest percentage of bandwidth in both inbound and outbound directions. These reports validate whether or not business applications, including VoIP, receive bandwidth based on their relative importance.

tions. Now CAD files are delivered efficiently within the controlled confines of a Packeteer-enabled partition.

Meanwhile, non-business applications like Web browsing, music downloads, and chat programs are relegated to extremely small portions of the company's links – or denied completely depending on the administrator's discretion. By controlling recreational and malicious traffic, HFI ensures that the money spent on bandwidth supports the applications that serve the company's business needs. The days of funding recreational activities over the business network – either knowingly or unknowingly – are history.

Compression

HFI's business needs are further served by Packeteer's compression technology. Packeteer improves throughput by compressing appropriate traffic loads and eliminating repetitive data. The value is clear. Ortiz said Packeteer achieves compression gains of up to 30 percent on its existing bandwidth. By generating greater bandwidth availability, HFI avoids unnecessary upgrades. The resulting cost avoidance generates returns on HFI's IT investments. According to Ortiz, meeting the growing needs of the company without adding IT costs or administrative overhead is cherished throughout the company, particularly at the executive level.

THE RESULTS: Consolidation, Convergence Pay Off

Packeteer's impact caps a skittish period in which the company was reconsidering the consolidation/convergence project's viability. Deploying Packeteer erased any doubts. Today, HFI is realizing the benefit of a consolidated, converged network. The company has the network visibility it needs. It has the bandwidth control to align WAN utilization and application performance with business priorities. And the company is enjoying consistent compression gains of up to 30 percent on its existing bandwidth. As a result, HFI is avoiding unnecessary bandwidth costs and accelerating the ROI on its network and application investments.

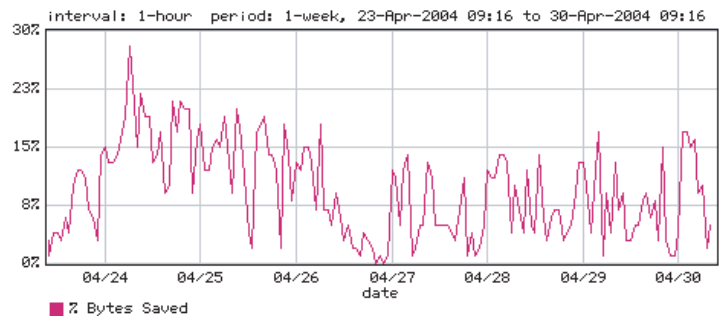
For example, Citrix MetaFrame, which supports HFI's accounting and billing application, is performing efficiently. VoIP and video are performing reliably. Lotus Domino is

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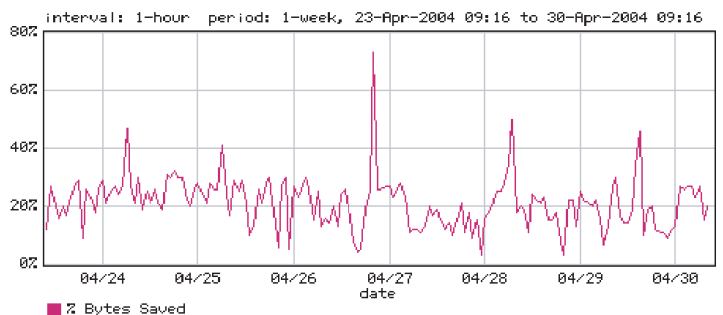
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Compression Gains – A Snapshot Into the Percentage of Bytes Saved

Inbound



Outbound



Packeteer's compression technology enables Hall & Foreman to generate greater bandwidth availability. Compression gains vary depending on the nature and size of compressible traffic loads at a given point in time. By compressing traffic and removing repetitive data, the company extends the serviceability of its existing bandwidth, resulting in welcome cost avoidance.

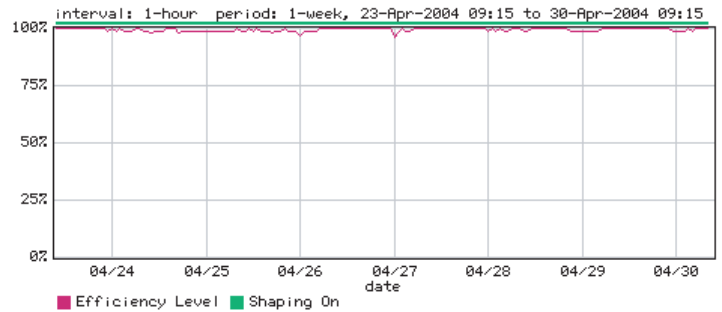
proceeding smoothly. CAD files are transmitted efficiently without disrupting other business traffic. Chat programs are under control. KaZaA and Napster are suppressed. Denial-of-service attacks are identified before they impact business operations. The list of positive results goes on.

Looking ahead, Ortiz said IT is poised to contribute to HFI's continuing growth. As network demands grow, the value of Packeteer's visibility, control, and compression will become more significant because of greater cost savings generated from the company's existing WAN infrastructure. Ortiz and the IT team will be supporting a bigger company with a more streamlined network – both in topology and in cost – and they expect Packeteer to be by its side as its evolution unfolds.

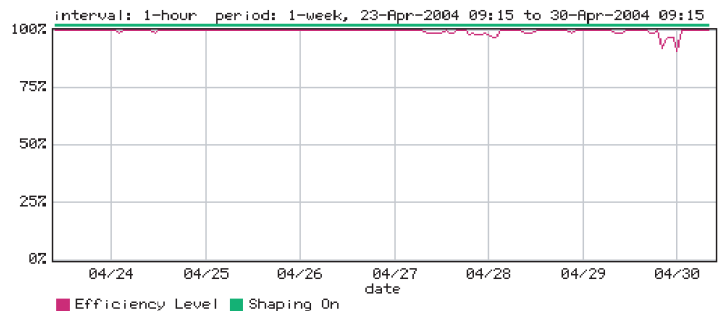
"We selected Packeteer because of their technology, business longevity, brand recognition, and corporate stability. These characteristics are very important to Hall & Foreman," Ortiz said. "We want a company that's going to be around tomorrow. We're very satisfied with Packeteer, and over time we'll continue to optimize our network traffic. Our deployment has been very successful. We are happy with the integration of this product into our network."

Network Efficiency

Inbound



Outbound



Packeteer ensures that Hall & Foreman's network is always running at peak efficiency – regardless of changing traffic loads or increased user demands – and provides a reliable infrastructure for critical business applications to perform effectively.