

# Acme Packet™ Increases Engineers' Productivity, Decreases Time to Market, and Realizes a Payback Period of One Month with Hammer Call Analyzer™

## IN BRIEF

- **Goal:** For Acme Packet™ to quickly and effectively identify and analyze Voice over IP (VoIP) call problems and debug problematic call scenarios when designing and deploying its Net-Net™ session border controllers.
- **Solution:** Empirix Hammer Call Analyzer™ – a VoIP network analysis tool.
- **Results:** A payback period of one month, an overall increase in corporate productivity of 5%, and an annual ROI of 2,343%. A five-year net benefit of \$5,576,684, driven by a 12% increase in engineers' efficiency and faster time to market for revisions of its session border controllers.

## CONTENTS

About Acme Packet .....	2
The Challenge: Efficiently Debug Call Scenarios .....	2
Acme Packet Chooses Hammer Call Analyzer™ .....	3
An Inside Look at Hammer Call Analyzer™ .....	3
The Bottom Line for Acme Packet.....	5
Acme Packet Looks to the Future.....	7

NOTE: This case study was authored by the Case Study Forum. The Case Study Forum is dedicated to writing and publishing case studies for the IT community. The financial analysis that appears in this case study was performed by ITCentrix, the premier software and services company for measuring and managing the business value of information technology investments. Results shown are not a guarantee of equivalent performance.

Voice over IP (VoIP) has become one of telecommunications hottest technologies, as businesses and network providers look to cut telecommunications costs by delivering voice via IP networks. But VoIP, while it can drastically reduce costs and enable new services, requires close quality control. Service Providers need to ensure that calls go through and sound good and that features work properly. This is made all the more complex because calls typically transcend multiple networks. Acme Packet helps service providers meet the challenges of satisfying customers and ensuring their revenues while they partner with other network operators. When Acme Packet needed a tool to tackle VoIP problems, it turned to Empirix's Hammer Call Analyzer™. It chose Hammer Call Analyzer™ because the product offers a graphical, intuitive way to help engineers zero in on symptoms quickly, speed up diagnosing problems, and more quickly and effectively debug VoIP systems. The solution has yielded over \$5.5 million in net benefits, sped up time to market for Acme Packet products, and increased engineers' efficiency.

## Benefits

Objective	Benefits Achieved
Make it easier for engineers to reconstruct call flows.	Engineers can automatically construct complete call flows just by double-clicking on a single packet.
Handle debugging at remote customer sites.	Acme Packet customers can capture traces at their own sites, and send those traces to Acme Packet – and engineers can then use Hammer Call Analyzer™ to reconstruct and analyze problems experienced at the remote site.
Allow engineers to more quickly analyze call-related network problems.	Cut the amount of time it takes an engineer to analyze a typical problem from an hour to ten minutes. Additionally, Hammer Call Analyzer™ has helped engineers determine the causes of network problems at customer sites, ensuring that Acme Packet will not be held accountable for problems caused by other network components.
Increase overall engineering efficiency.	The adoption of Hammer Call Analyzer™ by Acme Packet has led to a 12% increase in the productivity of its engineers.
Bring new versions of Acme Packet products to market more quickly.	Because of increased productivity, and analytical tools that allow problems to be analyzed and debugged more quickly, Acme Packet can bring its products to market 10% quicker.

## About Acme Packet

Acme Packet enables network service providers to deliver premium, interactive communications – voice, video and multimedia sessions – across IP network borders. Their Net-Net family of session border controllers satisfies critical security, service assurance and law enforcement requirements in wireline, wireless and cable networks. The Net-Net session border controllers are deployed in over 30 production networks worldwide, spanning all border applications – peering, access network-backbone network, and data center – and all protocols – SIP, H.323, and MGCP.

Acme Packet's two primary products for network providers for VoIP are:

- **Packet Net-Net Session Director (SD)**, a session border controller that performs critical control functions at IP-to-IP network borders, satisfying security, service assurance and regulatory requirements.
- **Acme Net-Net Session Router (SR)**, a high-performance Session Initiation Protocol (SIP) router that optimally routes or load balances interactive communication sessions.

## The Challenge: Efficiently Debug Call Scenarios

VoIP voice packets travel across IP networks mixed in with millions of other data packets. Unlike calls in traditional networks, a VoIP call is not a single continuous end-to-end connection. Rather, it is made up of many discrete IP packets.

It can be very time consuming for engineers and developers to reconstruct VoIP call flows. Each call is made up of both signaling packets and media packets – signaling packets contain information required to connect and then disconnect callers, while media packets contain the actual voice information. Particularly with a high call volume, it can be very challenging for engineers to wade through a mix of signaling packets to reconstitute the messages of a particular call.

Associating media packets with a particular call can be even more difficult. With a high volume of calls, even determining which packets are part of the same media stream is not straightforward. Complicating the task is that reconstituting calls requires delving into the signaling to determine the particular IP ports used for each individual call – and even finding out the exact moments in time when those ports were in use.

**“It can be extremely difficult and time-consuming to debug problematic call scenarios and to identify specific flows in network traffic – it’s like trying to find a needle in a haystack.”**

KEVIN CASSIDY

DIRECTOR OF QUALITY ASSURANCE

ACME PACKET

For all these reasons, even when an engineer can find a single problem packet, it is an extremely difficult and time-consuming job to reconstruct the entire call with which it was associated – but necessary to solve many problems.

However, in order to design and deploy their products for network providers, Acme Packet engineers must be able to debug call scenarios and analyze, trace, and solve network problems. During the development cycle, developers and engineers need to be able to re-create problems that might occur in the field. During deployment, they need to be able to debug actual call scenarios so that they can solve implementation problems.

**The freeware network protocol analyzer Ethereal lacked the kind of sophisticated capabilities that Acme Packet engineers needed for tracing call problems and debugging problematic call scenarios.**

Tracing call problems and debugging problematic call scenarios can be a very time-intensive process. Acme Packet engineers were using the freeware network protocol analyzer called Ethereal, but it was difficult to use, and does not offer sophisticated tools for VoIP analysis and debugging.

All this was an issue for Acme Packet, particularly because, as a young company without a large engineering staff, it needs to ensure that its engineers use their time as efficiently as possible and focus on product development.

### **Acme Packet Chooses Hammer Call Analyzer™**

To solve the problem, Acme Packet chose Hammer Call Analyzer™ because it is VoIP application-aware, has a simple-to-use graphical interface, can reconstruct call flows from a single packet, offers a real-time, multi-stage call flow display, and includes protocol-aware capture triggering.

**Acme Packet chose Hammer Call Analyzer™ because the analyzer is VoIP application-aware, has a simple-to-use graphical interface, can reconstruct call flows from a single packet, offers a real-time, multi-stage call flow display, and includes protocol-aware capture triggering.**

Additionally, Acme Packet had been using other Hammer products to simulate network traffic for its development efforts. Based on Acme Packet's positive experience with those products, and Empirix in general, and because it was impressed with the software's unique capabilities, it decided to buy a number of Hammer Call Analyzers™.

Installation and deployment went smoothly. Within minutes of receiving the software, Acme Packet engineers were using the software to analyze call flows and debug VoIP problems.

### **An Inside Look at Hammer Call Analyzer™**

Hammer Call Analyzer™ is the first in a new generation of application-aware analysis tools. With previous tools, problem diagnosis in

a VoIP environment was a complex and tedious job. With calls traversing multiple devices (perhaps using different protocols), call flow, signaling, and equipment-related problems are difficult to wrestle down in even the most straightforward NextGen network implementations. This kind of troubleshooting often requires protocol experts to spend hours sifting through reams of cryptic data collected by multiple capture tools.

Unlike generic protocol analyzers, Hammer Call Analyzer™ is VoIP application-aware, and offers a variety of powerful capabilities, all designed to help engineers rapidly zero in on problem calls. For example, the unique call list and multi-stage call flow display walk engineers through the legs of a particular call. This enables engineers to visualize problems in the way messages are exchanged between the various devices along the way and to quickly solve those problems.

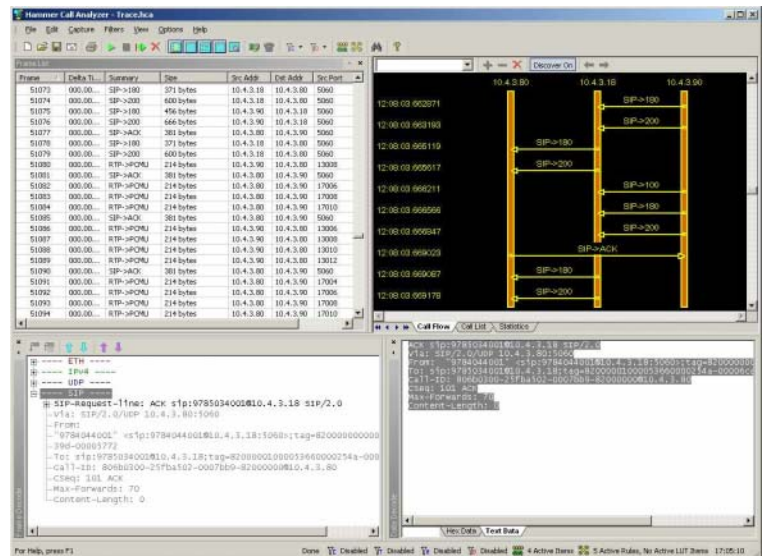
The Hammer Call Analyzer enables users to visualize media problems as well as signaling problems. For any call, it displays waveforms and the Stream Quality Signature, a unique display that enables engineers to quickly visualize and diagnose packet timing problems. In addition, the analyzer provides a variety of media stream metrics, including R-factor for voice quality.

Making it particularly powerful is its easy-to-use graphical interface. The following figures show some of the tool's capabilities.

**"Hammer Call Analyzer" is a very simple piece of software to install and use. Literally within minutes of getting a copy, we were up and running."**

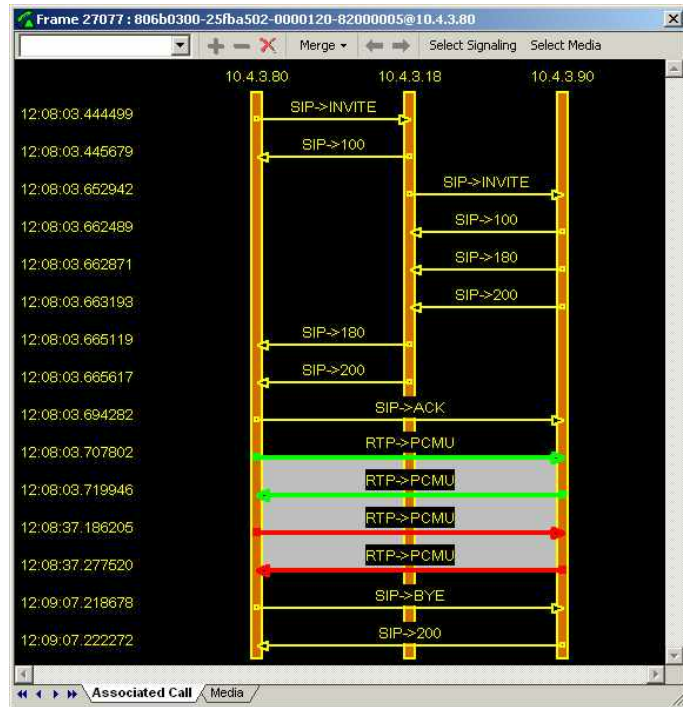
KEVIN CASSIDY  
DIRECTOR OF QUALITY ASSURANCE  
ACME PACKET

**FIGURE 1: TRACE**



This screen shows how Hammer Call Analyzer™ can capture large quantities of VoIP traffic from an IP link using capture filters, and display the signaling in an intuitive ladder diagram format.

**FIGURE 2: AUTOMATIC CALL ASSOCIATION**



**Acme Packet's bottom line for the project: A cumulative five-year net benefit of \$5,576,684, an annual ROI of 2,343%, a payback period of one month, an increase in engineers' productivity of 12%, and an overall increase in corporate productivity of 5%.**

Acme Packet has found Hammer Call Analyzer™'s automatic call association capability to be a huge time saver. Clicking on any message immediately brings up a window displaying all of the signaling and media for the call with which the message is associated.

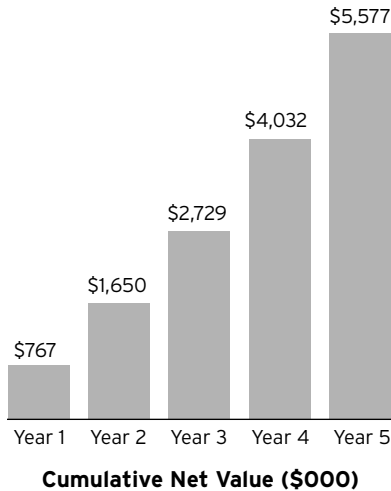
### The Bottom Line for Acme Packet

A detailed analysis of the implementation shows that Acme Packet will gain a cumulative five-year net benefit of \$5,576,684 from the project. It will yield an annual ROI of 2,343%, and has a payback period of one month. It will lead to an increase in engineers' productivity of 12%, and an overall increase in corporate productivity of 5%.

The benefit of \$5,576,684 is made up of a significant increase in engineers' productivity, and extra value gained by bringing new versions of Acme Packet products to market more quickly.

Hammer Call Analyzer™ increases engineers' productivity in a variety of ways. For example, rather than searching through many packets and signaling sessions, engineers can double-click on a single packet in Hammer Call Analyzer™ and the entire call flow will be reconstructed. Also critical for Acme Packet was Hammer Call Analyzer™'s application-aware filtering and automated features including triggering events such as generating email alerts based on error messages. This and other Hammer Call Analyzer™ capabilities help cut the amount of time it takes an engineer at Acme Packet to analyze a typical problem from an hour to ten minutes.

The software has also helped Acme Packet keep existing customers satisfied. It helps engineers resolve technical issues more rapidly, and so the company is able to solve customer problems more quickly. Customers can perform traces at their own sites, and send those traces to Acme Packet – and engineers can then use Hammer Call Analyzer™ to reconstruct and analyze problems experienced at the remote site.



Because of increased productivity, and analytical tools that allow problems to be analyzed and debugged more quickly, Acme Packet engineers can more easily implement new features and functions in new versions of the company's software. Acme Packet releases approximately five software updates per year, and in those releases the company tries to implement ideas generated by customers, who often ask for specific features. Using Hammer Call Analyzer™, Acme Packet can bring these releases to market approximately 10% more quickly. This not only satisfies existing customers, but also allows the company to gain new business as well.

The following chart provides a detailed, five-year analysis of the solution.

### BUSINESS ANALYSIS OF THE SOLUTION

#### Project Summary

Annual ROI	2343%
Cumulative Five Year Net Benefit	\$5,576,684
Payback Period (months)	1
Increase in VOIP Engineer Productivity	12%

#### Project Costs (\$000)

	Startup	Year 1	Year 2	Year 3	Year 4	Year 5
Acme Packet Software Costs	\$40	\$0	\$0	\$10	\$10	\$10
Acme Packet Hardware Costs	\$8	\$0	\$0	\$2	\$2	\$2
Acme Packet Maintenance Costs	\$0	\$7	\$7	\$9	\$11	\$13
<b>Total Project Costs</b>	<b>\$48</b>	<b>\$7</b>	<b>\$7</b>	<b>\$21</b>	<b>\$23</b>	<b>\$25</b>

#### Benefits (\$000)

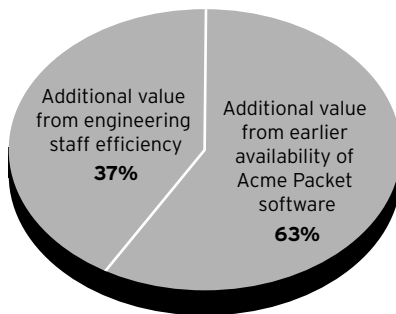
	Year 1	Year 2	Year 3	Year 4	Year 5
Additional Value from Engineering Staff efficiency	\$529	\$540	\$689	\$843	\$1,003
Additional Value from earlier availability of Acme Packet software	\$292	\$351	\$412	\$483	\$567
<b>Total Benefits</b>	<b>\$822</b>	<b>\$891</b>	<b>\$1,100</b>	<b>\$1,326</b>	<b>\$1,569</b>

#### Financial Analysis (\$000)

	Startup	Year 1	Year 2	Year 3	Year 4	Year 5
Net Value	(\$48)	\$814	\$884	\$1,079	\$1,303	\$1,545
Cumulative Value	(\$48)	\$767	\$1,650	\$2,729	\$4,032	\$5,577
Net Present Value	\$4,357					
Annual ROI	2343%					
IRR	1866%					
Payback Period(months)	1					

#### Key Performance Indicators (KPIs)

Increase in Corporate Productivity	5%
Increase in VOIP Engineer Productivity	12%



**Cumulative 5 Year Net Benefit = \$5,576,684**

© ITCentrix 2004 This financial analysis was performed by ITCentrix, the premier software and services company for measuring and managing the business value of information technology investments. Results shown are not a guarantee of equivalent performance.

## Acme Packet Looks to the Future

**“Hammer Call Analyzer™ has more features than other software, and meets our needs better. As Acme Packet grows, we’re looking at buying more copies to help our engineers become even more productive.”**

KEVIN CASSIDY  
DIRECTOR OF QUALITY ASSURANCE  
ACME PACKET

Acme Packet is a venture-funded business with deployments in production networks worldwide, spanning all border applications – peering, access network-backbone network, and data center – and all protocols – SIP, H.323 and MGCP. As VoIP technology gains even wider acceptance, the increasing demand for its Net-Net family of session border controllers will enable Acme Packet to become a major player in the industry.

Acme Packet expects Hammer Call Analyzer™ to continue to be an important troubleshooting tool. Acme Packet is currently looking into buying more copies of the Empirix product, as a way of increasing engineering efficiency even further, bringing its products to market more quickly, and gaining a larger market share in a growing market.