Akamai Technologies, Inc.
Web Application Accelerator &
Dynamic Site Accelerator

TOLLY **17** YEARS 1989-2006

Test Summary

Real-World Performance Testing for Dynamic Web Applications

Premise: Enterprise IT professionals face ongoing challenges in delivering centrally located and managed Web applications to employees, business partners and customers on a global scale. Akamai's Web Application Accelerator (for B2B) and Dynamic Site Accelerator (for B2C) harness techniques such as dynamic mapping of user requests, route optimization technology, connection optimization and caching technology, among others, to accelerate and optimize the delivery of Web-based applications from the data-center all the way to the end-user, regardless of geography.

Akamai Technologies, Inc. commissioned The Tolly Group to benchmark the performance of the company's Web Application Accelerator and Dynamic Site Accelerator, managed services that promise to accelerate Web-based enterprise-class content and business processes on a global scale.

Web Application Accelerator (B2B) and Dynamic Site Accelerator (B2C) are services that enable enterprises to accelerate dynamic, highly interactive Web applications securely, resulting in improved performance, higher availability, and a universally enhanced user experience.

Application requests are routed across Akamai's trusted, globally distributed platform, and accelerates dynamic Web application content through a number of techniques, including dynamic mapping of user requests, route optimization technology, connection optimization, and caching technology.

Test Highlights

○ Improved transaction times for dynamic Web applications by up to 5X depending upon origin server location

○ Leverages Akamai's globally distributed platform to avoid Internet problem spots, sending application transactions over Internet paths that are both fast and reliable

○ Incorporates application acceleration techniques including compression, long-lived inter-server connections, content pre-fetching, and transport protocol optimization

○ Maintains application security by delivering applications over Secure Sockets Layer (SSL) and through integration with leading access control mechanisms

Percentage Improvement in Response Times for Applications Tested
with Akamai Application Acceleration
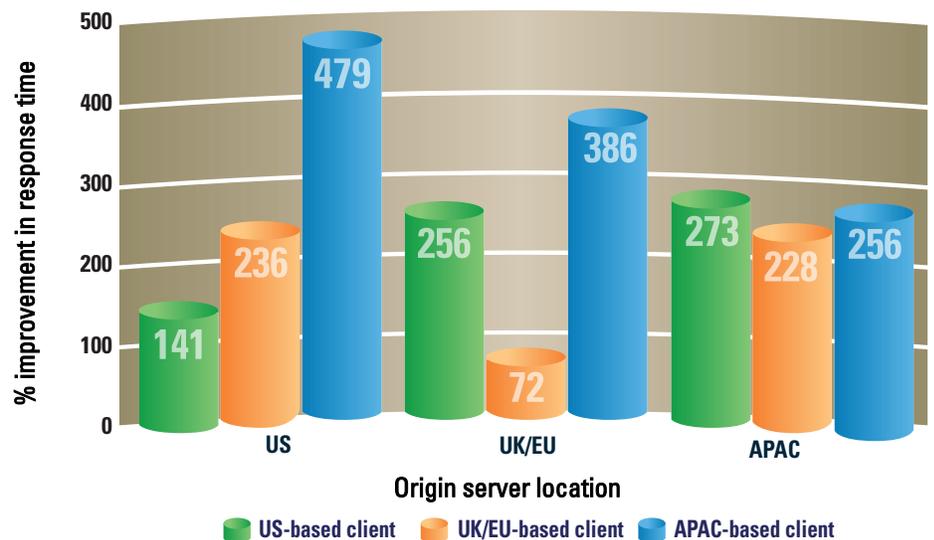
Source: The Tolly Group, April 2006

Figure 1

Tolly Group engineers conducted extensive tests pertaining to improving performance for Web applications. Engineers set up three Web servers in the U.S., United Kingdom, and Singapore. These servers fielded requests via HTTP from a wide variety of clients scattered worldwide. Tests were conducted during April 2006.
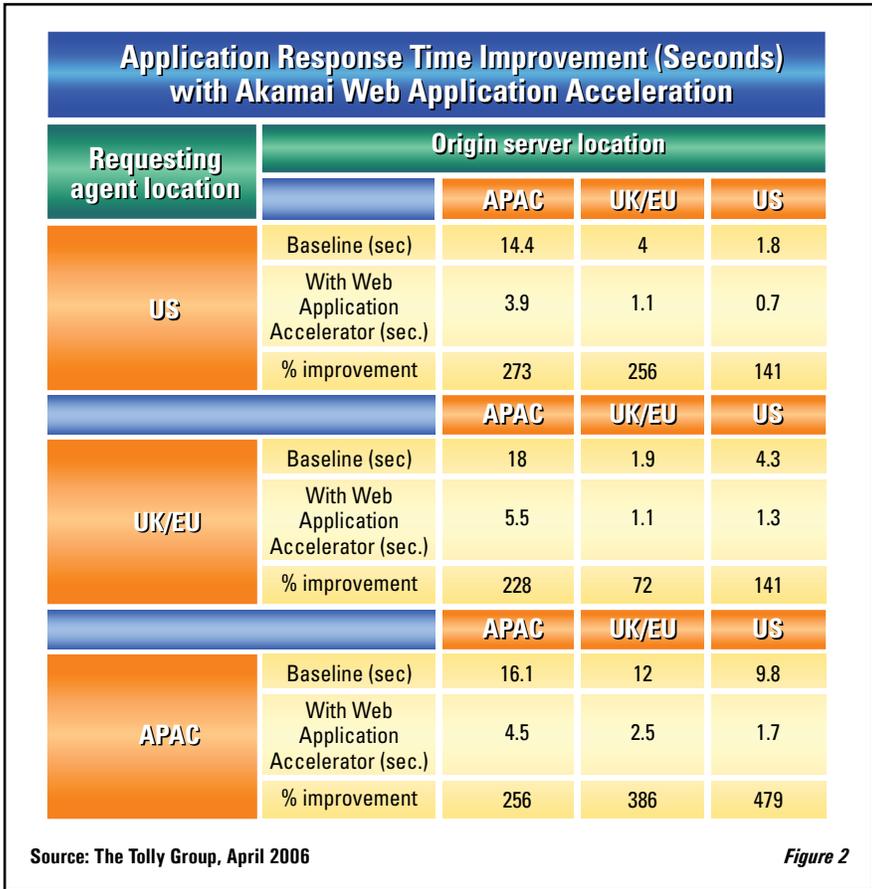
Results show that the Akamai Web application acceleration services improved the performance of actual applications via Web page downloads by as much as 5X across three global locations for B2C scenarios.

Executive Summary

The Web Application Accelerator and Dynamic Site Accelerator services are built on Akamai's EdgePlatform – a massive network of 19,000 servers in more than 1,100 networks in 70 countries. That platform is controlled by network intelligence systems that route requests, load balance, and ensure 100% uptime (as measured by Akamai's standard service-level agreement). Akamai's dynamic Web services enable enterprises to extend their Web-based applications to the Akamai EdgePlatform, thereby bringing cacheable content close to requesting end users. For dynamic non-cacheable content, additional performance improvements are gained through the use of connection and route optimization techniques to improve protocol efficiency and dynamically avoid problem spots on the Internet. The service aims to deliver high availability, superior performance, and greatly increased scalability.
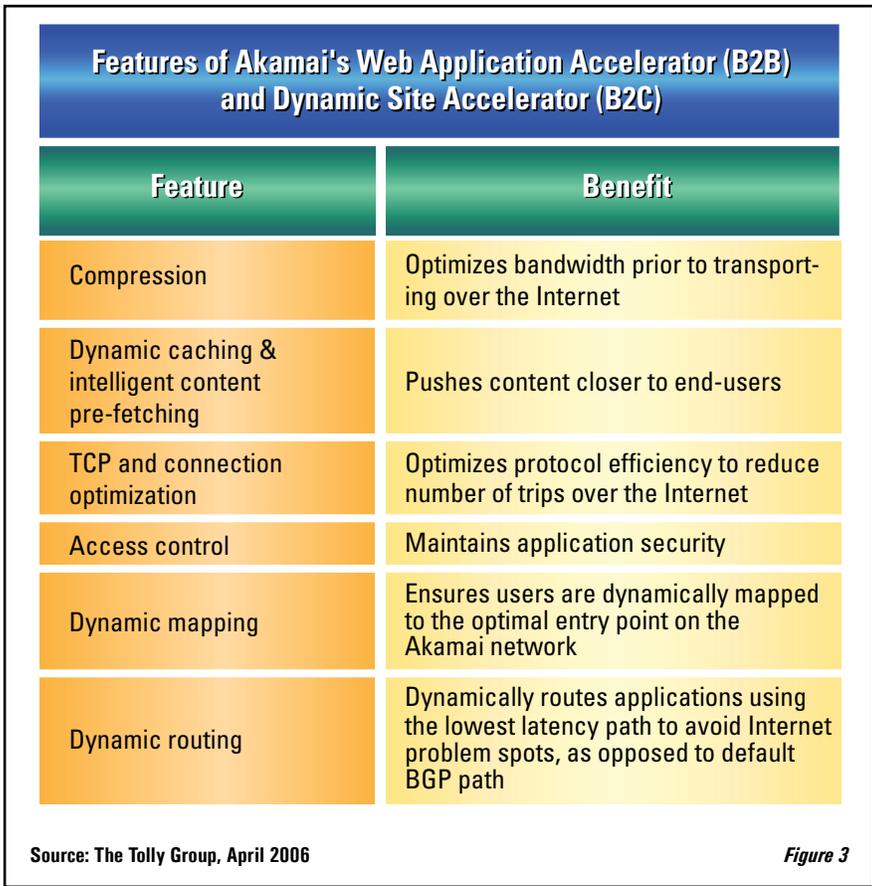
For the tests, engineers constructed a test bed of global proportions to represent actual network conditions enterprises are likely to encounter on a daily basis.

The goal was to create "*real-world performance testing*" to measure application acceleration performance of the Akamai application accelera-

Application Response Time Improvement (Seconds) with Akamai Web Application Acceleration

Requesting agent location		Origin server location		
		APAC	UK/EU	US
US	Baseline (sec)	14.4	4	1.8
US	With Web Application Accelerator (sec.)	3.9	1.1	0.7
US	% improvement	273	256	141
		APAC	UK/EU	US
UK/EU	Baseline (sec)	18	1.9	4.3
UK/EU	With Web Application Accelerator (sec.)	5.5	1.1	1.3
UK/EU	% improvement	228	72	141
		APAC	UK/EU	US
APAC	Baseline (sec)	16.1	12	9.8
APAC	With Web Application Accelerator (sec.)	4.5	2.5	1.7
APAC	% improvement	256	386	479

Source: The Tolly Group, April 2006   *Figure 2*

Features of Akamai's Web Application Accelerator (B2B) and Dynamic Site Accelerator (B2C)

Feature	Benefit
Compression	Optimizes bandwidth prior to transporting over the Internet
Dynamic caching & intelligent content pre-fetching	Pushes content closer to end-users
TCP and connection optimization	Optimizes protocol efficiency to reduce number of trips over the Internet
Access control	Maintains application security
Dynamic mapping	Ensures users are dynamically mapped to the optimal entry point on the Akamai network
Dynamic routing	Dynamically routes applications using the lowest latency path to avoid Internet problem spots, as opposed to default BGP path

Source: The Tolly Group, April 2006   *Figure 3*

tion services against live Internet conditions that fluctuate on a time-of-day and day-by-day basis. By utilizing such a real-world scenario, users can gain a deeper appreciation of the end-to-end performance gains delivered by Akamai, even as traffic and data requests traverse multiple service provider backbones.

Tolly Group engineers set up three Web servers in the U.S., United Kingdom and Singapore. In a U.S.-based origin server test, 53 clients utilized worldwide took about 5.3 seconds on average to complete downloading a page directly from the server and about 1.2 seconds via the Akamai servers. Viewed from a slightly different lens, users in an Asia/Pacific country requesting information from a U.S.-based business that utilizes Akamai application acceleration will benefit from a 479% improvement in response time. Likewise, users based in the European Union would experience a 236% improvement in response times when Akamai is used, and even U.S.-based users would benefit from a response time improvement of 141%. (See Figures 1 and 2.)

In the UK/EU-based server test, the same clients took about 5.9 seconds directly from the server (using the standard Internet path) and about 1.6 seconds via the Akamai service. On a percentages basis, that translates into response time improvements ranging from 72% for EU users, to 386% for users requesting data from Asia/ Pacific countries. (See Figures 1 and 2.)

In the APAC-based test, the world-wide clients consumed about 16.2 seconds to download the requested Web page without Akamai Web application acceleration and about 4.6 seconds with Akamai. In this scenario tests revealed response time improvements ranging from 228% to 273%, depending upon geographic location of the requesting user. (See Figures 1 and 2.)

The results show that Akamai can improve global download times for Web pages by up to 5X and often 2X to 3X within a single geographic region.

Interestingly, application acceleration appliances offer only a subset of the capabilities featured in Akamai's dynamic Web acceleration services. Akamai's Web-based application acceleration services extend beyond the data-center to address "middle-mile" performance and reliability bottlenecks such as Internet congestion and service-provider boundaries, in addition to providing the traditional "first-mile" bandwidth and protocol optimization techniques. As a result, Akamai provides a complete end-to-end acceleration solution from the origin all the way to the end-user, regardless of geography.

Test Configuration & Methodology

Tolly Group engineers measured the real-world Web performance for three different origin server locations with or without Akamai application acceleration services. The origin server locations were San Antonio, Texas (U.S.), London (United Kingdom) and Singapore. Each origin server was loaded with 191 KB of the Web page including a 40KB HTML document, one CSS file, small JavaScript files, flash objects and 40 images (mostly 3~5KB, two 10KB, one 15KB and one 20KB file.) The three origin servers had access to Tier 1 Internet providers at the rate enterprises are likely to have.

Engineers used Keynote testing service to measure the real-world Web performance around the world. Engineers picked 53 Keynote testing agents around the world having 25 agents from major cities in the U.S., 15 agents from major cities in the European Union, 11 agents from major cities in the Asia Pacific region, one agent from Mexico City and one agent from Johannesburg, South Africa.

Akamai Technologies, Inc.

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TOLLY Up to Spec CERTIFIED

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**Akamai Technologies
Web Application Accelerator
& Dynamic Site Accelerator
Product Specifications***

Application Acceleration

○ Compression: including standard Gzip
○ Dynamic caching capability standard
○ TCP optimization
○ Connection optimization
○ Intelligent content pre-fetching
○ Full SSL compatibility
○ Multiple access control options
○ Dynamic mapping
○ Dynamic route optimization

Monitoring and Analysis

○ Performance Service Level Agreement
○ Traffic reports
○ High MB usage alerting
○ Trend reports
○ Traffic offload reporting
○ Availability reports

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* *Vendor-supplied information not verified by The Tolly Group*

Test Bed

Source: The Tolly Group, April 2006   *Figure 4*
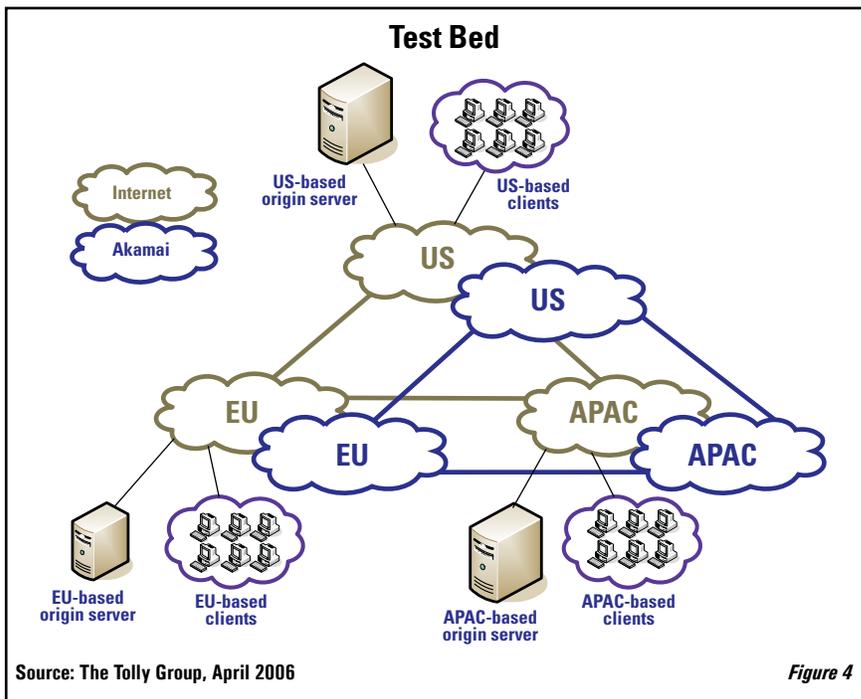
Engineers configured each agent to retrieve the Web page from three different locations with or without Akamai once an hour for two weeks of the test duration and record the response time for every request. The testing started on 03 April 2006 and ended on 16 April 2006. The Keynote testing service reported the Web application response time and availability with respect to the agents and the time with or without Akamai dynamic Web acceleration enabled. After the test ended, engineers put together the raw test results and analyzed them.

The Tolly Group gratefully acknowledges the providers of test equipment used in this project.

Vendor	Product	Web address
Keynote Systems, Inc.	Keynote Testing Service	http://www.keynote.com

Project Profile

Sponsor: Akamai Technologies, Inc.

Document number: 206110

Service class: Application Acceleration

Products under test:
- Akamai Web Application Accelerator
- Akamai Dynamic Site Accelerator

Testing window: April 2006

For more information on this document, or other services offered by The Tolly Group, visit our World Wide Web site at http://www.tolly.com, send E-mail to sales@tolly.com, call (561) 391-5610.