

Keynote[®] Service Level Rankings™



Keynote Service Level Rankings for Computer Hardware Web Sites

Fall 2005

Overview

Keynote believes that competitive research is the key to building a website that excels in performance and helps the company meet its online business goals. To succeed, companies must understand not only how consumers perceive their site, but also how their site performs compared to the competition.

To help companies understand how they stack up against key competitors, Keynote Service Level (SL) Rankings for Computer Hardware Web Sites provide a customer's perspective on the performance of the top online computer hardware web sites. The study ranks the sites on various components of site performance, such as transaction responsiveness, consistency, geographic uniformity, reliability, scalability, page design, and Internet connectivity, and provides companies with actionable insights into how to improve in these areas.

Because the rankings are based on quantifiable metrics, site owners can use Keynote's findings to improve their overall customer/site experience. Keynotes SL Rankings also provide valuable industry-wide insights. They identify the best sites, highlight areas for improvement, help industry analysts keep abreast of how ever-changing Web technology is being applied, and help site owners to set service level goals that are appropriate for their own industry. Armed with this intelligence, e-business and Operations Managers can make informed decisions that improve site performance relative to competitors, maximize returns on site content and design investments, and ultimately build stronger relationships with existing and new customers.

Sites Evaluated

The following sites were evaluated as part of this competitive benchmarking study:

- Apple
- Best Buy
- CompUSA
- Dell
- Gateway
- HP
- Lenovo
- PC Connection
- Sony

Overall Service Level Ranking

Using an extremely large set of measurement data and extensive analysis, Keynote ranks the sites in two major categories, Reliability and Responsiveness. A site's ability to service its customers without errors or outages is reflected in the Reliability ranking. Its ability to provide highly responsive and consistent page downloads is reflected in the Responsiveness ranking.

Keynote Service Level Rankings for Reliability

Rank	Computer Hardware Web Sites
1	Apple
2	Sony
3	Best Buy

Keynote Service Level Rankings for Responsiveness

Rank	Computer Hardware Web Sites
1	Apple
2	Best Buy
3	Dell

Key Performance Factors

To obtain the Overall Reliability and Responsiveness Service Level Rankings, Keynote first evaluates and compares the sites using up to 40 detailed service level metrics. Key Performance Factors are then derived by ranking the sites based on related sets of these underlying metrics. The Key Performance Factors are:

- High Speed Response
- Dial-up Response
- Response Time Consistency
- Geographic Uniformity
- Load Handling
- Availability
- Outages

Each Key Performance Factor represents a distinct aspect of site performance; as is illustrated by the selection of results presented below. It is rare for a single site to excel in all aspects. Keynote's Service Level Ranking Report presents detailed analysis and results for each aspect separately.

The full report provides detailed answers to questions like:

- Which sites offer the quickest transactions (fewest steps, fastest pages)?
- Which sites are the most stable, offering consistent levels of service?
- Which sites provide the best service for dial-up or broadband users?
- Which sites are the most reliable; which have fewest outages?

The following sections summarize the findings for four performance factors: Average High-Speed Response, Geographic Uniformity, Average Dial-Up Response, and Availability.

Average High Speed Response

The Average High Speed Response factor represents a customer's experience of site responsiveness when using a high speed Internet connection. This factor is derived from the following eight measures of site responsiveness, recorded when each site is measured over a high speed connection:

- Overall Transaction Response Time
- Average Page Download Time
- Home Page Download Time
- Details Page Download Time
- Shopping Cart Page Download Time
- Login Process Execution Time
- Checkout Process Total Execution Time
- Average Checkout Page Download Time

Of the sites in the study, Apple was the most responsive over a high speed Internet connection, followed by Dell and Best Buy.

High Speed Response

Rank	Computer Hardware Web Sites
1	Apple
2	Dell
3	Best Buy

Geographic Uniformity

The performance of some Web sites varies according to where in the US a customer is located. The Geographic Uniformity factor represents the degree to which a site delivers consistent performance, independent of geography or Internet backbone. This factor is derived by computing the variation among measurements taken by the ten Keynote measurement agents.

Keynote's research shows that the HP site delivers the most uniform service levels across the US, followed by Best Buy and Apple.

Geographic Uniformity

Rank	Computer Hardware Web Sites
1	HP
2	Best Buy
3	Apple

Average Dial-Up Response

The Average Dial-Up Response factor represents a customer's experience of site responsiveness when using a 56KBps Internet connection. Given that over 40% of the consumer population is still accessing the Internet over a dial-up connection, response time over dial is critical for all sites. The same underlying metrics were used for this factor that were used for High-Speed Response.

Apple, Best Buy and CompUSA scored best at Average Dial-Up, proving the best service to its user on narrow band connections.

Dial-Up Response

Rank	Computer Hardware Web Sites
1	Apple
2	Best Buy
3	CompUSA

Availability

The Availability factor represents a customer's experience of overall site availability. This factor is derived from the following seven measures of site reliability:

- Overall Transaction Availability (Peak)
- Overall Transaction Availability (24X7)
- Home Page Availability (Peak)
- Details Page Availability (Peak)
- Cart Page Availability (Peak)
- Login Availability (Peak)
- Checkout Process Availability (Peak)

Of the sites in the study, Apple was the most available, followed by Sony and Dell.

Availability

Rank	Computer Hardware Web Sites
1	Apple
2	Sony
3	Dell

Full Study Results

Customers purchasing the full study results will receive:

- An executive presentation, which highlights general industry trends and ranks each participating retail company on each of the key performance factors. The insight gained helps executives identify general areas of site improvement that have the maximum impact on the customer experience.
- An in-depth presentation that analyzes each of the diagnostic metrics that constitute the Key Performance factors. The presentation also contains detailed information on best practices in site design, as implemented by leaders in the study. Armed with this intelligence, IT Managers can tune specific site elements to improve the performance delivered to customers relative to what key competitors offer.
- A detailed investigation of their own site prepared by a Keynote Service Level Consultant. Based on the data collected during the Service Level Ranking study, a Keynote consultant will make tactical and strategic recommendations about how to improve the site's service levels and offer customers the best possible experience online.

Study Methodology

To measure the sites in the study, Keynote uses its Transaction Perspective agents—the industry’s most accurate web application monitoring technology based on the IE 6.0 browser. For this study, we placed Transaction Perspective agents in ten major US cities. These agents performed multi-page transactions on each of the sites included in the study, collecting over 6,500 detailed measurements of the responsiveness and reliability of each site. The overall methodology is illustrated in the figure below.

Transaction Measured

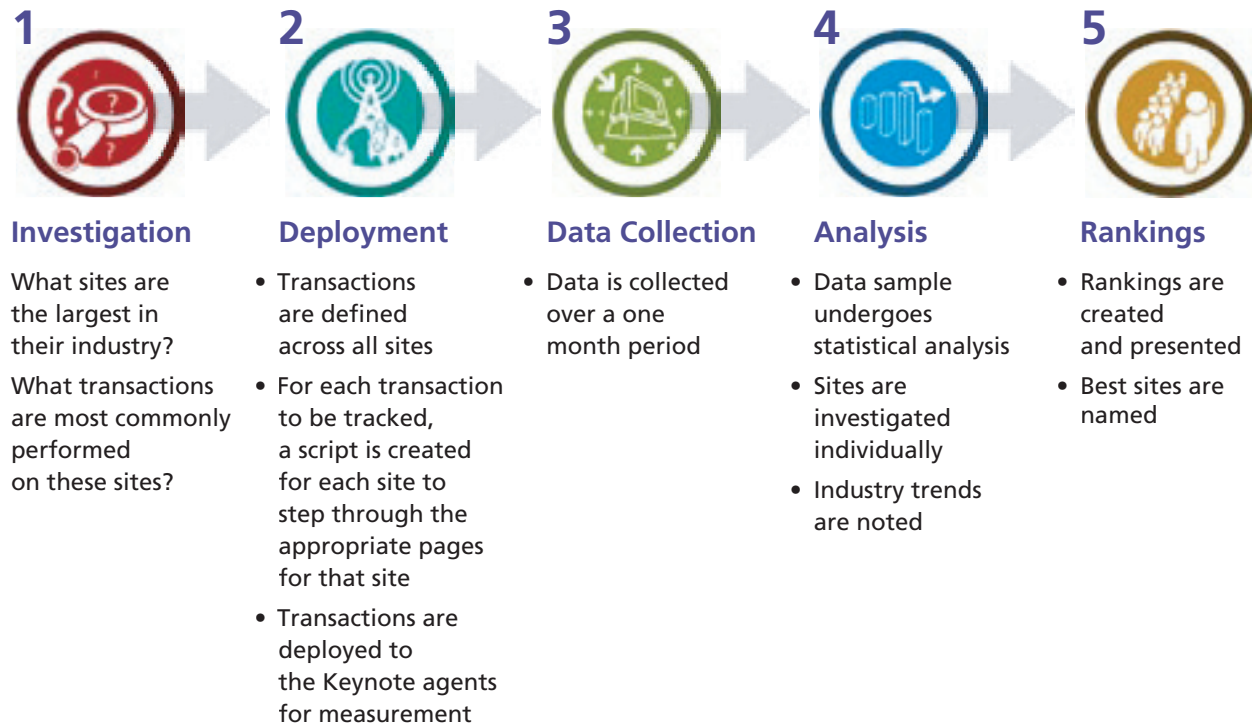
Keynote compared the process of shopping for a personal computer online. Each transaction began at the site’s Home Page, logged into the site, navigated to personal computers, drilled into the

specifications and details about a specific computer and continued to the purchase process. The transaction finishes when the credit card information is requested. No actual computers were purchased during the study.

The number of pages (or clicks) included in each transaction varied among sites, as each has a unique navigational path.

While Keynote measured only a single transaction, that transaction exercises various portions of the site and many general site conclusions can be drawn from it. The results obtained apply much more broadly to the entire purchase process on each site.

Overall Methodology



Measurement Frequency

Transactions were run against each site every hour from each of Keynote's US10 agents, and from a group of Dial-Up agents. Thus, each site was measured almost 300 times daily. Data was collected from August 16th through September 12th, 2005.

Peak and Off-Peak Periods

When computing many of the metrics evaluated, Keynote confined its analysis to a peak period, defined as daily from 8 am to midnight EST. Limiting the analysis to a peak period is especially important when calculating reliability, since many sites schedule routine maintenance at night when customer traffic is usually very light. Including outage data collected during off-peak periods could make the rankings unrepresentative of a typical customer's experience.

Transaction Perspective Agent

The Service Level Rankings study is based on Keynote's highly accurate and realistic Transaction Perspective® measurement service. This service

uses measurement computers ("agents") that mimic a series of actions by a consumer interacting with a Web site using the Internet Explorer browser, taking detailed measurements of the entire process.

Keynote's Transaction Perspective measurement computer ("agent") is the most accurate and high fidelity measurement technology available. The Agent uses the IE 6.0 browser to ensure measurement accuracy. Just like a user, the agent uses two concurrent threads to fetch page components and allows the use of persistent connections. This browser also handles SSL, JavaScript, Flash, ActiveX, and other interactive languages that can have a significant impact on both performance and availability. Measurement data includes rendering time of all components to ensure that the data gathered represents the complete customer experience.

Agent Locations

To represent the experience of real customers, Keynote's agents are located on major Internet backbones and in principal population centers.

Agent Locations



Ranking Methodology

The overall scoring and ranking process is performed in three stages. Keynote first evaluates a large collection of metrics that describe various aspects of site performance. Next, each site's scores for these underlying metrics are combined into an overall score for each of seven key performance factors. Finally these performance factor scores are combined to create separate scores and rankings for Responsiveness and Availability.

Each underlying metric score is based on statistics calculated from the large sample of measurements collected during the study. For example, for the underlying metric Overall Transaction Response Time, the statistic used for each site is the geometric mean of the site's total transaction response time; this is a good measure of the typical response time a majority of users would experience when using that site. Normalized metric scores are assigned to each site based upon the observed distribution of values of this statistic for all the sites in the study. Overall scores for all key factors are then calculated for each site, by averaging the scores for each factor's underlying metrics. For example, the score for the factor High Speed Response is the average of nine underlying metrics, each of which reflects the response times of different pages or components of the transaction of interest.

The overall scores and rankings for Responsiveness and Reliability are a weighted average of key performance factors. The Responsiveness ranking is based on five factors: High Speed Response, Dial-up Response, Response Time Consistency, Geographic Uniformity and Load Handling. The Reliability ranking is based on Availability and Outages. For readability, the final scores are transformed to a 1000-point scale.

Longitudinal Comparisons

Keynote Rankings provide a solid base for longitudinal comparisons and benchmarking. Studies are repeated at least annually. Each iteration of a study uses a similar study design, and the analysis is based upon standard Keynote metrics, resulting in data that can be easily benchmarked and compared over time.

Keynote plans to release the next wave of Service Level Rankings for Computer Hardware Web Sites in Fall 2006.

About Keynote Systems

Keynote Systems, The Internet Performance Authority®, is the worldwide leader in e-business performance management services. Over 2,100 corporate IT departments and 19,000 individual subscribers rely on Keynote's growing range of measurement and monitoring, service level and customer experience management services to improve e-business performance by reducing costs, improving customer satisfaction and increasing profitability.

Keynote Service Level Management (SLM) solutions provide enterprises with the tools to align IT and e-business goals. Keynote's SLM solution suites offer comprehensive approach to the problem of managing e-business service levels effectively for IT, application deployment and support personnel and e-business executives. To learn more about Keynote's Service Level Rankings study, visit:

http://www.keynote.com/solutions/slm_service_level_rankings.html, or contact us at sales@keynote.com.