

Keynote's Web Transaction Indices

Background & Methodology

Keynote's public services division provides useful and relevant information to the public and to the media pertaining to various aspects of Internet performance. The division reports on general Internet-related performance as a result of large-scale, unplanned Web events (viruses, worms, natural disasters, hardware/peering problems, denial of service attacks), and during planned Web events including holiday shopping, presidential elections, the Super Bowl and tax deadline day.

In addition to providing expert commentary on Internet performance to the external world, Keynote's public services division maintains a broad range of representative Web performance indices. Built using accurate data gathered continually by Keynote's comprehensive Internet measurement network, these indices are considered in the industry to be the 'gold standard' for benchmarking Web page and transaction responsiveness and availability against competitors. Keynote's indices are also used for setting internal goals and metrics for performance (as part of MBOs), and for use in service level agreements (SLAs) with a wide variety of providers.

Web Performance Indices -- Introduction

Keynote's page download and transaction indices measure the responsiveness and availability of Web pages and multi-step processes on leading Web sites. Every week since 1997, Keynote has published results for one or more Web performance indices on its own Web site (http://www.keynote.com/solutions/mm_public_services.html) and on the sites and in the magazine pages of its publishing partners.

Keynote's line-up of Web performance indices currently includes the following page download indices: The Keynote Business 40 Internet Performance Index, The Keynote Consumer 40 Internet Performance Index and The Keynote Government 40 Internet Performance Index.

Keynote's line of transaction indices include: The Keynote Broker Web Transaction Performance Index, The Keynote E-Banking Web Transaction Performance Index, The Keynote Credit Card Web Transaction Performance Index and The Keynote Online Retail Transaction Performance Index (includes leading Apparel, Books & Music, and Electronics online retail Web sites). The remainder of this document details the rigorous processes and methodologies for assuring the accuracy of Keynote's transaction indices. Also described are the transaction components unique to each vertical market index.

Process for Selecting and Building Web Transaction Indices

When deciding whether to create a new index, Keynote carefully evaluates specific market segments or up-and-coming business verticals. Most commonly, the following factors are considered: number of companies in a particular vertical that have a significant online presence, the level of sophistication of the Web technologies in general use among a particular vertical, level of media focus on a vertical and anticipated traffic from these companies' e-business channel.

Once a particular vertical is identified, Keynote chooses which sites in the vertical should be part of the index based on the following criteria: online brand awareness, third-party published traffic to the site, ability to be measured by Keynote's measurement computers and percentage of revenues driven via the online channel. All of these factors are weighed to develop a list of viable sites that represent the vertical segment accurately and realistically, while also being generally accepted as a representative sample of that vertical.

The goal of any vertical transactional index is to represent as many major sites as possible, while balancing the management and upkeep costs of collecting the measurements.

Therefore, a typical vertical market index will comprise a representative sample of 10-15 sites; this number may be slightly higher or lower depending on the vertical type, manageability of the measurement scripts, and the number of well known companies or organizations that were considered candidates for inclusion.

Methodology

To ensure that the data published in an index is both relevant and credible, Keynote specifies a common end-to-end business process or task that can be measured reliably and accurately at each of the sites selected for inclusion in a vertical transaction index. To enable fair "apples-to-apples" comparisons among the selected sites, Keynote creates measurement scripts that step through the set of actions needed to accomplish the specified business process or task. Because each Web site may have been built using a different design or different technology, there can be differences in the number of script steps (Web site interactions) needed to accomplish the specified process. Such differences affect a customer's experience of a site, and will be reflected in Keynote's measured performance results.

Measurement Infrastructure

The foundation for Keynote's measurement and monitoring services is an extensive network of over 2,100 measurement computers strategically located in over 120 locations around the world and connected to the major Internet backbones. These computers accurately represent the performance that may be experienced by actual end users in over 70+ metropolitan areas worldwide. Keynote's sophisticated operations center constantly monitors the health and security of these computers. For more information on Keynote's measurement infrastructure click: http://www.keynote.com/keynote_method/keynote_method_methodology.html

Coverage and Reporting Periods

While Keynote measures each of the sites from multiple global locations 24/7, the final index results published on Keynote's site and through our publishing partners are based only on measurements taken from a specified number of geographic locations and for a pre-defined period during the week. Relevant days of the week and hours of the day are explicitly stated for any index that does not use a full week of data.

Keynote's weekly indices are updated on the www.keynote.com by end of day on Tuesday. The new performance and success rates published each week summarize Keynote's measurements of the index taken during the previous week.

Data Analysis & Review

Each week, before the results for any index are published on Keynote's Web site or reported to our publishing partners, the data is systematically analyzed and reviewed as follows:

1. For each index, an automated data-aggregation script selects only those measurements taken during the relevant days of the week and hours of the day.
2. To minimize the impact of outliers in general in the Internet performance data, Keynote calculates the geometric mean of the total transaction time from all the measurements during the period. The geometric mean is the final value for the week for that site in the speed table.
3. In the calculation of site availability values (success rate table), additional filters are also applied to the data as needed for specific sites depending on the type of errors encountered; this step allows removal of errors caused by Keynote script problems, in which a script fails because of a site change. However, error measurements that indicate unexpected outages of a site reflect the real user experience and are therefore not removed from the results.
4. In the calculation of site availability values, Keynote excludes other measurement errors that do not directly correspond to a loss of site availability (those labeled by Keynote as "miscellaneous errors").
5. The Outage Hours column included in the success rate table is a secondary matrix to measure the site reliability. It is calculated by taking the count of any hour during which the measured transaction is not available more than 30% of the time.
6. If a site exhibits an unusual pattern of performance which cannot be explained after further investigation, measurements of the site during the time period in question are usually excluded from the reported data.
7. Normally, a site will not be included in the published results unless at least 70% of its selected data points are valid measurements. Because the published index data is subjected to a more stringent analysis and filtering process and uses a more robust methodology to calculate the performance and availability results, those results do not necessarily match the corresponding statistics displayed using MyKeynote, the portal Keynote customers use to view their performance data.

Brief Description of Keynote's Transaction Indices

Keynote publishes three transaction indices in the financial services market (e-broker, credit card and e-banking), and three transaction indices in the online retail market.

A short description of each of Keynote's transaction indices is provided below.

The Keynote Broker Web Transaction Performance Index - Measurements are taken every 15 minutes between 9:00 a.m. and 4:00 p.m. (Eastern Time) on market trading days from the 10 largest population centers in the U.S. Each transaction has the following six

components (which may represent six or more pages in the particular transaction being measured depending on site design and navigability):

- Accessing the home page
- Logging into a brokerage account
- Obtain a stock quote
- Create an order to buy stock
- Logs out before confirming the order. (transaction ends before brokerage executes the purchase)

The Keynote E-Banking Web Transaction Performance Index- Measurements are taken every hour seven days a week from the 10 largest population centers in the U.S. Reporting period is from 8:00 a.m. to midnight (Eastern Time) Monday through Friday. Each transaction has the following four components (which may represent four pages in the transaction):

- Accessing the home page
- Logging into the bank account
- Checking the account balance
- Logging out of the account

The Keynote Credit Card Web Transaction Performance Index- Measurements are taken every hour seven days a week from the 10 largest population centers in the U.S. Reporting period is from 8:00 a.m. to midnight (Eastern Time) Monday through Friday. Each transaction has the following four components (which may represent four pages in the transaction):

- Accessing the home page
- Logging into the credit card account
- Checking the account recent activity or charge
- Logging out of the account

The Keynote Online Retail Transaction Performance Index suite consists of three “mini” indices, each focusing on a specific vertical in the online retail industry. The three mini indices are the Apparel, Books and Music, and Electronics. Measurements are taken every hour seven days a week from the 10 largest population centers in the U.S. Reporting period is from 8:00 a.m. to midnight (Eastern Time) Monday through Friday. Each transaction has the following components (which may represent five pages in the transaction):

- Accessing the home page
- Searching for a product
- Viewing the product
- Adding that product to shopping cart
- Proceeding to checkout without login

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Publication Policy

Keynote's Web performance indices are based on measurements taken over the public Internet and cover sites that are generally accessible to the public at large. Keynote uses its own infrastructure to conduct the measurements on these sites and publishes the results on an aggregated, weekly basis only on its own site and through its publication partners.

From time to time, Keynote is requested to refrain from publishing results that may not be favorable to a particular company. The media, Keynote customers, and other sites included in the index do not look favorably upon these types of exclusions. Therefore Keynote will not simply remove a measured site from an index upon request, if the measurements being reported in the index are an accurate reflection of the site's performance and availability characteristics. Keynote stands behind its indexes and the methodologies it follows to compute them.

These have been painstakingly refined over the years to deliver the most accurate and representative Web performance data possible to the Internet-using public and to the media. As a publisher of large amounts of data, on rare occasions mistakes may occur "in print." Keynote has implemented procedures for correcting such mistakes, for whatever the reason, on its public Web site.