

CAN BING BONG GOOGLE?

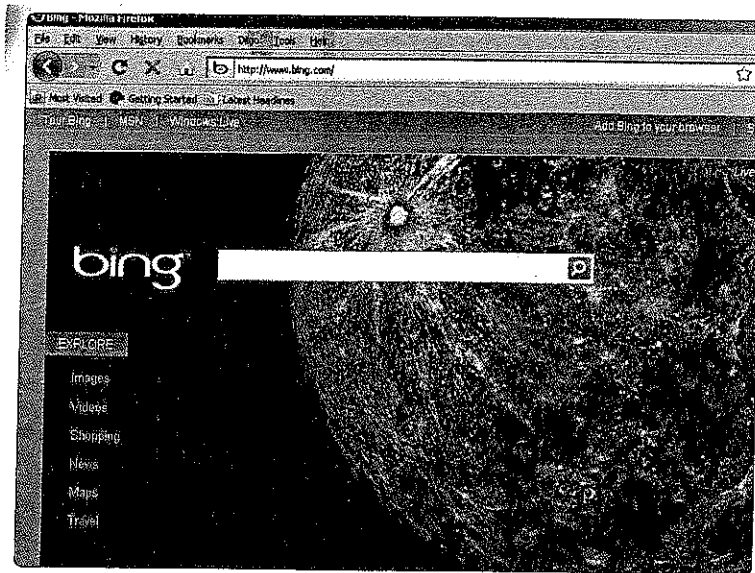
After years of trying to develop a search engine and related search-based advertising platform that would be competitive with Google, on May 28, 2009, Microsoft unveiled its newest effort, called Bing. Why Bing? Allegedly, the name connotes the feeling you get when you discover something (as in "bada bing!"), it's one syllable, and potentially can become a verb (as in "Bing it!") with as much cultural weight as "Google it!" The interface is simple, but much richer and more interesting than Google's in part because each day a new full-page nature photo is shown. In fact, Bing is downright elegant according to many observers and users. Google, in contrast, under the influence of computer scientist Marissa Meyer, who controls Google's homepage, has not changed its minimalist, stark, white interface since its inception. In March 2009, Google's top designer, Doug Bowman, quit because he couldn't deal with Google's data-driven approach to page design, which in one instance caused Google to test 41 different shades of blue to use on its screens. In contrast, Bing presents a much richer customer experience.

Microsoft calls Bing a "decision engine" because of its focus on helping users make decisions in four areas: shopping, health, travel, and local business. For instance, a Bing search on "flights from Seattle to San Francisco" will produce a link that shows the lowest extant round-trip fare, and an icon for calculating the likely future cost of the ticket based on historic trends over the next seven days. There are also links to a Bing travel site from which users can link to airline sites and hotels. In contrast, a similar search on Google and Yahoo returns links to airline and other booking sites, but no information on fares or their future price.

Bing may be just the solution Microsoft needs to break into the big leagues of ad-based search. In April 2009, the industry leader Google commanded the pole position with 65% of U.S. searches, Yahoo 20.1%, and Microsoft 8%. By the middle of June, Microsoft had jumped to 12% of online searches (a 50% pop for Bing in just a few weeks), with both Yahoo and Google giving up some share. This marked the first time in history that Google's and Yahoo's share of the search market declined. Score one for Microsoft.

When the Web was first invented, no one envisaged that by 2009 online search would grow to a \$12 billion dollar business. In fact, early pundits thought that online search would be a commodity business, at best a small niche player in e-commerce. Of course, no one envisaged that search could be married to advertising, and that search was in essence a huge new advertising platform. Today, search ad spending is nearly 50% of all online advertising. The search engine market is booming, along with the larger Internet advertising marketplace, now estimated at about \$25 billion for all types of online advertising. It is apparent that search has become a major Web-based industry driven in large part by advances in technology, both hardware and software. What is less apparent is who exactly will dominate this marketplace and what role technology (as opposed to marketing muscle or economics) will play in the ultimate outcome. Where's the money in search and who's going to get it? A related question is how many search engines will remain when the competition is over. Is this a "winner-take-all market" or can search continue to support an oligopolistic market with two or three major players?

Today, five Web sites account for over 95% of all Web searches: Google, Yahoo, Microsoft/Bing, AOL (3.5%), and Ask.com



(2.1%), with the rest accounted for by over 100 less popular and specialized search engines such as Kosmix. Of these firms, Google stands out as the only "pure" search engine for which search is the major line of business, whereas the other firms are either also content portals (Yahoo and AOL) or, in the case of Microsoft, the provider of 95% of the world's desktop computer operating systems.

Google achieved its early and powerful lead in the search business through superior software technology, a highly efficient computer hardware architecture, and excellent Web site design. Google was started in 1998 by two enterprising Stanford grad students, Sergey Brin and Larry Page, who were studying data mining and the process of analyzing data for patterns. Early search engines such as Alta Vista (which once had 90% of the search market) merely counted how many times a search term appeared in a given Web site to determine where to rank a particular page. Brin and Page's research reflected the work of Jon Kleinberg, professor of Computer Science at Cornell, who originated an algorithm that rates pages based on the number of links to other pages (hubs) as well as the links they receive from oth-

ers (authorities). HITS (Hyperlinked Induced Topic Search) is an algorithm for automatically identifying the leading hubs and authorities in a network of hyperlinked pages. In other words, when you search on a topic, the HITS algorithm takes you to those pages that are ranked both high in authority on the topic, and high in the links they have to other sites related to that topic. For

instance, if you search for a term such as "measles," the HITS algorithm will often show the Mayo Clinic page on this topic in the top results (first page). This is because the Mayo site receives a large number of links for this topic (it is an authority), and also links to a lot of other sites related to measles (it's a hub for information on the topic). Almost all search engines today use some form of the HITS algorithm, which as a set of ideas is not restricted by patent or copyright.

Google's version of the HITS algorithm also uses the popularity of Web pages as the most important criteria for ranking pages, as well as the page content. The more other Web pages link to a particular page, the higher it jumps in Google's ranking structure, called PageRank. This is called "link analysis" and is run independently of the query being made. Once all the Web's indexed pages are ranked, Google also factors in other information, such as the number of links that a site contains to other sites, the text content of a page, its link structure, proximity of search words to one another on the page, fonts, heading, and text of nearby pages. Since the PageRank algorithm was invented by Brin and Page while they were students at Stanford, it is patented and

owned by Stanford University, which licenses its use to Google.

However, Google is much more than a page rank algorithm. It's also a hardware superpower. It possesses the largest civilian computing system in the world with an undisclosed number of servers (rumored to be anywhere from 500,000 to 1 million, many of which today have dual- or quad- core processors or "computers") in 16 server "farms" throughout the world. The overall number of computer processors is estimated to be about 3 million.

Google also leads in two related areas: network management software, which permits parallel processing of search queries, and information management software. Google pioneered the concept of using hundreds of thousands of cheap PCs to process huge amounts of data (queries and responses) in microseconds using free Linux software. Searching an index of over 1 billion Web pages requires exceptional software that can coordinate the work of all these PCs. Want to know how many people search on "BMW" on Sundays from 8 a.m. to 8 p.m. in the New York metro area? Where did they come from (prior search), and what was their next search term? Or, maybe you would like to calculate queries and click-throughs for each hour in a 24-hour period in the United States for a single text ad paid for by a customer. To answer these and related marketing driven questions, Google uses an open source program called HADOOP (named after a toy elephant). HADOOP enables search engines to break large sets of data into smaller chunks stored across thousands of PCs, and then ask questions of this data, and receive responses in seconds.

However, it is unclear if Google can maintain its technological edge in search given the investments being made by Microsoft, as well

as the proliferation of several other smaller but popular search engines. Google only has an exclusive license to the original PageRank patent until 2011. In the competition among search engines, it is clear that search software alone is not the key ingredient, just the foundation for the winning hand. It's a necessary but insufficient condition for success.

In 2004, Google became a public company, greatly expanding its capital foundation to support further growth. Google's strategy has been to extend its advantages in search into two areas and try to "out-invent" the competition. These areas are advertising and applications: in the words of CEO Eric Schmidt, Google is all about "search, ads, and apps." It has extended search to include images, books, scholars, content, finance, and news. It has extended its advertising services through its AdWords and AdSense programs. AdWords is an auction program that allows advertisers to bid for placement on Google pages. AdSense allows Google to place ads on publisher Web sites (basically any Web site is a "publisher" Web site) based on the content of that site's Web pages. Other services include Google Geo (Maps, Earth, and local content), and Google Checkout (an online wallet). No other online competitor has approached the success of Google's advertising platform. Where to put Google's \$1.65 billion purchase of YouTube? Wall Street analysts have had a tough time with this question too. YouTube is all three: it's an online application for storing and sharing videos; it's a search system for videos; and it's an advertiser's dream come true: over 120 million viewers watched more than 10 billion user-posted videos in August 2009. At this point, YouTube is not yet profitable because advertisers have not signed up for its display and text ad services for fear of losing control of ad placement.