

Portal Kombat: The Battle between Web Pages to become the Point of Entry to the World Wide Web

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Summary:

Over the past few years the web has grown to several hundred million pages, while just a few of them get most of the visits. Such sites, called portals, attract visitors, advertisers and provide lots of valuable content at no charge to the visitors. The portals attract a disproportionate amount of the Internet advertising dollars and have the ability to influence the success of new electronic commerce ventures. In this paper we show the evolution of portals from a web in which all pages are equally accessible. In addition, we analyze the nature of the competition between portals and show the impact of technological developments and added services on their economic viability.

Extended Abstract:

The exponential growth of the number of web pages on the Internet presents its users with an unprecedented depth and breadth of information from thousands of online sources. This creates a major problem for the users who would like to get directly at the set of web pages mostly relevant to their needs and interests without having to go through an excessive number of irrelevant pages. Instead of using a general search engine, the

user looking for technical information can use a specialized web site such as CNET for IT related articles, news and sites. Over the past few years several other sites have emerged as easy and organized gateways to the web, or to a set of web pages addressing specific topics. Users find it easier to log on first to one of these and from there to be hyperlinked to other pages of interest on the Internet. These sites, called *portals*, have become major gateways into the Internet. This new phenomenon raises some interesting research questions:

- What is the role of portals in the Internet economy?
- Why do they arise?
- Which factors affect the growth of portals?
- And, are all portals created equal?

We address the issues raised above by analyzing the evolution of web pages into portals using economics based models. The models consider the information needs of a heterogeneous user population, the cost of providing quality content on a continuous basis, the advertising and cross selling revenues, which are typical of portals. Each of the economic entities in the general equilibrium model, the web owners, advertisers and the web users act to maximize their own surplus. We derive and analyze the equilibrium that emerges.

We find that a positive feedback mechanism plays a key role in formation of portals. To attract traffic, portals provide value added services to the users. They continuously scan the World Wide Web for relevant and timely information, screen and prioritize the links, and provide a consistent interface to the ever changing Web.

Portals attract a large portion of visitors. For instance, 43% and 13% of all the users of the Web visit *AOL.COM* (which is accessible by all Internet users) and the newly developed *Disney* portal, respectively. Having so many visitors going through the same few pages attracts advertisers who pay the web site owner based on the number of visitors. The web owners in turn can use this increased revenue to improve the quality of free information available to web surfers. This completes the loop. The web sites grow to a point where the cost of placing additional information is equal to the incremental advertising revenue.

A key result we show is that there is no symmetric equilibrium among web pages as the content on the web becomes more valuable over time. This is driven mainly by the competition for traffic. Over time, as the competition among web sites heats up, the web sites compete for Internet visitors by offering more and more services. Providing greater services is costly for the web sites. We show that in the long run, the portals cannot sustain a competition where each one of them competes with similar offerings. To survive, they have to differentiate from each other on quantity and quality of information. A few web sites offer larger amounts of valuable content and advertising while others specialize in content. This phenomenon is observed in many other realms of economic activity where a more featured product is available in the marketplace along with a simpler one. This lop-sided equilibrium is not unlike that between convenience stores and pharmacies and large grocery superstores. The portals are the superstores of the web.

Many technology trends reinforce the formation of portals. In particular, improving technology for creating web content enhances the formation of portals. New technology such as streaming technology and XML, make it easier to create and publish

content. The portal and the non-portal web sites take advantage of it with the portal site having an upper hand because of its larger budget for content. This provides a higher return for investments in content for portals that share the cost among a larger number of visitors.

Many web sites get their income from advertising which the users view as a cost. Web page managers carefully balance the income producing and the customer deterring ability of advertisements. Improving access technology, such as faster modems, reduces the downloading delay costs that advertisements place on the user. This allows the web sites to sell more advertisements on the page. The impact is greater on the web site with more advertisements – the portal. Consequently, improvements in access technology also accentuate the formation of portals.