

**UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

CENTER FOR DEMOCRACY & TECHNOLOGY,
et al.,

Plaintiffs,

v.

No. 03-5051

MICHAEL FISHER, Attorney General of the
Commonwealth of Pennsylvania,

Defendant.

**Second Expert Report and Testimony
of Michael B. Clark**

**Types of Web Hosting Services, and the
Identification of Shared IP Addresses Situations**

1. I am employed as the Webmaster of the Plaintiff Center for Democracy & Technology (CDT), a position I have held since September 2000. I also serve as Webmaster to a separate organization, the Internet Education Foundation (IEF). My resume, a copy of which is attached to my First Expert Report and Testimony, details my work in Internet, network, computer, and data management activities dating back to 1988. From August 1995 through May 1998, I was the Data Systems Manager of the Virginia Tech Center for Survey Research in Blacksburg, Virginia, and as part of this position was a member of the Research Faculty at Virginia Polytechnic Institute and State University.

2. As part of my current positions as Webmaster to CDT and IEF, I have responsibility for managing a number of very active and changing web sites, including responsibility for both the design and formatting of the web sites and the operation and configuration of the web servers that host the web sites. I am the primary point of contact for both CDT and IEF with our Internet Service Providers (ISPs) and web hosting companies, and have direct responsibility for the allocation and use of Internet Protocol (IP) addresses utilized by CDT, IEF, and other related organizations.

3. In addition to and wholly separate from my work for CDT and IEF, I also operate a small web hosting company, PlanetMike.com that provides web site design and hosting services to its customers. In contrast with my work for CDT and IEF (where I am in the position of a customer), I am a vendor to my own web hosting customers.

4. Through all of this work and experience, I have acquired extensive knowledge of different forms of web hosting companies, and in what situations it is possible or likely that customers of a web hosting company will share IP addresses. I know most of what is discussed below as a direct result of my experience (a) as the operator of a web hosting company, (b) as a customer of web hosting company (both in my work at CDT and IEF, and as part of my operations as a web hosting company), and (c) through my work in evaluating choices in the market available to CDT, IEF, and my own web hosting company.

5. This Report and Testimony uses a number of terms and concepts that are explained in greater detail in the Report and Testimony of Mitchell Marcus, and in my First Report and Testimony.

The Focus of This Report

6. I was asked by CDT to explain and clarify the different types of companies that collectively can be grouped under the category of "web hosting companies." The term "web host" can apply to a wide variety of companies with quite different business models and modes of operation.

7. Below I use a number of descriptive labels to describe the different types of companies. There is not in the Internet industry a clear and universally agreed set of labels to apply to the different business types, and thus other experts may use somewhat different terms to categorize the different types of web hosting companies.

8. I have reviewed "Defendant's Answers to Plaintiffs' Third Request for Production of Documents and Interrogatories," served on Plaintiffs on November 17, 2003. In particular, I have reviewed the Defendant's definition of "web hosting company" set out in response to Interrogatory 12:

First, Defendant defines "web hosting company" (and "web hosting service") to mean an entity or person that permits other persons to post their own sites or content as sub-pages under the single domain name of the host, such as GeoCities.com, Terra.es, or Photoisland.com.

Based on my experience, I believe that this definition is highly under-inclusive and very confusing. I agree that entities like GeoCities.com can be categorized as web hosting companies, but they are more commonly categorized as "online communities" or "cyber-communities." As described below, the term "web hosting company" typically refers to companies (and technical and business models) that are radically different than "online communities."

9. In my First Report and Testimony I described research that I have done to gauge the prevalence of the sharing of IP addresses. To fully understand the phenomenon of shared IP addresses, it is important to understand the different types of web hosting companies, because the

great majority of instances where IP addresses are shared among wholly unrelated web sites arise in the context of web hosting companies (as I describe that broad term below).

Web Hosting Companies and Similar Entities

10. I would define the term "web hosting provider" to be a "company that offers to third party users the exclusive or non-exclusive use of a web server to allow the users to publish one or more web sites that are then made available over the Internet." From the customers' perspective, what is most defining about web hosting providers is that a customer can create and publish to the world one or more web sites without having to own or operate a web-page serving computer.

11. There are, however, a number of different subcategories of the general term "web hosting provider" or "web hosting company." Below I define six types of service providers (although the final type, while very relevant, is not in fact a web hosting company). The categories are not presented in order of importance or prevalence, but in a rough ascending order of how much technical responsibility and control the customer can exercise over the web server.

12. One important preliminary point is that a given entity can simultaneously be a web hosting provider (such as a "virtual web hosting" company described below) and a customer of a web hosting provider (such as a customer of a "managed web hosting" company). In other words, a company can become a web hosting provider by first being a customer of a web hosting company (thereby obtaining space on a web server), and then reselling a portion of that space to third parties. As described below, this is exactly how I operate my PlanetMike.com web hosting company.

13. I would categorize different types of web hosting (and similar) companies as follows:

A. An "online community" or "cyber-community" is (as the Defendant defined it in his Interrogatory response), a company "that permits other persons to post their own sites or content as sub-pages under the single domain name of the host, such as GeoCities.com, Terra.es, or Photoisland.com." Thus, an "online community" offers to customers (often individuals or small organizations) the ability to create and post a web site that will appear under the domain name of the hosting company. Thus, I might have a web site on GeoCities, with the URL <http://www.geocities.com/mikeclark/home.html>. Often these web sites are offered for free, with the hosting company making money by selling advertising space that appears around or above each web site. In this scenario, the customers (a) create the HTML pages, but (b) are responsible for no other functions of the operation of the web server.

B. A "virtual web hosting" company allows customers to create or publish a web site that is then hosted – along with other wholly unrelated customers' web sites – on a web server that uses a single IP address. This technical model is also called "name based web hosting," because the web server determines which web site to return based on the

requested web site's name. In this very common business and technical model, the customers are usually wholly unrelated to each other and their web sites each have their own unique domain names, yet their web sites share a common IP address. In this scenario, the customers (a) create the HTML pages (or contract with someone else to do so), but (b) are responsible for no other functions of the operation of the web server. This is how I provide services through my PlanetMike.com company – I have control over a single web server, and I have configured that server to support the multiple different web sites of my customers on the same single server.

C. In a category sometimes called "shared web hosting," a company will host different customers' web sites all on the same web server, but will assign different IP addresses to each different domain name. This technical model is also called "IP based web hosting," because the web server determines which web site to return based on the requested web site's IP address (but, as explained in the Expert Report and Testimony of Mitchell Marcus, name based web hosting is now strongly encouraged over IP based web hosting). In this scenario (as with virtual web hosting), the customers (a) create the HTML pages (or contract with someone else to do so), but (b) are responsible for no other functions of the operation of the web server.

D. In a category sometimes called "dedicated web hosting," the web hosting company allocates one web server (on the hosting company's premises) to each customer, and the server has its own IP address(es). The customer can, if desired, allow multiple web sites to be hosted on the web server. In this scenario, the customers (a) create the HTML pages (or contract with someone else to do so), and (b) the web hosting company would have primary or exclusive responsibility for the proper configuration of the web server (but the customer might also be able to configure the server).

E. With "managed web hosting," the web hosting company allocates one web server (on the hosting company's premises) to each customer, and the server has its own IP address(es). The customer can, if desired, allow multiple web sites to be hosted on the web server. In this scenario, the customers (a) create the HTML pages (or contract with someone else to do so), and (b) each customer would have primary responsibility for the proper configuration of the web server assigned to them. This is the type of service that I obtain on behalf of CDT (from Dataprise.com). This is also the type of service that I obtain (from Rackspace.com) for use with my PlanetMike.com virtual web hosting service. In both situations (CDT and PlanetMike.com), the separate web servers are each used to host separate web sites with separate domain names but using only one IP address for each server. Generally in this situation, it is very possible that the managed web hosting company would not know how the customer is using the web server, and whether the customer is supporting one or multiple web sites on the server.

F. The final category – a "collocation provider" – is not really a "web hosting company," but the situation has some similarities to the managed web hosting scenario. All that a "colo" company provides is IP addresses, electric power, and air conditioning, etc. to operate a web server that is owned by the customer but located on the colo

provider's premises. In this scenario, the customers would have sole responsibility for the proper configuration of the web server, and the collocation provider would likely have little or no idea how the customer is using the machine.

14. As noted above, a "customer" in scenarios D, E, or F could easily in turn use the web server in question to operate as a provider of scenario A, B, or C services. For example, PlanetMike.com is a customer of a scenario E provider, and is itself a scenario B provider to its own customers.

15. In addition to the above six web hosting and collocation scenarios, there is an entirely different method (which I will call category "G") by which many companies and some individuals make content available on the Internet – they operate their own web servers on their own premises, and simply obtain Internet connectivity from an Internet Service Provider (who may be entirely unaware of whether the customer is operating a web server). In both situations (with companies and individuals), it is easily possible for the web server to be used to operate multiple different web sites using a single IP address. For example, in addition to the web server services that CDT obtains from Dataprise (as noted above), I also am responsible for the operation of a separate web server on CDT's own premises.

Identification of Shared IP Addresses Situations

16. In category A above ("online communities"), numerous separate customers of the provider post their own web sites as sub-pages of the hosting provider main domain. Thus, all of these different web sites appear under a single domain name and use in most cases a single IP address. With category C ("shared web hosting" or "IP based web hosting"), as a general matter the web sites have their own IP addresses.

17. For all other categories (B and D through G), there exists a significant possibility (and in some cases an almost certainty) that multiple web sites can be hosted on the same web server utilizing the same IP address. Moreover, in all of those categories, it is quite possible that the multiple web sites are wholly unrelated to each other.

18. Based on my knowledge and experience, it is reasonable to conclude that the majority (if not the vast majority) of the situations of shared IP addresses that are documented in my First Expert Report and Testimony arise because of the use of web hosting services falling into any of categories B, D, E, or F above.

19. Because of (a) the diversity of technical and business models above, (b) the fact that the customer of a web hosting service can in turn also be a web hosting service (as with PlanetMike.com), (c) the technical architecture and design of the Internet, and (d) the lack of complete public documentation about the assignment and use of IP addresses, I know of no lawful technical means that exist that can be used to determine with any confidence whether more than one web site is hosted on any given IP address. Indeed, even unlawful hacking into a given web server would not reveal in all instances whether more than one web site is supported by the server.

20. The only method that can reliably and consistently reveal whether a given web site shares its IP address with other web sites is to contact the company or person directly responsible for the operation and internal configuration of the web server in question. In some cases that responsible party might be a web hosting company, but in other instances that party might be the customer of a web hosting company (or even the customer of a customer of a web hosting company).

I declare under penalty of perjury that the foregoing is true and correct.

Michael B. Clark