



UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION
WASHINGTON, D.C. 20580

**BEFORE THE
NATIONAL TELECOMMUNICATIONS
AND INFORMATION ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
WASHINGTON, D.C.**

In the Matter of

Improvement of Technical Management of Internet Names and Addresses

Docket No. 980212036-8036-01

**Comment of the Staffs of the Bureaus of Economics and Competition
of the Federal Trade Commission(*)**

March 23, 1998

I. Introduction

The Staffs of the Bureaus of Economics and Competition of the Federal Trade Commission ("FTC Staff") welcome this opportunity to respond to the National Telecommunications and Information Administration's ("NTIA") request for comments ("*RFC*") on its proposal to privatize the Internet Domain Name System ("DNS").⁽¹⁾ Internet domain names are the familiar and descriptive names for Internet sites (e.g., "www.ftc.gov"). They link to the unique Internet Protocol ("IP") numbers (e.g., 98.37.241.30) that serve as routing addresses on the Internet. The Domain Name System translates Internet names into the IP numbers required for transmission of information across the network. Currently, the registration and propagation of "top-level domain" ("TLD") names is carried out by a single firm that is under a soon-to-expire contract with the National Science Foundation.

The NTIA now proposes that the administration of TLDs, and the registration of domain names, be provided competitively by private, for-profit entities. The NTIA also proposes that certain other technical functions (e.g., management of number addresses; coordination of the root server system; dissemination of protocol parameters for Internet addressing) be carried out cooperatively (via a new not-for-profit corporation) by parties having vested interests in the efficient operation of the system.

As explained more fully in this comment, purchasers of domain name registration services might be subject to supracompetitive prices in the future if they become "locked-in" to a particular vendor of those services. The likelihood of a significant customer investment that results in "lock-in" is a detailed factual question on which this comment cannot reach a definitive conclusion. Economic analysis suggests, however, that purchasers may be able to take steps to reduce their vulnerability to higher prices from "lock-in" effects. In addition, higher prices arising from "lock-in" also could occur under alternatives to the NTIA proposal and under the current registration system. Finally, the benefits to consumers of introducing competition to the registration of domain names are likely to make the NTIA proposal, on balance, preferable to the current system.

II. Expertise of the Staff of the Federal Trade Commission

The FTC is an independent agency responsible for preventing unfair methods of competition and unfair or deceptive acts or practices.(2) In response to requests by federal, state, and local government bodies, the staff of the FTC often analyzes regulatory or legislative proposals that may affect competition or the efficiency of the economy. In the course of this work, as well as in antitrust and consumer protection research, nonpublic investigations, hearings, and litigation, the staff applies established principles and recent developments in law and economics to the analysis of competition and consumer protection matters.

The FTC has actively applied its competition and consumer protection enforcement principles to Internet commerce. The FTC began to examine the potential for consumer protection problems on the Internet even before on-line consumer transactions became common. In the fall of 1995, for example, the FTC held public hearings to explore business and consumer issues arising from technological innovation and increasing globalization.(3) Thereafter, a workshop in 1996 focused on issues relating to the on-line collection of information from consumers.(4)

As part of its ongoing review of issues relating to on-line commerce, the Commission has directed education efforts and brought several law enforcement actions to combat frauds that have migrated to (or taken advantage of) the on-line medium. For example, in 1996, the staff of the FTC coordinated the "Internet Pyramid Surf Day," a law enforcement surveillance effort that included federal, state and local law enforcement officials. The participants surfed the Internet to locate those sites posting possible pyramid scams. In 1997, the staff of the FTC conducted additional "surf days" seeking to identify, among other things, possible on-line credit repair and business opportunity frauds. In addition, firms that have used the Internet and related hi-tech products to peddle fraudulent business opportunity and pyramid scams have been charged by the FTC with violating federal laws.(5)

III. Introducing Competition into Registration and Administration of Domain Names

A. Background

The actual address of a computer on the Internet is a string of numbers -- the Internet Protocol ("IP") address.(6) Every Internet site is assigned a unique IP number.(7) Because these numbers can be difficult for users to remember, most Internet sites also have a "domain name." Domain names are an alphabetical, hierarchical, and more user-friendly system of Internet addresses. The network depends on the numerical address, however, so to use domain names, the system relies upon machines known as "name servers," which translate (or "resolve") domain names into their corresponding IP addresses.

The Internet domain name space is divided into top-level domains ("TLDs"), with each TLD then divided into second-level domains ("SLDs"), and so on.(8) A set of generic top-level domains ("gTLDs") denote the intended function of that portion of the domain space. For example, "com" was established for commercial users, "org" for not-for-profit organizations, and "net" for network service providers.(9) The registration and propagation of these gTLDs are performed by Network Solutions, Inc. ("NSI") under a five-year cooperative agreement with the National Science Foundation that expires in March 1998. The master list of domain names and IP numbers is kept on a "root server" operated by NSI, which is updated daily.(10)

According to the NTIA *RFC*, there is dissatisfaction with the absence of competition in the provision of domain name registration, and with the limited number of TLDs now available under the existing system.(11) NTIA proposes a new system that would create a competitive market for "registries" and for "registrars." Under the proposal, up to five new privately-owned, for-profit entities would be allowed to become Internet *registries*.(12) Initially, each of these registries would be allowed to offer one TLD (e.g., "store", "vend", "biz", etc.).

In addition, NTIA's proposal would allow unlimited entry into the market for "registrar" services. A "registrar," as contrasted with a "registry," essentially would be an intermediary between a registry and a firm that wishes to create an Internet site. For example, a firm (e.g., a retailer wishing to create a web site to sell merchandise on-line) might employ the services of a registrar, to (among other things) help the retailer choose the registry best suited to its

demands and actually register the client's domain name and IP number with the chosen registry. Presumably a client could, if it wished, do some or all of these things for itself, as now appears to be the case.

B. Competitive Issues

The principal competitive issue in this proceeding centers on the *registry* issue. According to the *RFC*, some parties have expressed reservations about the desirability of a competitive registry system. These parties argue that lack of portability among registries (that is, the fact that users cannot change registries without adjusting at least part of their domain name string) could create lock-in problems and harm consumers.⁽¹³⁾ Some have recommended that if multiple registries are to exist, they should be undertaken on a not-for-profit basis.

The potential problems associated with "lock-ins" and "switching costs" have been analyzed extensively in the economics and antitrust literature.⁽¹⁴⁾ The phenomenon arises when buyers must make relationship-specific investments in order to do business with particular suppliers. Even if competition between suppliers is perfect *ex ante* (*i.e.*, before any such investments are made), customers may find themselves locked in to those suppliers *ex post*, possibly rendering them vulnerable to opportunistic future price increases.

It would appear plausible that the absence of domain name portability across registries could impose a switching cost on users who change registries. For example, if a firm must invest substantial resources to familiarize consumers with its web-site name (*e.g.*, "brandname.biz"), the cost of switching to a new site (*e.g.*, "brandname.store") would consist of the incremental investment that it would have to make to inform consumers of the new name, plus any lost profits from forgone sales (because some consumers never learn the new site). It is theoretically possible, therefore, that a supplier could raise the future prices to locked-in customers. Nonetheless, it would be premature to conclude that this switching cost provides a sufficient basis for precluding the proposed move to a competitive domain name registration system.

The economic analysis of markets with switching costs has identified a number of factors that, in appropriate circumstances, can diminish the ability and the incentive of a supplier to act opportunistically with respect to its locked-in customers.⁽¹⁵⁾ As we discuss below, important to this analysis are: (1) the extent to which prospective customers are aware of the possibility of supplier opportunism; (2) the extent to which customers have effective means (*e.g.*, enforceable long-term contracts) to protect themselves against opportunism; (3) the intensity of competition among suppliers; and (4) the importance of reputation and repeat business to suppliers' current and future profits.

If prospective buyers are aware that choosing a particular vendor commits them to that vendor in future periods, thus exposing them to *ex post* opportunism,⁽¹⁶⁾ then they have incentives to seek contractual protection against such behavior -- for example, in the form of a long term contract that restrains the vendor's pricing discretion in future periods -- before committing to a particular vendor. Buyers' ability to obtain such protection will be greater, other things held constant, the more intense the competition among vendors, for one important dimension of competition among these vendors likely would be their ability to credibly assure buyers that they will not be victimized by future price increases.⁽¹⁷⁾ Other things equal, vendors that can provide such credible assurances to buyers will profit at the expense of those that cannot.

Even without the ability to obtain explicit and complete contractual protections against supplier opportunism, there nonetheless may be other factors that afford buyers some degree of protection against supplier opportunism.⁽¹⁸⁾ If prospective buyers are concerned about the future prices as well as current prices, and have reasonably good information about vendors' pricing policies towards their existing locked-in customers, then vendors will have a reduced incentive to engage in opportunism, for it will diminish their ability to attract new customers.⁽¹⁹⁾ This incentive will be amplified, the greater the growth rate of the relevant market, for then the costs of opportunism to suppliers (forgone profits from lost future sales) will weigh more heavily against the corresponding benefits (profits from opportunism against existing locked-in customers).⁽²⁰⁾ By contrast, if the market is in decline, or the vendor is considering exit for some other reason, then these forgone future profits may be sufficiently small that the vendor will

find it profitable to engage in opportunism. Given the prospects for growth in Internet commerce, this set of circumstances generally would appear unlikely.

Overall, we would conclude that while the possibility of supplier opportunism exists, the potential benefits to customers from enhanced competition -- such as possible price reductions and quality improvements -- argue in favor of the NTIA proposal. This is especially true given that the alternatives that have been proposed likely would not remedy any such problems. One possible alternative is simply maintaining the status quo (*i.e.*, a monopoly registry). Clearly, this would not address any competitive issues associated with lock-in. If lock-in is perceived as a competitive problem in a market with competitive registries, it follows *a fortiori* that it would be at least as great a problem absent such competition.

A second alternative is to allow competition among registries, but to require that registry services be provided only by not-for-profit entities. The problem here is that neither economic theory nor available empirical evidence establishes a presumption that not-for-profit entities would forgo exploiting locked-in customers, assuming that it would be profitable to do so. Theoretical analyses have yielded ambiguous predictions as to whether not-for-profit firms are less likely than their for-profit counterparts to exploit market power. Similarly, empirical tests of this proposition have yielded ambiguous outcomes; some studies claim to find that not-for-profit entities leave market power unexploited,⁽²¹⁾ while numerous others find the contrary.⁽²²⁾ At present, there is insufficient evidence to conclude that organizing registries on a not-for-profit basis would solve any problems arising from customer lock-in.

C. Law Enforcement Considerations

Domain name registration information also plays an important role in the enforcement of consumer protection laws, because it often enables the FTC and other law enforcement agencies to identify the persons or entities responsible for fraudulent or deceptive commercial practices on a particular web site. Increasingly, however, domain name registration information for web sites containing fraudulent commercial activity is unreliable. To the extent that fraudulent operators of web sites are permitted to easily register under fake names or sham corporations or entities, it becomes more difficult for the FTC and other law enforcement agencies to protect consumers who wish to do their shopping on-line. Thus, from a law enforcement perspective, it is important that whatever domain name registration system is in place appropriately safeguard the accuracy of this information.

IV. Activities Requiring Coordinated Private Behavior

Although the NTIA proposes to allow certain activities, such as domain name registration, to be carried out in a competitive market setting, the NTIA also maintains that certain other technical functions (*e.g.*, management of number addresses; coordination of the root server system; dissemination of protocol parameters for Internet addressing) will continue to require coordinated behavior among various parties having vested interests in the efficient operation of the system ("stakeholders"). To carry out these activities, the *RFC* proposes the creation of a new not-for-profit corporation whose board of directors would be made up of representatives of IP number registries, domain name registries, domain name registrars, the technical community, and Internet users (commercial, not-for-profit, and individuals). As the *RFC* notes, 63 Fed. Reg. at 8828, this corporation will act much like a private standard-setting body.

The FTC has a long-standing interest in industry self-regulation of the type proposed in the *RFC*. As the *RFC* notes, cooperation among Internet stakeholders may be essential for maintaining a stable system of Internet addresses that will continue to provide connectivity for all users. Economic analysis suggests that private parties will be likely to voluntarily set socially efficient technological standards when (1) there are aggregate net benefits from standardization; (2) per capita private benefits from promoting standardization exceed per capita private costs; and (3) no party has vested interests in any particular standard.⁽²³⁾ Private standard setting often will be more efficient than government standard setting because industry participants possess better information than government regulators regarding technical protocols, system administration, and future growth of relevant markets. Moreover,

industry participants are likely to move more quickly and flexibly than would be possible for government regulators.⁽²⁴⁾

Many of the benefits of industry self-regulation can be lost if competitors use otherwise legitimate industry forums to undermine competition. When this occurs, it is usually because some party has a vested interest in a particular standard. The FTC generally is concerned when competitors use self-regulation mechanisms to inappropriately limit choices available to consumers or to forestall welfare-enhancing innovation.⁽²⁵⁾ In the context of the *RFC*, several types of conduct could raise antitrust concerns. These include discriminatory allocation of number blocks; exclusionary conduct against companies desiring to provide registry or registrar services; and adoption of technical protocols that anticompetitively disadvantage competitors of board members.

To alleviate these possibilities, the NTIA has suggested a number of safeguards designed to ensure that no single competitor or group of competitors will be able to use the proposed new corporation to impair competition. For example, to protect against “capture by a narrow group of stakeholders,” the *RFC* proposes that the new corporation’s “decision-making processes should be sound and transparent; the bases for its decisions should be recorded and made publicly available.” The corporation’s board is to contain representatives of various groups of Internet stakeholders, including regional number registries, domain name registries and registrars, the Internet technical community, and commercial and non-commercial Internet users.

Forming the proposed new corporation consistently with these guidelines should provide some protection from anticompetitive conduct. Self-regulatory decisions made pursuant to a clearly-established decision-making procedure, based on objective criteria, may be less likely to raise antitrust concerns than those that are not. As we understand the proposed structure, the decision-making process would provide opportunities for interested parties not directly represented on the new corporation’s board of directors to express their views on particular questions and to notify the corporation of issues that may warrant consideration. The informational benefits of broad-based participation in the process, coupled with the diverse composition of the corporation’s board of directors, would increase the likelihood that decisions will be made in an appropriate manner. If these safeguards fail, the arrangements still would be subject to antitrust review by the Federal Trade Commission and the Department of Justice.

The *RFC* also suggests that super-majority or consensus (*i.e.*, unanimity) voting could provide additional protection against co-optation of the new corporation by narrow coalitions of self-interested board members. The competitive implications of this proposal, however, are ambiguous. If unanimous voting is required, a self-interested board member could block the corporation from taking appropriate action. There may be circumstances where giving individual board members an effective veto would be proper, but in other circumstances a veto might be used anticompetitively.

V. Conclusion

The NTIA has proposed that the administration of TLDs and the registration of domain names be provided competitively by private, for-profit entities, and that certain other technical functions be carried out cooperatively by a diverse collection of interested parties via a new, not-for-profit corporation. Both proposals would appear to offer benefits to current and future Internet users. Although one cannot rule out, as a matter of theory, the possibility of an exercise of market power under these proposals, on balance the likely benefits to customers of enhanced competition support adoption of the proposed changes.

Endnotes

(*) This comment represents the views of the staffs of the Bureau of Economics and Competition of the Federal Trade Commission. They are not necessarily the views of the Federal Trade Commission or any individual Commissioner. Inquiries regarding this comment should be directed to Michael Vita (202-326-3493) or Frederick Horne (202-326-2308).

(1) See Department of Commerce, National Telecommunications and Information Administration, *Proposed Rule and Request for Public Comment* In the Matter of Improvement of Technical Management of Internet Names and Addresses, Docket No. 980212036-8036-01, February 20, 1998.

(2) 15 U.S.C. § 41 *et seq.*

(3) FTC Staff Report, *Anticipating the 21st Century: Consumer Protection Policy in the New High-Tech, Global Marketplace*, May 1996.

(4) FTC Staff Report, *Public Workshop on Consumer Privacy on the Global Information Infrastructure*, December 1996.

(5) See *FTC v. FutureNet et al.*, No. 98-1113 GHK (ALJx) (C.D. Cal. filed Feb. 17, 1998) (illegal pyramid scheme involving Internet access devices); *FTC v. TouchNet, Inc.*, No. 98-0176 R (W.D. Wash., filed Feb. 11, 1998) (fraudulent claims that investors could earn \$15,000 a month by becoming "Internet Consultants"); *FTC v. Hart Marketing Enterprises, Ltd., Inc.*, No. 98-222CIV-T-23E (M.D. Fla., filed Feb. 2, 1998) (fraudulent claims that consumers who invested in the computer kiosks selling Internet access could expect earnings between \$500 and \$700 per kiosk per week).

(6) IP numbers are 32 bit addresses that consist of eight octets, and they are expressed as four numbers between 0 and 255, separated by periods (e.g., 198.41.0.52).

(7) The Internet Assigned Numbers Authority ("IANA") at the University of Southern California coordinates this system by allocating blocks of numerical addresses to regional IP registries. These are the American Registry for Internet Numbers ("ARIN") in North America, Reseaux IP Europeens ("RIPE") in Europe, and the Asian-Pacific Network Information Center ("APNIC") in the Asia/Pacific region. Larger Internet service providers apply to the regional IP registries for blocks of IP addresses. The recipients of those address blocks then reassign addresses to smaller Internet service providers and to end users.

(8) In the Domain Name System, the top-level domain is that portion of the domain name that appears furthest to the right (e.g., the "gov" in "ftc.gov"). The second-level domain is that portion of the domain name that appears immediately to the left of the top-level domain (e.g., the "ftc" in "ftc.gov"). Second-level domain names are often descriptive and have come to be used increasingly to represent businesses and other commercial concerns on the Internet. The third-level domain is that portion of the domain name that appears two segments to the left of the top-level domain (e.g., the "reston" in "reston.va.us").

(9) Currently, there are five world-wide generic domains ("com", "org", "net", "edu", and "int"); two U.S.-only generic domains ("mil" and "gov"); and numerous country code domains (e.g., "us" for the United States, "au" for Australia, etc.).

(10) A root server is a machine with the software and data needed to locate name servers that contain authoritative data for the top level domains (e.g., root servers know which name servers contain authoritative data for com, net, fr, uk, etc.). Currently, technical specifications limit the number of root servers to 13. These machines are located in the U.S., the U.K., Sweden, and Japan.

(11) For example, BellSouth has argued that the current monopoly system has led to inconsistent levels of service (e.g., slow response time for assigning domain names) and high prices for registering names. See Comments of BellSouth *In the Matter of Request for Comments on the Registration and Administration of Internet Domain Names*, Docket No. 970613137-7137-01, August 18, 1997. Similarly, MCI has observed that the current system provides NSI with inadequate incentives to achieve improved reliability and performance. See Comments of MCI *In the Matter of Request for Comments on the Registration and Administration of Internet Domain Names*, Docket No. 970613137-7137-01.

(12) A registry is responsible for delegating Internet addresses (such as Internet Protocol numbers and domain names), and keeping a record of those addresses and the information associated with their delegation. Examples of regional IP registries include RIPE, APNIC, and ARIN. Examples of domain name registries include Network Solutions' InterNIC operation (.com, .net, and .org) and the ISO 3166 country code registries (e.g., .fr, .de, .uk, .us).

(13) Some commenters (see, e.g., Comments of the Electronic Frontier Foundation *In the Matter of Request for Comments on the Registration and Administration of Internet Domain Names*, Docket No. 970613137-7137-01, August 18, 1997) have recommended that NTIA mandate portability of domain names across registries. Such portability would eliminate competitive problems arising from lock-in. Whether such portability can be achieved at reasonable cost is unclear, however; as the NTIA noted in its review of the comments, "the technical implications of [mandatory domain name portability] were not fully discussed and certainly not resolved." See NTIA, Summary of Comments *In the Matter of Request for Comments on the Registration and Administration of Internet Domain Names*, Docket No. 970613137-7137-01. If significant lock-in problems develop, NTIA may wish to revisit these technical issues and consider means for enhancing portability.

(14) Early analyses are Klein, Crawford, and Alchian, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," 21 J. L. & Econ. 297 (1978); and Williamson, *The Economic Institutions of Capitalism* (1985). More recent contributions include Farrell and Shapiro, "Dynamic Competition with Switching Costs," 19 RAND J. Econ. 123 (1988); Farrell and Shapiro, "Optimal Contracts with Lock-In," 79 Am. Econ. Rev. 51 (1989); and Klemperer, "Competition When Consumers Have Switching Costs: An Overview With Applications to Industrial Organization, Macroeconomics, and International Trade," 62 Rev. Econ. Stud. 515 (1995).

(15) See footnote 14, *supra*. See also Shapiro, "Aftermarkets and Consumer Welfare: Making Sense of Kodak," 63 Antitrust L.J. 483 (1995); Shapiro and Teece, "Systems Competition and Aftermarkets: An Economic Analysis of Kodak," 39 Antitrust Bull. 135 (1994); Kattan, "Market Power in the Presence of an Installed Base," 62 Antitrust L.J. 1 (1993).

(16) The extent to which current and prospective creators of Internet sites would be aware of the possibility and consequences of lock-in is unknown. Certainly, at least some of them are aware (e.g., those who raised the issue in their responses to the NTIA's July 1997 *Request for Comments on the Registration and Administration of Internet Domain Names*). It is not always necessary for all prospective customers to be equally well-informed about this possibility; if there is a substantial number of well-informed customers, and if vendors cannot easily discriminate between those who are well-informed, and those who are not, then competition for the former frequently may result in contractual protections being offered to all. See, e.g., Shapiro and Teece, *supra* note 15, at 143-45.

(17) From this perspective, then, there is considerable appeal in expanding the number of registries, perhaps even beyond the five contemplated in the NTIA *RFC*. We recognize, however, that expanding the number of gTLDs increases the technical complexity of the tasks that must be carried out by the root server system.

(18) See Shapiro and Teece, *supra* note 15, at 146-48; Shapiro, *supra* note 15, at 490-95.

(19) As noted by Shapiro (*supra* note 15, at 493-94) and Shapiro and Teece (*supra* note 15, at 148), in theory buyers may receive protection against monopoly prices even if they do not take into account future prices when choosing a vendor. This is because vendors will compete for the ability to "lock-in" customers. If this competition is sufficiently intense, and if the competition for new customers is price (as opposed to nonprice) competition, the initial price could fall to the point where all of the future monopoly profits are competed back to consumers. See Shapiro, *supra* note 15, at 505-11, for a formal analysis of this proposition. In some of these instances, some inefficiency could remain, notwithstanding a complete dissipation of any profits from lock-in. This could occur in situations where (for example) consumers must buy replacement parts for durable goods from the original equipment vendor. Here, the price of the original equipment would be too low, and the price of replacement parts too high, leading to inefficiently frequent rates of replacement for the original equipment. See Borenstein, Mackie-Mason, and Netz, "Antitrust Policy in Aftermarkets," 63 Antitrust L.J. 455 (1995).

(20) The incentive for vendors to hold-up buyers also will be diminished if the vendor would suffer reputational damage in other product markets.

(21) See, e.g., Lynk, "Nonprofit Hospital Mergers and the Exercise of Market Power," 38 J. L. & Econ. 437 (1995).

(22) See, e.g., Simpson and Shin, "Do Nonprofit Hospitals Exploit Market Power?," Int'l J. Econ. of Bus., forthcoming, 1998; Dranove and Ludwick, "Competition and Pricing by Nonprofit Hospitals," J. Health Econ., forthcoming, 1998; Keeler and Melnick, "Effects of Competition on Nonprofit and For-profit Hospital Prices," J. Health Econ., forthcoming, 1998.

(23) See Besen and Saloner, "The Economics of Telecommunications Standards," in Crandall and Flamm, eds., *Changing the Rules: Technological Change, International Competition, and Regulation in Communications* (1989). Much standard-setting activity typically falls into this category, such as the activity carried out by the Society of Automotive Engineers ("SAE"), the American National Standards Institute ("ANSI"), the International Standards Organization ("ISO"), and the International Telegraph and Telephone Consultative Committee ("CCITT").

(24) See Lemley, "Antitrust and the Internet Standardization Problem," 28 Conn. L. Rev. 1041, 1063-65 (1996).

(25) In a recent case, the FTC charged that Dell Computer Corporation restricted competition in the personal computer industry and undermined the standard-setting process by threatening to exercise previously undisclosed patent rights against computer companies adopting the VL-bus standard, a mechanism to transfer instructions between the computer's central processing unit and its peripherals, such as a hard disk drive or video display hardware (*In re Dell Computer Corp.*, Docket No. C-3658 (May 20, 1996) (Comm'r Azcuenaga dissenting)). According to the FTC complaint detailing the charges, Dell was a member of the Video Electronics Standards Association ("VESA"), a non-profit standards-setting organization, when the association began developing a design standard for a computer bus design to respond to demand for faster graphics performance. VESA members, representing virtually all major U.S. computer hardware and software manufacturers, voted to approve the new VL-bus standard in 1992. As part of the approval process, a Dell representative allegedly certified that he knew of no patent, trademark or copyright that the bus design would violate. After the VESA VL-bus design standard became successful and computer manufacturers had sold more than 1.4 million personal computers incorporating the VL-bus, Dell contacted certain VESA members and asserted that it had obtained a patent in 1991 that they were violating by using the VL-bus standard. To settle the FTC's charges, Dell agreed not to enforce its patent rights against computer manufacturers using the VL-bus.