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FCC - WASHINGTON



February 18, 1994

Donna R. Searcy, Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Comments on Proposed Rule Making, ET Docket No. 93-7

Dear Madam Secretary:

In response to the Commission's proposed rule making for assuring compatibility between consumer electronics equipment and cable systems, we are submitting a copy of my recent testimony on a related matter before the House Subcommittee on Telecommunications and Finance.

We strongly believe that interoperability is an essential requirement for the National Information Infrastructure, and that interoperability depends on barrier-free access to the specifications for its key interfaces. One of those interfaces is clearly that between consumers' electronic devices and the network transmission vehicle.

We hope that this information will be helpful in your deliberations.

Sincerely,

A handwritten signature in black ink, appearing to read "Wayne Rojng".

Wayne Rojng
Corporate Executive Officer
Sun Microsystems, Inc.
and President, First Person, Inc., a division of Sun

Enclosures

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SUMMARY
Testimony to the House Subcommittee on
Telecommunications and Finance
1 February, 1994
WAYNE ROSING

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The success of the national information infrastructure depends on interoperability. Each of its components must be able to communicate with the other components – that is, to interoperate. Interoperability between the components of any system, in turn, depends on the use of widely accepted standard interfaces. Interfaces are the connection points between the pieces of a system. For example, the standard connection jack on the back of all your stereo gear at home, is a standard interface.

A crucial distinction must be made between *interface specifications* – which are pieces of paper, and *implementations* – which are actual products or services. An example is the ISO ASA 100 specification for 35mm film. It defines the size of the film, the spacing of the sprocket holes, and how the film will respond to light. It does not define the “recipe” for a product. Camera and film makers compete on implementations, not the spacing of the sprocket holes or size of the film cannister.

There will be a number of critical interfaces to the digital superhighway. For example, where consumers attach their “set-top” box to the network; and at the other end, where content providers enter the network to distribute their information services.

Monopoly control of these critical superhighway interfaces threatens access and choice – and even the very existence of a true national information infrastructure. Monopoly control would restrict or eliminate access to the interface specifications needed by potential competing suppliers to create interoperable products. Without the pressure of competitive products or services, the level of investments made, the pace of innovation, and the intensity of price competition, would all be greatly reduced.

Sun believes that the interface specifications which become standards in the data superhighway must be free of monopoly control and proprietary barriers. Although implementations – the actual products – can and should be proprietary and built by private industry, the *interface specifications* must be *barrier-free*. Barrier-free means that the interface specifications are fully and publicly documented, and freely available to all. The internet, the prototype for the information superhighway, follows this very practice.

Barrier-free interface specifications will allow multiple vendors to create competing yet compatible products. Vendors will benefit from a greatly enlarged, accessible market; consumers will benefit from lower costs and greater choices; and the economy will benefit from the reduction in barriers to the formation of new companies and industries.

Although it may seem counter-intuitive, many companies [including Sun] and industries have thrived in business environments using barrier-free interface specifications. For example: camera and film makers, tire and auto makers, radio and television manufacturers, and all electrical appliance makers, etc. In each case, the companies compete on the basis of their implementations, not the interface specifications.

The Government alone can guarantee access and choice, by mandating barrier-free interfaces. To do this the Government should: (1) Designate critical NII interfaces as barrier-free. Sun recommends that the FCC establish a broad-based committee made up of representatives from government, industry, consumer groups, and academia, to identify the critical NII interfaces which must remain barrier-free; and (2) Set the policy: legislatively define what constitutes barrier-free. In doing so, it is crucial that the Government **NOT** select specific implementations – that would freeze innovation and greatly limit the benefits of competition. The Government’s role in the information superhighway should be to set the rules, not pick the winners.

The ultimate success of the national information infrastructure depends on the competition resulting from many competitors. Their participation requires the freedom of access that only barrier-free interface specifications make possible.

**TESTIMONY OF MR. WAYNE ROSING
CORPORATE EXECUTIVE OFFICER OF
SUN MICROSYSTEMS, INC.
AND PRESIDENT, FIRSTPERSON, INC., A DIVISION OF SUN,
BEFORE THE HOUSE SUBCOMMITTEE ON
TELECOMMUNICATIONS AND FINANCE
FEBRUARY 1, 1994**

***BARRIER-FREE INTERFACES AND
THE NATIONAL INFORMATION INFRASTRUCTURE***

I would like to thank Chairman Markey and Congressman Fields for inviting me to testify before their committee today. This hearing will contribute to the debate on how the Government can help make sure that all Americans have the opportunity to participate in the new information age.

Overview

Although the national information infrastructure (NII) will continue to evolve over the rest of this decade, a number of key architectural decisions made today will shape its entire future. Among these decisions are the questions of how to guarantee universal access and choice, and whether monopoly control of key interfaces will be allowed.

Introduction

The NII is envisioned as a network of networks, connecting multiple sources of data, education, services, and entertainment, with homes, schools, businesses, and government. When widely deployed, it will enable entirely new ways of learning, working, selling, consuming, and communicating. The socioeconomic impact of this "Information Superhighway" is widely expected to exceed the impact of a physical superhighway — the interstate highway system — built during the 1950's and 1960's in the United States.

***The success of the NII depends on interoperability.
And interoperability depends on the use of standard interfaces***

A key element to the successful development of the NII is interoperability. Each of the pieces of the NII must be able to communicate with the other pieces, that is, to interoperate. Interoperability is what allows systems with multiple components to work together, and it creates the opportunity for the existence of competing, interchangeable implementations. Interoperability assures a level playing field for businesses interested in providing products and services for the NII; it also guarantees consumers the widest possible range of choices at competitive prices. This interoperability will require the establishment of widely accepted, standard interface specifications.

Interfaces are the on-ramps and off-ramps to the Superhighway. *Interface specifications* are the maps that tell drivers how to go from one road to another.

The national information infrastructure will have a number of critical interfaces. For example, the interface where consumers attach their "set-top" box to the network; and at the other end, where content providers enter the digital superhighway to distribute their information services. The use of standard interfaces in the NII is critical because without such agreed upon interfaces, the Information Superhighway would remain just a collection of unconnected dirt roads.

Role of Interfaces

A crucial distinction in the formulation of public policy must be made between *interfaces* and *implementations*. Interface specifications are pieces of paper; implementations are actual products or services.

For example, the ISO specification for 35mm ASA 100 film is an interface specification. It defines the size of the film, the spacing of the sprocket holes, and how the film will respond to light. The interface specification enables multiple manufacturers to produce cameras which can use the film, and multiple producers of film. Each of them competes on the value of their implementations; no one attempts to profit by controlling the spacing of the sprocket holes or the size of the film can.

An interface specification does not define the "recipe" for a product. It would not, for example, specify the chemical ingredients of the film, nor provide the instructions for how the film is made. Such a definition would actually specify an implementation.

The distinction between an interface specification and an implementation is important because the former provides the basis for interoperability, while the latter provides the basis for competition.

An interface specification is necessary to design interoperable components. For example, the interface specification for the electric outlets used in the U.S. is widely known, and enables every manufacturer of electrical products to design a cord and plug for their products which will connect with every outlet in the U.S. (Note, however, that the lack of an international standard for electrical outlets precludes the same interoperability from country to country).

Another common example of a standard interface, is the connection jack used on stereo components. Not too many years ago, a stereo was a large, integrated unit, incapable of being modified by its owner to incorporate new technologies. Today, however, it is a simple matter for most owners to add a CD player, a new tape deck, or even a surround-sound amplifier to produce a home entertainment center – all because of the use of a standard interface.

Although there is widespread agreement that the interfaces to the NII should utilize this same concept of standard interface-based interoperability, there is disagreement over the issues of ownership and control. Should a single company be allowed to own or control the specification for a key interface to the NII?

Universal Access

Universal access to the NII is important to both consumers and industry.

The NII will make a wide variety of services available to the consumer, including educational tools, lifetime training, interactive video, and other services. Many of these services may prove to be as integral to daily life as the telephone and U.S. mail are today. Just as the Government assures universal access to these services, so must it commit to making the NII available to all by guaranteeing access to basic services at an affordable price.

Universal access is important to industry, too. The development of the NII is dependent upon the investment of large sums of money and human capital – in the form of innovation – by many firms, in many industries. Their economic participation is, in turn, dependent upon the minimization of any

structural entry barriers that would otherwise tend to limit competition. For example, for multiple companies to successfully offer each of the key elements of the NII, their products and services must be widely interoperable – like stereo components. To achieve this end, the components of the digital superhighway must utilize standard interfaces whose specifications are freely available – i.e. not under monopoly control.

***Monopoly control of key NII interfaces
threatens universal access and choice***

Monopoly, or single-point control of interfaces would restrict or eliminate access by potential alternative suppliers to the specifications necessary to create and produce interoperable components. Similarly, it would limit the ability of potential players to add new interfaces and services. This would clearly limit consumers' choices. Without the pressure of such competitive products or services, the pace of innovation and the intensity of price competition would be reduced. This lack of competition would not only be detrimental to consumers, but also to America's competitive strength in the global economy. Some potential barriers to competition based on proprietary control of interface specifications are summarized in Table 1.

Table 1 Potential Barriers to Access and Choice
Monopoly, restricted, or discriminatory control of interface specifications
Excessive license fees
Intellectual property restrictions
Changes without adequate notice

Each of these potential barriers to competition exerts its influence by restricting access to the information necessary to produce interoperable products or services. Monopoly control of interfaces might make specifications unavailable to third parties, or it might allow access to only a select group of suppliers, thereby limiting competition. A similar anti-competitive impact would occur if interface specifications were only available for excessive license fees, by effectively prohibiting new entrants. In-

complete or untimely disclosure of interface specifications might also make true interoperability difficult, and stymie new, smaller entrants.

Choice

Consumers will demand choices when they connect to the NII; choice of content, choice of providers, and choice of the devices they use to access the digital superhighway. Why? Because their needs and desires differ. Just as Henry Ford discovered that not every driver wants a black car, not every NII consumer will choose to access the same services from the same company, using the same set-top box.

Proprietary control of NII interfaces would limit consumers' choices

Proprietary control of the key NII interfaces would limit consumers' choices. For example, if the interface to the network in your home — an NII off-ramp — was proprietary, it would be possible for the transmission company provider to require that you use only their set-top box. Once locked into their system, you have only two choices: pay the price of the service, or forgo the service. Similarly, at the origin end of the network, the transmission company might limit consumer choice, by blocking services that others want to provide to the consumer. This would be tantamount to blocking the on-ramps to the interstate highway.

Government Action Needed

Sun believes that the interface specifications which become standards in the data superhighway must be free of single-point control and proprietary barriers. Although implementations — the actual products and services — can and should be proprietary and built by private industry, the interface specifications must be barrier-free. These interface specifications must be free from the barriers like those shown in Table 1, which limit access or choice and restrain competition and innovation.

The Government alone can guarantee universal access and choice by mandating barrier-free interfaces

The impact of the NII, like the interstate highway system, the telephone network, and NTSC broadcast television, will be immense. That is why it is fundamentally different from other industries and why

the Government alone has a responsibility, and the ability, to guarantee universal access and choice, by mandating barrier-free interfaces. To do this the Government should take two actions:

1. Designate critical NII interfaces as barrier-free. Sun recommends that the FCC establish a broad-based committee made up of representatives from consumer groups, government, industry, and academia, to identify the critical interfaces which must remain barrier-free; and
2. Set the policy – legislatively define what constitutes barrier-free, along the lines illustrated in Table 2.

Table 2 Possible Barrier-Free Public Policy Requirements
Interface defined by a fully and publicly documented specification
Available for use by all
Free of license fees
Free of intellectual property restrictions
Free of commercial trademark control
Changed only with timely notice
Provide criteria for objective conformance testing
Open on both sides of the interface (like film, wheels, televisions)

These criteria are meant to apply to critical NII *interfaces*, not implementations. Sun has always, and will always, support appropriate and stringent intellectual property protections for implementations. We, like other companies, have a serious stake in protecting the hundreds of millions of dollars we invest every year in the research and development that produces intellectual property.

When setting policies for creating barrier-free interfaces, it is crucial that the Government **NOT** select specific implementations posing as standards – that would freeze innovation and greatly limit all the benefits of competition. The Government's role in the information superhighway should be to set the rules, not pick the winners. Let the marketplace – consumers and producers – do that.

***The Government's role should be to define the rules,
not pick the winners***

The forerunner to the NII, the Internet, is an excellent barrier-free model for the information super-highway. The rules of the Internet prohibit the selection of an interface as a standard which has any elements which remain under the proprietary control of a vendor. These same practices should be incorporated in the policy setting which establishes the NII.

Barrier-free interface specifications will allow multiple vendors to create competing, yet compatible implementations. Benefits from this competition include: lower costs and greater choices for consumers, increased opportunities for companies — both large and small, a reduction in barriers to the formation of new companies, and resulting economic and job growth.

For some industry executives, a barrier-free business philosophy seems counter-intuitive. Yet, many companies and entire industries have prospered in business environments using barrier-free interfaces. Common examples exist throughout everyday life:

- Camera and film makers share the interface specification for film.
- Tire and auto makers meet the same interface specifications for wheels. Consumers know they can buy different brands — proprietary implementations — on both sides of the interface.
- Makers of basketballs and basketball rims are secure in their knowledge that one will fit the other.
- The specification for motor oil, SAE10W-40, is not controlled by a single oil company.
- And the TCP/IP computer networking protocol used by in most large government computer networks.

In each case, the companies in these industries compete on the basis of their implementations, not the interface specifications. Companies in industries from automobiles to computers, photography to VCRs, and tires to electrical appliances, have benefited enormously from the vastly enlarged markets made possible by the widespread use of barrier-free interfaces.

Equally important, the customers of technologies based on barrier-free interfaces have won, because they have benefitted from widely expanded choices, at competitive prices, in industries aggressively pursuing innovation.

The ultimate success of the NII depends on the contributions, the experimentation, and the entrepreneurial efforts of many service providers. Their participation requires the freedom of access to the NII as *a major new medium of commerce*, that only barrier-free interface specifications can make possible.

The technologies which make the NII possible hold the potential for new, billion dollar industries in the U.S. They will present massive new business and job opportunities. They can, and will, increase our nation's lead in the information, software services, and entertainment sectors of the global economy, and thereby fuel exports of high value goods and services. A timely Government decision to specify the use of barrier-free interfaces in the NII would help to ensure that the NII achieves its potential.

Thank you.

About Sun Microsystems and FirstPerson

Sun Microsystems, Inc. is the worldwide market leader in the design, manufacture, and distribution of workstations and servers, utilizing the UNIX-based Solaris operating system. Not yet 13 years old, Sun has annual sales of approximately \$4.5 billion. Sun's products and services are based on an open systems business philosophy.

FirstPerson is a division of Sun Microsystems that specializes in software for the emerging network base consumer software marketplace.

Wayne Rosing

Until recently founding FirstPerson, Mr. Rosing was President and Director of Sun Microsystems Laboratories, Inc., where he directed Sun's long term research agenda on advanced SPARC systems, future operating systems and software environments, and human interface technologies.

Previously, Mr. Rosing was Vice President of Sun's desktop systems graphics group, and responsible for the development and marketing of the company's desktop products, including the SPARCstation family, graphics products, window systems, application toolkits, and low-end software. Prior to heading the desktop systems graphics group, Mr. Rosing managed the company's advanced development efforts and spearheaded the development of the SPARC RISC processor and licensing programs.

Mr. Rosing came to Sun as vice president of the workstation engineering, from Apple Computer where he was director of engineering for the Apple II group. Before that, he supervised the LISA division at Apple, first as director of engineering for LISA development and later as general manager of advanced development. Prior to joining Apple, Mr. Rosing held a variety of engineering positions at Digital Equipment Corporation and Data General Corporation.

Mr. Rosing attended the University of California at Berkeley and Arizona State University. He is a director of Caere Corporation, Zetetic Institute and a member of the advisory board of Georgia Institute of Technology.