

Perspectives on the Global Information Infrastructure



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Introduction

The Global Information Infrastructure (GII) is more than a "network of networks." In CSPP's vision, the GII is a worldwide assembly of systems that integrates five essential components:

- communications networks, such as telephone, cellular, cable and satellite networks;
- information equipment/appliances, including computers, televisions and telephones;
- information resources, including educational materials, medical databases, and entertainment and commercial programs;
- applications, such as telemedicine, electronic commerce and digital libraries; and
- people of all skill levels and backgrounds.

The GII will continually evolve as it incorporates more advanced technologies, new information, new consumers and different ways to use its resources.

The GII is already creating a whole new way of learning, working and playing. Fully deployed, it will link individuals around the world to each other and to private and public institutions, from schools and businesses to libraries and laboratories. It will revolutionize the way people and businesses relate to each other. It will unleash enormous potential to improve our quality of life by providing virtually unlimited access to public services, cultural opportunities, commercial transactions and many additional sources of information. However, real strides in advancing the GII will require industry action to address complex technological issues and government action to eliminate regulatory and policy barriers to its deployment and use.

In this report, CSPP offers a summary of the issues of most immediate concern to the computer systems industry and recommendations for future actions in the U.S. and abroad.

Foundations for Policy

Launching the Global Information Infrastructure

The GII is not waiting for government action. Industry is creating and deploying many innovative, global applications. CSPP companies have established domestic and transnational applications to support electronic mail systems, distance learning projects, commercial networks, and interconnected libraries, medical facilities and service organizations, among others. Around the world, other companies are piloting similar applications and making them available to an increasing number of consumers. These applications represent the beginning of the GII. Much work remains to be done to ensure its long-term viability.

Putting the Private Sector in the Driver's Seat

The private sector has taken the lead in creating and making available the networks, appliances, information services and applications that will constitute the GII. The role of governments around the world is to nurture the GII by establishing policies that support and encourage private sector initiatives. Governments must also ensure that private sector views are fully represented in any international dialogue about the GII.

Going Beyond the Telecommunications Agenda

The GII is the integration and interaction of all five components mentioned above--networks, information appliances, information resources, applications and people. The GII will not thrive unless both the government and industry agendas for GII policy go beyond competition, privatization and market access in the telecommunications sector. The other components of the GII are subject to very different regulatory and policy treatment in the U.S. and abroad, and the issues affecting these components must also be addressed.

Advances Depend on Competition and Deregulation

Competitive markets and deregulation are the most effective mechanisms to stimulate innovation, expand customer choice and decrease costs. For example, in the U.S., demand for access to commercial on-line services and the Internet has resulted in a rapidly growing number of competitive on-line service providers. Consumers have experienced easier to use interfaces, reductions in prices and a huge expansion in the information available over computer networks.

Governments should identify and remove regulatory, trade and policy barriers that impede competition and limit widespread deployment of the GII. The U.S. government should work aggressively with other governments and within the appropriate international organizations to achieve competitive, deregulated markets.

Markets Will Drive Availability and Affordability

The U.S. government and other governments have identified universal service as an important goal in the deployment of the GII. This is a laudable and appropriate concern. However, at this early stage, new definitions of universal service would be premature and counterproductive. Competitive markets and open access to networks are the most effective mechanisms to ensure wide availability of products and services at affordable prices, and energy should be focused on creating those conditions worldwide. Moreover, it is not possible to predict from today's limited vantage point the potential uses that people will make of the GII, the services they will want or the prices they will be willing to pay. Consumers in different nations (and in different regions within nations) will have their own unique needs for the GII. The marketplace must be allowed to develop before policies requiring new services are implemented. In the interim, however, an ongoing dialogue between the private sector and governments will assist in identifying unmet needs and the potential for technological solutions. As the GII evolves, the private sector has a responsibility to work with governments to identify strategies, other than government mandates, for making essential services and information sources broadly accessible to people and communities.

Substantive Priorities To Be Addressed

At this early stage, the GII could easily slip into the realm of international rhetoric and overstatement. Ensuring that it becomes a viable, useful tool requires that the private sector and governments work through the following substantive issues:

- **Interoperability:** developing and adopting globally accepted standards for key interfaces;
- **Market Access:** achieving open and competitive markets, in a deregulated environment, for all components of the GII throughout the world;
- **Security:** developing and adopting security mechanisms, including encryption standards, that ensure privacy and authentication for business and personal transactions;
- **Privacy:** protecting sensitive and personal information and providing access to personal information only in accordance with accepted guidelines; and

- **Intellectual Property Protection:** defining and protecting the rights of the owners of intellectual property in the GII environment.

Testbeds

International testbeds or pilot projects, supported by joint industry/government action, will both increase knowledge about practical and legal barriers to the GII and identify potential solutions to overcome them. While testbeds on socially beneficial applications are important to illustrate to consumers the benefits of the GII, testbeds that focus on commercial applications will provide the best means to identify and address policy issues preventing private sector investment and deployment. CSPP strongly encourages the U.S. government to assume a leadership role in creating commercial international testbeds.

Purpose of the Report

This report will examine some of the substantive issues that could pose a threat to realizing the full potential of the GII. It will also recommend steps that governments and industry, separately and together, can take to make the GII an international success.

Substantive Priorities

Many of the concerns described below are already being considered at the domestic level in the context of the U.S. National Information Infrastructure (NII). However, addressing these issues in the context of the GII will require more than simply applying U.S. experience to other national systems. The barriers that exist differ between markets and cultures. Restrictions are practical and technological, as well as legal and regulatory.

Interoperability

The GII will enable computers, telephones, televisions, applications, information and databases located in one country to interact with counterparts anywhere in the world, but only if the components of the GII are interoperable at critical interfaces. Market forces will play a central role in driving interoperability. However, developing and adopting internationally accepted standards will also be a key factor. Industry should lead the way in developing these standards, which will have to be flexible and open to allow for the rapid pace of technological innovation.

The U.S. government can support this process by:

- helping other governments understand the benefits of inter-operability at critical interfaces and the value of market-driven (i.e., customer-driven) standards;
- encouraging other countries to adopt an industry-led, voluntary standards process, rather than rely on government-led standards processes or on mandated standards;
- encouraging other nations and their private sector standards organizations to participate in a variety of international standards bodies, including the International Telecommunications Union (ITU) and the International Standards Organization (ISO), and in ad hoc industry/user standards groups, since no single international organization can address the full range of standards concerns presented by the GII;
- encouraging international participation in the Information Infrastructure Standards Panel (IISP), which is sponsored by the American National Standards Institute (ANSI) and other entities and offers a coordinated, cross-industry approach to developing standards for interoperability;

- ensuring that U.S. companies can participate in standards processes in other countries, just as foreign companies can participate in the U.S processes; and
- encouraging other nations to recognize the rights of owners of intellectual property included in standards for interfaces and to refrain from implementing compulsory licensing related to standards.

Market Access

A viable GII depends on markets that are open to real competition and are hospitable to foreign-owned suppliers of goods and services. This principle applies equally to the U.S. and to other countries. The objective for market access is to overcome barriers whenever and wherever found, whether legal, regulatory, technological or trade-related. The barriers affecting the various elements of the GII -- networks, appliances, applications, information sources and individuals -- differ enormously in nature, scope and purpose. They all, however, must be addressed before the GII can be fully deployed.

Liberalization of the telecommunications sector is a critical step in fully realizing the GII. Markets throughout the world must be open to providers of basic and enhanced telecommunications services, within countries and across national borders. Government-sanctioned monopolies of critical network services, which exist throughout much of the world, distort efforts to achieve widespread availability of innovative, low-cost services.

Until the telecommunications sector is deregulated, the information industry is at risk of also being subjected to the existing burdensome telecommunications regulatory model. The information industry generally has not been subject to elaborate regulation. The convergence of technologies and the slow pace of telecommunications liberalization has heightened the risks.

For example, while relatively free trade in computer equipment (computers, peripherals, software and related products) is well established in much of the world, trade in telecommunications apparatus is often subject to higher customs duties, different standards and certification rules and other technical trade requirements. Reclassifying computer equipment containing communications software or modems as "telecommunications apparatus" significantly distorts the cost of trade and may stifle competition, delaying the implementation of the GII. Maintaining the industry's competitive and deregulated character will be critical to the GII's deployment.

Finally, there are existing impediments to market access that specifically affect the U.S. information industry. The U.S. government should give early attention to addressing these barriers. As suggested by the example above, one important objective should be to eliminate tariffs, worldwide, on computers, semiconductors, software and telecommunications equipment. More broadly, attention is required in the following three areas.

Existing trade barriers: The information industry's ability to participate in foreign government equipment procurement and to interconnect with regional, national and global networks is drastically restricted in a number of markets. Governments must work together to eliminate the following obstacles that stand in the way of the industry competing in foreign markets:

- mandated standards;
- subsidized domestic providers;
- domestic content or manufacturing requirements;
- tariffs;
- restrictive import and export controls;
- investment restrictions;
- discriminatory or archaic customs administration;

- lack of intellectual property protection or enforcement;
- governmental refusal to accord mutual recognition to testing and certification procedures in other countries; and
- encouraging other nations to recognize the rights of owners of intellectual property included in standards for interfaces and to refrain from implementing compulsory licensing related to standards.

National regulations: The GII will develop most rapidly if marketplace economics, rather than government planning, determine what products and services are offered and at what prices. To achieve that goal, each country should ensure that participants in the information industry are treated the same as local businesses (national treatment), can establish businesses in the country (right of establishment), can conduct business in the country from outside of its borders (cross-border business), and can import components and services from other countries (transnational sourcing).

Government action also may be required to ensure that the newly competitive marketplace is protected from unfair practices by current state-owned or -sponsored monopolies. Crucial protections include fair and open access to networks (interconnection rights), pricing for network components that is based on cost rather than on market-distorting subsidies, and roaming privileges across borders for mobile uses.

The U.S. itself must seek an open domestic market that enables foreign participation, in conjunction with open foreign markets. Limitations in any country on domestic content, foreign ownership or participation in various research and development programs create barriers to the goal of a GII.

Technological barriers to access: Governments and the private sector, together and separately, must address technological barriers to access that could also impede the GII's progress. The most critical example is radio spectrum allocation. The new technologies will require access to substantial allocations of radio spectrum on a timely and global basis. Governments must act to streamline existing domestic and international spectrum allocation and coordination processes. For its part, the private sector must develop spectrum-sharing strategies and compression technologies.

Private sector research and development also must focus on technological issues that affect use of the GII by individuals and businesses. These include electronic payment mechanisms, ease of use and reliability. While private sector solutions will be required, government action may also be needed to encourage international acceptance.

Security

The GII will not flourish without effective security mechanisms to protect commercial transactions. Consumers and providers of products and services, particularly those involving health care and international commerce, will not use GII applications unless they are confident that electronic communications and transactions will be confidential, that the origin of messages can be verified, that personal privacy can be protected, and that security mechanisms will not impede the transnational flow of electronic data. Governments have a critical interest in commercial security mechanisms that are consistent with their own national security needs. As a result, they must participate in private sector efforts to develop and adopt security standards. However, government needs should not be used as reasons to replace or overwhelm the private sector standards processes.

To meet the security goals for the GII:



- All participating countries must adopt standards to support security mechanisms that are acceptable to the private sector and suitable to commercial transactions. These standards must also ensure privacy and authentication. This may require nations to adopt commercial security solutions that are different and separate from solutions for national security and diplomatic purposes.
- The U.S. government must cooperate with industry to resolve U.S. policy concerns that have blocked acceptance of international encryption mechanisms necessary for commercial transactions.
- The private sector and government should convene a joint international conference to address the need for security mechanisms to support commercial applications and to develop a strategy for implementing acceptable security solutions.

Privacy

The GII will vastly expand the quantity of readily available information and the distance and the speed with which it can travel. It is imperative that sensitive and personal information be protected and made available only in accordance with accepted guidelines. Overzealous protection of data, on the other hand, could stifle the growth of a dynamic, useful GII. Many nations, including the United States, are presently drafting and refining policies to guide the use of personal information available over electronic networks.

For the GII to proceed successfully, these policies must balance the need for the free flow of information across borders with individual privacy protections. Further, policies of different nations must be compatible. Different levels of protection and expectation can disrupt cross-border transactions.

The U.S. Administration's current efforts to update U.S. privacy practices are a step in the right direction, but should be pursued in the context of the GII. One practical action would be to include privacy policies in the international conference on security recommended above. This is appropriate since many of the concerns associated with security mechanisms for commercial applications apply equally to the privacy needs of individuals and institutions.

Intellectual Property Protection

The U.S. has always been in the forefront of the effort to strengthen international intellectual property protection. In the GII context, it is even more essential to continue this effort, since "bits don't recognize borders." The problems for the providers of content -- on which the success of the GII depends -- have been analyzed extensively by the U.S. Administration's Information Infrastructure Task Force (IITF) working group in its "Preliminary Report on Intellectual Property Rights in the NII" issued last year.

The preliminary report, however, did not address in detail the additional concerns of the suppliers of high technology equipment in the international arena. For example, the U.S. government must address the practice by some nations of adopting mandatory standards and compulsory licensing that incorporate proprietary designs. While the new intellectual property agreement and the dispute settlement mechanism of the World Trade Organization will be an important foundation, the U.S. government must be willing to take an aggressive stand in negotiating needed protections abroad.

The Role of Industry

The GII ultimately will develop through the efforts and investments of the private sector. Industry's role is to lead the development and deployment of new technologies, services and applications in response to market demand. Industry also can help accelerate the GII's evolution by:

- convening private sector-only international meetings on privacy and security, prior to the joint conference on security recommended in this paper, in order to develop suggested private sector positions and approaches;
 - continuing to lead efforts to develop and adopt, on a global basis, standards for GII interoperability; and
 - continuing to invest in research and development for new information technologies.
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The Role of Government

The role of governments, both in the U.S. and abroad, is primarily to enable the private sector to develop and deploy the GII, not to regulate or control it. The U.S. government can support GII initiatives worldwide by:

- working with other governments to develop a vision for the GII and its uses;
 - developing a U.S. public/private partnership to support U.S. GII initiatives;
 - funding research and development on pre-commercial technologies needed for security, ease of use, reliability and other requirements identified in the public/private sector paper entitled "R&D for the NII: Technical Challenges;"
 - promoting private sector efforts to develop interoperability standards for the GII;
 - collaborating with other governments to create a political and regulatory environment that encourages the development of new technologies and opens markets worldwide; and
 - joining other governments and the private sector around the world to address complex policy issues, such as market access, security, privacy and intellectual property protection.
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Need for Cooperation and Collaboration

Governments and the private sector together should establish one or more multinational testbeds. These projects would serve as concrete examples of what can be accomplished in the formative stages of the GII and would crystallize where obstacles lie, for both industry and government.

Governments should give priority to testbeds that address the issues identified as critical in this paper: interoperability, market access, security, privacy and intellectual property protection. The testbeds should identify the immediate policy and regulatory barriers associated with each area. Participating countries should then quickly consider necessary policy changes to remove the barriers.

Testbeds on a variety of applications can help accelerate international adoption of information technologies and diffusion of their benefits. However, testbeds for commercial applications, such as electronic commerce, electronic collaboration, information retrieval and distributed data processing, appear to provide the best opportunity to highlight the issues identified in this paper.

Countries participating in testbeds may have to waive or revise certain policies and regulations -- for the purposes of the testbed -- that are currently hindering rapid adoption of new technologies and use of the GII. Such policies or regulations might affect approval of licenses, restrictions on electronic commerce, data transmission across borders and rules regarding privacy and encryption.

Multinational testbeds should balance sharing and exchange of technology and resources between participants.

There are many possible models for GII testbeds, including an international commercial network based on the existing U.S. CommerceNet. The specific design of test projects should be left to the testbed sponsors but should be fully supported by the governments involved.

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