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Building the Information Society:

**MOVING CANADA**

**INTO THE**

**21<sup>ST</sup> CENTURY**

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# Building the Information Society: MOVING CANADA INTO THE 21ST CENTURY

Industry and Innovation in the 21st Century  
A Report on the Information Society and the Canadian Economy

## Building the Information Society:

# MOVING CANADA INTO THE 21ST CENTURY

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Pour entrer de plain-pied dans le XXI<sup>e</sup> siècle.*



# Building the Information Society:

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## MOVING CANADA INTO THE 21ST CENTURY

### *Policies and initiatives to facilitate Canada's transition to an information society and knowledge economy by:*

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- ◆ developing Canada's Information Highway
- ◆ making sure Canadians can seize its benefits
- ◆ providing a prominent place for Canadian content
- ◆ ensuring affordable, accessible and responsive government.

The Information Highway is a work in progress. It is more than the Internet or World Wide Web — though for millions of Canadians, the Net is indeed an opportunity to glimpse the promise of the future. It is more than the digital switches and intelligent networks of the Canadian telecommunications system — though without them, the Information Highway would not be possible. The Information Highway will be more than a 500-channel universe. It is more than the broadcasters and cable companies of the Canadian broadcasting system — though their success will be essential.

It will be all of these — and more.

Like the Internet, some parts of the Information Highway are already touching our lives. This includes ATM bank machines, credit and debit cards, computerized airline reservation systems. These technologies have changed the way we work, play and learn. The emerging Information Highway holds the promise of even more dramatic changes.

With that in mind, the Government of Canada has prepared an action plan designed to ensure that Canadians have the Information Highway they need and want — not something imposed upon them.

This will require concerted efforts by governments, the private sector and institutions. Like the Information Highway itself, this plan is a work in progress. Parts of the plan are already in place or under way. Others will come into play soon.

### PROMISE OF THE INFORMATION HIGHWAY/1

- ◆ Knowledge-based industries are growing faster than any other sector of the Canadian economy. In the computer services industry alone, jobs grew from 79 000 in 1993 to 99 000 within a year.
- ◆ Employment in Canada's cultural sector, which constitutes 2.7 percent of our GDP, grew by 32 percent between 1981 and 1991. As demand grows for new forms of entertainment and information, this growth could escalate.
- ◆ Traditional manufacturing, resource and agricultural industries — long the foundations of Canadian economic well-being — are joining service industries such as banking and travel in their increased use of the new technologies. Manufacturers use information technologies to find export markets and fill orders from around the globe. Resource companies use these technologies to gain access to the scientific and marketing data necessary for sustained growth — and sustainable development. These enabling effects of the Information Highway are building a foundation for competitiveness in the global economy.

## ACTION PLAN GOALS

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The action plan aims at providing Canadians with a national framework for building an Information Highway that meets Canadians' needs, a framework that will facilitate Canada's transition toward an information society and knowledge economy. It represents a comprehensive response to this new reality, involving a government-wide effort by more than 30 federal departments and agencies.

The action plan is made up of four strategic thrusts. Taken together, they address the many issues raised within the federal jurisdiction by the transition to a knowledge society and the urgent need to move ahead. These four thrusts involve the following policies and initiatives:

- ◆ **Building Canada's Information Highway** by creating a competitive, consumer-driven policy and regulatory environment that is in accord with the Canadian public interest and that is conducive to innovation and investment by Canadian industry in new services on the Information Highway.
- ◆ **Growing Canadian content** on the Information Highway, thereby strengthening our ongoing national cultural dialogue and creating economic growth and jobs.
- ◆ **Realizing the economic and social benefits for all Canadians** of the Information Highway and allowing them to participate fully in the emerging information society.
- ◆ **Getting government right** by ensuring better services and more affordable, accessible and responsive government and making government a model user and a catalyst for Information Highway developments across Canada.

## CANADA'S INFORMATION HIGHWAY

This action plan is intended to ensure that the enormous enabling power of Canada's Information Highway can be harnessed to create jobs and open up new realms of economic possibility and competitiveness for Canadian firms, small and large, in every sector of the Canadian economy.

To the federal government, Canada's Information Highway is a vision of a low-cost, high-quality network of networks so interconnected and interoperable that access to one network means transparent access to all.

Canadian content must have a prominent place on Canada's Information Highway, both to create jobs and to intensify the ongoing cultural dialogue that makes us Canadians.

Canada's Information Highway can and must be used to strengthen our health system, as well as to build a culture of lifelong learning that will help all Canadians seize the opportunities of the emerging knowledge society.

The federal government believes that all Canadians must have affordable access to the Information Highway, no matter where they live.

Canadians must be able to enjoy the full benefits of electronic commerce to transact their business instantly from home or office or shop floor.

All personal information must be legally protected, especially with the advent of electronic commerce.

The enabling power of Canada's Information Highway must be used to get government right — to help give Canadians more affordable, accessible and responsive government.

## PROMISE OF THE INFORMATION HIGHWAY/2

- ◆ The building of Canada's Information Highway by Canadian firms will require investment worth tens of billions of dollars over the next decade. This investment will result in jobs and growth for Canadians.
- ◆ People will be able to telecommute to work, instead of taking a bus, car or train, bringing us closer to the ideals of a clean environment and sustainable development.
- ◆ From home, these same people may use the Information Highway to shop or bank electronically — or play the latest video game.
- ◆ The Information Highway should allow us to address the differences in knowledge of, access to and use of new technologies within society, including the different realities of men and women.
- ◆ The Information Highway has the potential to involve ever more Canadians in our ongoing national cultural dialogue and the debates that shape our national community.
- ◆ Lifelong learning is both an ideal and a future necessity. Everyone's skills will need updating on an ongoing basis. With the Information Highway, schools, teachers and courses will be easily available.
- ◆ Geography will no longer be an obstacle for people with something in common getting together. Virtual communities are a growing reality.
- ◆ Telemedicine, electronically enhanced administrative systems, and timely gathering and analysis of health information will help improve the health of Canadians.
- ◆ Government will grow more accessible and responsive. Citizens will be able to reach government officials and obtain useful information and services using electronic means.

## THE CHALLENGE AND THE URGENCY

Our major trading partners — the United States, Japan and the European Union — have all launched multi-billion-dollar initiatives and major policy and regulatory overhauls to encourage the construction of their parts of the Information Highway.

*The first challenge facing Canadians is to facilitate Canada's transition into the knowledge society.*

We already have a solid foundation for Canada's Information Highway. We can take pride in having created one of the most advanced telecommunications and broadcasting systems in the world. That system is the result of a concerted national effort to bridge the barriers of distance, climate and geography that have always separated Canadians.

In the 1980s and early 1990s, Canada took the first steps toward reforming the policy, legislative and regulatory framework for telecommunications and broadcasting. Those steps encouraged competition and new services, and started us on the road to an environment in which Canada's Information Highway can rapidly evolve.

*If we fall behind our major trading partners in building our Information Highway, its worldwide counterpart will come to Canada — later — and not the way Canadians want to see it.*

*Failure to seize the opportunity of using Canada's Information Highway will also result in reduced competitiveness and the loss of high-growth knowledge industries and high-quality jobs.*

*The social costs in terms of lost job opportunities will be enormous. Our national cultural dialogue will languish and our governments will be less able to keep up with the rapidly changing realities of the electronic age.*

But these are only first steps, and a sound foundation is not the finished structure. Estimates place the cost of building Canada's Information Highway in the order of tens of billions of dollars.

The government's plan of action squarely addresses these challenges with policies and initiatives to ensure that Canadians can seize the opportunities of the new reality.

## THE FEDERAL GOVERNMENT'S STRATEGY

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The Government of Canada has been busy laying the groundwork for the Information Highway. In the January 1994 Speech from the Throne, the Government of Canada promised Canadians a strategy to develop and implement a Canadian Information Highway. In spring 1994, Industry Minister John Manley released a strategic framework to guide this process and established the Information Highway Advisory Council (IHAC) to advise the government.

The strategic framework set out five operating principles to guide the development of Canada's Information Highway:

- ◆ an interconnected and interoperable network of networks
- ◆ collaborative public and private sector development
- ◆ privacy protection and network security
- ◆ competition in facilities, products and services
- ◆ lifelong learning as a key design element of Canada's Information Highway.

These principles were intended to ensure that the development of the Information Highway would meet three strategic objectives:

- ◆ creating jobs through innovation and investment in Canada
- ◆ reinforcing Canadian sovereignty and cultural identity
- ◆ ensuring universal access at reasonable cost.

## THE INFORMATION HIGHWAY ADVISORY COUNCIL

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These principles and objectives shaped the work of the Information Highway Advisory Council, a group of 29 distinguished Canadians drawn from the telecommunications, cultural and information technology industries and institutions; from the artistic, creative and educational communities; and from consumer and labour groups.

In September 1995, the Advisory Council released its final report, *Connection, Community, Content: The Challenge of the Information Highway*, which contains some 300 recommendations for government action.

The Advisory Council's report, along with ongoing consultations with other groups, provided valuable guidance for the development of the government's action plan.

# BUILDING CANADA'S INFORMATION HIGHWAY

The Government of Canada believes that Canadian companies must build a low-cost, high-quality Canadian Information Highway that truly responds to Canadian needs in all their diversity. The private sector should undertake the necessary investment in infrastructure, bearing the risks and reaping the associated rewards — to the benefit of all Canadians.

To this end, the Government of Canada is moving rapidly to create a competitive environment in which Canadian firms can be innovative and create wealth and jobs for all Canadians.

Competition must, however, be sustainable and must be consistent with those cultural and social goals that are central to the Canadian experience. Competition will create — and, indeed, is already creating — a consumer-driven environment that will ensure the Information Highway meets the needs of all Canadians.

The government is actively encouraging the new services that will form essential parts of this advanced network infrastructure. The government will stimulate market-driven research and development (R&D) on Information Highway-related technologies, applications and services and will encourage adoption of the open international standards that will allow all parts of this network of networks to communicate with each other.

## BUILDING CANADA'S INFORMATION HIGHWAY

INITIATIVES	ACTION	
	TAKEN	UPCOMING
<b>Creating a Competitive Environment</b>		
Convergence policy		✓
Harmonization of ownership rules	✓	
Overseas telecommunications policy		✓
<b>Encouraging New Services</b>		
Advanced satellite services for multimedia		✓
Global mobile satellite policy	✓	
New wireless broadband services	✓	
Personal communications services	✓	
Digital television		✓
Digital radio		✓
<b>Stimulating Information Highway R&amp;D</b>		
Science and Technology Strategy	✓	
Phase 2 of CANARIE	✓	
<b>Making Networks Talk to Each Other</b>		
Further measures on standards		✓
Standards setting with industry		✓

## CREATING A COMPETITIVE ENVIRONMENT

The push for a competitive environment has already brought results in the markets for telephones, terminal equipment, cellular phone systems, long distance telephone services and advanced telecommunications services. Canadian consumers can now choose among an ever-widening range of progressively less expensive and more powerful communications services and equipment.

Consistent with trends in Canada and internationally, this action plan envisages greater competition within the Canadian communications system.

### Competition between telephone and cable

Within the next few months, the ministers of Industry and Canadian Heritage will finalize the policy framework governing competition between cable television and telephone companies, clearing the way for full competition between them.



Until now, cable and telephone companies have been in very different businesses. Cable-TV companies, with their one-way broadband distribution systems, have delivered broadcasting services that are regulated in light of the cultural objectives of the *Broadcasting Act*. In contrast, the telephone companies, with their switched networks, have provided telecommunications services, regulated under telecommunications legislation. Historically, broadcasting and telecommunications have been the “two solitudes” of the Canadian communications system, separated from each other by protective layers of policy, legislation, regulation and technology.

In the past few years, the technological barriers between these two kinds of businesses have largely disappeared. In 1994, the government issued an Order in Council outlining policies for introducing competition in the provision of facilities, services and products.

*The government will issue a policy on convergence that will allow cable-TV and telephone companies to compete with each other in their core businesses.*

The policy will provide a level playing field for competition while ensuring that the cultural objectives of the *Broadcasting Act* are fully respected. The resulting competition between two of the largest industries in the Canadian communications system — in both the delivery of television signals and the provision of local telephone services — will stimulate investment and innovation in the new technologies and services critical to building Canada’s Information Highway.

Domestic ownership requirements for broadcasters have been a means of ensuring that the Canadian broadcasting system meets Canadian objectives. These requirements, under the *Broadcasting Act*, have been different from those under telecommunications legislation, resulting in greater difficulty for the cable industry in raising capital in foreign markets. This year, the **Minister of Canadian Heritage** released new broadcasting rules for domestic ownership more in line with those for the telecommunications industry.

## **The global Information Highway**

Canada places high priority on ensuring that Canada’s links with the rest of the world will become stronger through the emerging global Information Highway.

For some years, Canada has moulded its telecommunications policies to reinforce our role as a major trading nation. Indeed, if Canadians are to find international markets and keep in touch with global events, they must have a variety of low-cost, high-quality connections to the world, provided by a range of suppliers in a competitive environment.

Until the past few years, Canadian telecommunications companies were not encouraged to invest in the growing number of **global and regional mobile satellite services** soon to be launched by international consortia. In November 1994, the Minister of Industry released a **new policy** framework for such services. This policy provides that Canadian service providers may use such satellites as long as there are clear benefits to Canadians and the Canadian share in these partnerships is proportionate to Canadian use.

Internationally, Canada has taken a lead role within the Group of Seven (G-7), the Organisation for Economic Development and Co-operation (OECD) and other international bodies in setting rules that favour the rapid evolution of global networks and services. Similarly, Canada has actively participated in the trade negotiations aimed at securing a General Agreement on Trade in Services (GATS).

*The Minister of Industry will soon complete a major review of overseas telecommunications, focussing on the role of Teleglobe Canada. The review addresses the question of how best to meet the needs of Canadians in an increasingly competitive global economy.*

The Government of Canada is fully committed to ensuring that the global Information Highway is both English and French. To this end, the Minister for International Cooperation and Minister responsible for Francophonie announced in April 1996 a contribution of \$400 000 to the Centre international pour le Développement de l'Inforoute en Français (CIDIF). The Moncton-based centre's primary aim is to promote la Francophonie on the Information Highway and to act as a catalyst in this regard.

## **ENCOURAGING NEW SERVICES**

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The ministers of Industry and Canadian Heritage will continue to press forward aggressively with policy measures and regulatory initiatives, through the Canadian Radio-television and Telecommunications Commission (CRTC), to encourage the development of new services and access links throughout the Canadian communications system. With respect to the licensing of some selected new services, the Minister of Industry is also exploring the use of auctioning the radio spectrum and other market-based approaches.

Many of the new services involve wireless communication, which, for some applications, provides a less expensive link to the Information Highway. For people in Canada's North, in remote or rural areas, satellites and a variety of services provided over the airwaves will represent the best ways of connecting to the Information Highway. Other new services promise significant improvements in the quality of what the consumer receives, as is the case with digital broadcasting.

### **Multimedia by satellite**

By the end of 1999, the advanced satellite services flowing from Industry Canada's **Advanced Satcom Initiative** will place Canada in the forefront of the information economy and allow us to compete effectively in the rapidly growing domestic, regional and international markets for multimedia services.

These satellite-based multimedia services will be available across Canada and will complement those provided by terrestrial means, such as optical fibre. Satellite-based services, if implemented early enough,

represent an effective and comparatively inexpensive means of satisfying early demand and stimulating the market for the new services that will eventually be provided by optical fibres.

Through this initiative, Industry Canada has supported and shared the risks of the private sector as it undertakes the early development and commercialization of these new satellite-based multimedia services. The first phase has just ended, with the submission of a business plan calling for a regionally based, commercial satellite system offering multimedia services and bandwidth on demand. The system could involve a direct investment of \$600 million by the private sector, with the government contributing a further \$141 million. Spinoffs in the form of indirect investment and sales in domestic and foreign markets could exceed \$4 billion.

The second phase of the initiative will start this year and will culminate in late 1999 with the implementation of a commercial system.

### **New wireless broadband services**

In February 1996, the Minister of Industry issued a policy for wireless broadband services and a call for licence applications. These new services, known as **Local Multipoint Communications Systems (LMCS)**, have the potential to provide a range of services in urban areas over the airwaves — everything from TV programming to high-speed data to telephone services — without using traditional wires or cable.

The Minister of Industry is expected to issue licences under the *Radiocommunications Act* for LMCS by fall 1996. A year later, services should be up and running. Applicants will be evaluated in part on the extent to which they have invested in innovative R&D and field trials. If the applicants wish to provide broadcasting services, they will also have to apply to the CRTC for broadcasting licences under the *Broadcasting Act*.

Because wireless broadband has the potential to compete with local services provided by both telephone and cable-TV companies, its introduction will mark an important step in creating the competitive environment needed to stimulate the investment

and innovations required to build the Information Highway. Once in place, these entirely new, independent local networks for broadcasting and telecommunications will be fully competitive with the existing networks and will offer another choice to consumers. Over the next 10 years, the technology could create an estimated 12 000 to 15 000 new jobs.

### **New personal communications services**

In December 1995, the Minister of Industry licensed four companies to provide **Personal Communications Services (PCS)** on a competitive basis across Canada.

*These compact, fully portable, low-cost PCS devices will give Canadians a wireless connection to the Information Highway, one that can be used for business or pleasure when subscribers are away from the home or office. Instead of having numbers assigned to a piece of equipment such as a home or business phone, subscribers will have their own personal numbers wherever they are. Over the next five years, the licensees will spend an expected \$3 billion on these new services, which will create some 8500 jobs.*

PCS devices have the potential to add a new dimension to the now-imminent competition in local telephone services. Having a wireless on-ramp to the Information Highway will also be important for remote or rural areas, where the cost of laying new high-capacity land lines may be prohibitive.

### **Digital broadcasting**

The Information Highway is a digital communications route. Measures are under way to take full advantage of its possibilities by moving broadcasting from its present analogue basis to a new digital foundation. The result will be clearer, higher-resolution pictures, better sound and less signal degradation, as well as a new capability on the part of broadcasters to distribute data and value-enhanced services.

*The start-up date for digital television, at least on a transitional basis, could be as early as mid-1998.*

In October 1995, the Minister of Canadian Heritage established an industry-government task force to give advice on a policy framework to manage and coordinate the transition to **digital television** in Canada.

In the case of **digital radio**, the process is further along. This year, the CRTC will begin issuing transitional licences for the provision of digital radio services. Later this year, the commission will begin a public process to develop a long-term policy approach to digital radio, laying the foundation for the transformation of today's FM and AM radio stations into digital radio broadcasters.

## **STIMULATING INFORMATION HIGHWAY R&D**

The Government of Canada has already put in place a number of key initiatives to stimulate R&D, including R&D required to build the Information Highway. Initiatives include the recently announced Science and Technology Strategy; the Canadian Network for the Advancement of Research, Industry and Education (CANARIE); and a greater responsiveness to the private sector by Industry Canada's Communications Research Centre (CRC), the only government laboratory focussing mainly on the Information Highway.

### **Science and Technology Strategy**

The government now spends some \$3.2 billion on R&D by government laboratories. In addition, the Scientific Research and Experimental Development (SRED) tax credit provides more than \$1 billion in indirect assistance to the private sector to conduct R&D, much of it in the information technology area.

Three of the government's core responsibilities — as set out in the S&T Strategy — will strengthen the private sector's R&D effort on the Information Highway. These are:

- ◆ supporting research in universities and colleges, Networks of Centres of Excellence and other non-governmental research institutions

- ◆ supporting private sector research and technology development
- ◆ providing information and analysis, and building networks.

Many government laboratories are carrying out research that touches directly on the Information Highway. For example, **Transport Canada** is championing research on **Intelligent Transportation Systems**. Associated communications systems will form part of the Information Highway.

### **The Communications Research Centre**

The main focus of Industry Canada's **Communications Research Centre** is R&D on advanced wireless telecommunications services. These include digital radio broadcasting, advanced television systems, wireless broadband and innovative PCS information services. Development of these networks and services will extend the Information Highway to all parts of Canada — to rural, remote and northern communities and to people dependent on mobile communications.

The lab works closely with the information technology industry, giving private firms ever greater access to its facilities and work. In the past year, the CRC has held meetings with CEOs from research consortia to develop the means for even closer collaboration with the private sector.

Already, the CRC provides facilities that industry can use to test new broadband applications and technology, as well as users' responses to new broadcasting technologies. The centre carries out many joint research projects with small and medium-sized companies across Canada and helps put together private consortia for other projects. The CRC now invites private sector scientists to work with its own scientists on the commercialization of technologies developed at the centre. The CRC also acts as a hub of expertise for many Canadian information technology companies.

### **CANARIE — testing advanced networks and new applications**

The Canadian Network for the Advancement of Research, Industry and Education (**CANARIE**) is a Canadian success story. It grew out of the recognition that Japan, the European Union and the United States were spending billions of dollars to build the high-speed broadband networks that would form the main lanes of their information highways. The **CANARIE** consortium, created in 1993 by the federal government and involving government, business and key public institutions, focusses on speeding up the deployment of such networks in Canada. Participants share the risks and high R&D costs associated with commercializing advanced networking technologies, applications, products and services.

Phase 1 of **CANARIE**, with \$26 million in federal funds, managed to lever several times that amount from industry and other sources to involve 200 firms and institutions in projects right across Canada. **CANARIE** also supported the upgrade of **CA\*net**, the national backbone network for Canada's branch of the worldwide Internet.

**Phase 2**, which began in March 1995, will require \$78.5 million in federal funding over four years. Last November, 50 projects involving 175 Canadian firms, universities and research organizations received \$18.5 million to develop technology, business, health and educational applications for the Information Highway. This investment could lever more than \$70 million from the private sector into the program.

In November 1995, **CANARIE** announced the creation of a new high-speed broadband network, the **National Test Network** for research and development. The result is a world-class R&D facility. **CANARIE** is also providing further upgrades to **CA\*net** for the more than one million users of Canada's Internet.

Building on its current programs, which have been funded to 1999, **CANARIE** will focus its efforts on working with industry, government and academia in three primary areas: the development, testing and demonstration of advanced networking technologies

and applications; the promotion of Canadian technology and applications, and the firms involved in producing them, by facilitating product development and technology partnering; and the promotion of Canada's information society both at home and abroad. Specific areas that will be receiving special attention in the coming years are the further development of the Internet in Canada; the promotion of networking applications in support of the health and education sectors in this country; and the development of international partnerships, both in connection with research network activity and the commercialization of Canadian technology.

### **MAKING NETWORKS TALK TO EACH OTHER**

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Only open standards, universally adopted within Canada and around the world, will allow Canada's Information Highway to develop into an interconnected and interoperable network of networks, where access to one network means access to all. In the absence of such standards, the Information Highway could turn into a network of cul-de-sacs and footpaths that lead nowhere. The acceptance of open international standards is also a necessary precondition for the emergence and growth of information-based markets and services.

*The Minister of Industry will take further measures to encourage Canadian industry to adopt **open, interoperable standards** for the Information Highway.*

These measures will include a joint government – industry effort to develop a “standards road map” for Canada's Information Highway. Such a road map will identify and provide the basis for resolving key issues with respect to interconnection and interoperability. The road map will also be an important tool in ensuring the compatibility of Canada's Information Highway with its global counterpart.

This effort will complement steps taken by the government as a model user to implement open standards in the procurement of the major components of its communications infrastructure. Government procurement and standards-setting activity with industry through the **Telecommunications Standards Advisory Council of Canada (TSACC)** and **Government Enterprise Network (GENet)** will reinforce this position. The government will also undertake a wide-ranging public awareness campaign to convince Canadian businesses, consumers, institutions and other levels of government of the benefits of adopting open international standards. A number of joint projects, involving government, industry, consumers and others, will also be undertaken.

# GROWING CANADIAN CONTENT

The Information Highway will give Canadian creators and entrepreneurs the opportunity to develop new content products and services for domestic and global markets. Canada's existing software and computer services industries are already experiencing significant growth as a result of this trend. New knowledge-based industries such as multimedia and courseware and a range of other information providers and packagers are emerging quickly and growing at a startling pace. At the same time, more traditional businesses, from telecommunications to manufacturing to resource companies, are expanding into the information field, creating new profit centres that have a powerful synergy with their core businesses. These new forms of Canadian content are already starting to make a significant contribution to economic growth and job creation in Canada.

For this reason, the Government of Canada intends to help Canadian creators and entrepreneurs develop and market Canadian information products and services that are competitive at home and abroad. The policy and regulatory framework must therefore be designed to encourage innovation, jobs and growth.

The Information Highway must also provide us with a new and more powerful means of enriching and invigorating the ongoing cultural dialogue that defines our national identity, our shared values and the common social purpose that provides the foundation for democratic institutions. It must, in short, deliver Canadian cultural content that reflects our linguistic duality and cultural diversity. It was for this reason that the federal government sought exemptions for culture in international trade agreements. Similarly, the federal government's commitment to Canadian culture remains equally strong in the new electronic environment.

INITIATIVES	ACTION	
	TAKEN	UPCOMING
<b>A Strategy for Canadian Cultural Content</b>		
A comprehensive strategy		✓
<b>Content and Information Industry Development</b>		
Access to capital for multimedia producers		✓
Export development strategy		✓
Canadian content in Canadian classrooms		✓
<b>Digitization of Canadian Content</b>		
Government Task Force on Digitization		✓
Canadian Heritage Information Network	✓	
Access AMICUS	✓	
Imaging Centre	✓	
Digital Collections program	✓	
<b>Copyright Protection</b>		
Determine need for further revision of Act	✓	
<b>Creators and the New Technologies</b>		
Developing pilot projects for training and R&D		✓

*The Government of Canada strongly believes that Canadian cultural policies must be reinforced in relation to the Information Highway.*

Canada has an abundance of creative talent, and Canada's cultural policies have helped it thrive at home and abroad. Despite our location next to the world's largest exporter of entertainment and cultural products, Canada with only one tenth the population is one of the most dynamic producers of content (cultural and otherwise) on the globe. Our robust production sector has shown it can compete in world markets. It has also benefited from a mix of government support initiatives that at the same time have allowed Canadians to enjoy a range of choice unsurpassed elsewhere in the world. These initiatives have involved regulatory measures, financial support, market development and structural initiatives, not to mention the crucial impetus to Canadian production provided by such national institutions as the Canadian Broadcasting Corporation (CBC/SRC), Telefilm Canada and the National Film Board (NFB). This marriage of talent and government support has generated a flourishing Canadian content sector that in 1992 created, directly and indirectly, some 660 000 jobs for Canadians.

## **A STRATEGY FOR CANADIAN CULTURAL CONTENT**

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To meet the challenges and seize the opportunities of the Information Highway, the Government of Canada recognizes the need for a cohesive and comprehensive strategy on Canadian cultural content.

Therefore, the **Minister of Canadian Heritage** will develop, in consultation with other ministers and the provinces and territories, a **comprehensive strategy for Canadian cultural content** in the information society. This strategy will involve:

- ◆ expanding opportunities for economic growth and job creation
- ◆ employing a range of measures to support the production, distribution and promotion at home and abroad of Canadian cultural content that reflects our linguistic duality and cultural diversity

- ◆ fostering an ongoing national cultural dialogue within Canada
- ◆ promoting the dissemination of the government's public information holdings.

## **CONTENT AND INFORMATION INDUSTRY DEVELOPMENT**

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Only high-quality Canadian content and sound marketing strategies will ensure that Canadians and people from other countries choose Canadian material from among the wealth of material on the Information Highway.

Access to capital is critical to the production of high-quality content and to effective marketing. This is especially true for the small undercapitalized Canadian enterprises that produce multimedia content. In the coming year, the ministers of **Industry** and **Canadian Heritage** will identify new ways to facilitate access to capital by Canadian multimedia producers.

The Information Highway, with its global reach and its hunger for content, promises to open up world markets to content producers, but many small Canadian content producers are inexperienced in this global marketplace.

To assist them, the ministers of **Industry** and **Canadian Heritage**, with the ministers of Foreign Affairs and International Trade, will work to develop and implement an **export development strategy** for Canadian content products.

Learning materials represent a major market for Canadian multimedia producers. The Government of Canada will consult with provincial and territorial governments to find the most appropriate way to build, through SchoolNet, a rich base of electronic learning materials for the school market, with a major emphasis on French-language and Aboriginal content. From this secure domestic base, Canadian producers of learning materials and courseware will be in a better position to seek export markets.

## DIGITIZATION OF CANADIAN CONTENT

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The Information Highway is a digital highway. For content to be available to us on the Information Highway, it must have an underlying digital format.

One important source of such content will be the information generated and collected by government institutions, much of it not yet in digital form. Another important source will be the collections of national cultural institutions, including the National Library, the National Archives, the National Museum of Science and Technology, the Canadian Museum of Civilization, the Canadian Museum of Nature, the National Gallery of Canada, the National Film Board and the CBC/SRC.

These large national collections have been built, preserved and made available chiefly at public expense. They document and allow us to appreciate the cultural diversity and wealth of expression that is Canada.

Digitization of these collections offers a unique opportunity to make them available to Canadians across the country and to stimulate the development of Canada's content industries.

Because of the diverse content that will travel the Information Highway, it will be necessary to hold extensive consultations among federal departments to identify and foster the development of all genres of content, both government and non-governmental.

For 23 years now, the **Canadian Heritage Information Network (CHIN)** has been breaking new ground with respect to the digitization of Canadian content. This special operating agency of the Department of Canadian Heritage now provides on-line access via the Internet to comprehensive reference services and the 25 million objects in the national inventories of Canadian museum collections. Its Web site constitutes a value-added gateway to other Canadian and international heritage services, including virtual exhibits and special presentations.

The **National Library of Canada**, through its **Access AMICUS** service, allows Canadian libraries and researchers to search electronically through 10 million bibliographic authority records for purposes of reference, information verification, cataloguing support and interlibrary loans. The National Library has also begun a number of pilot projects to digitize materials

The ministers of **Canadian Heritage** and **Industry** will create a **Task Force on Digitization** to address the following key issues:

- ◆ selection of materials for digitization
- ◆ funding for digital conversion
- ◆ opportunities for revenue generation
- ◆ navigational tools
- ◆ standards
- ◆ connectivity
- ◆ copyright
- ◆ preservation
- ◆ partnerships.

from its collections for mounting on the World Wide Web. These can be accessed, together with electronic versions of National Library publications, descriptions of the National Library's collections, services, cultural events and pointers to other Canadian Internet information resources, at <http://www.nlc-bnc.ca>. The National Library is also carrying out a pilot project involving the acquisition of Canadian electronic publications and addressing issues of access, preservation, copyright and the need to maintain the integrity of electronic documents.

The **National Archives of Canada**, through its Web site, provides access to information about its archival holdings and services, including directions for conducting archival research, virtual exhibitions, publications, genealogical databases and guides.

The **Canadian Broadcasting Corporation's** English and French services (CBC/SRC) have their own home pages on the Internet's World Wide Web, linking users to radio and television programs and providing information on CBC policies. This new technology is used not only for program promotion and audience feedback, but for program distribution as well. Some CBC radio/stereo programs now offer complete audio or text versions of their contents on the Net.



CBC/SRC television's flagship newscasts, *The National* and *Le Point*, have their own site. *The National's* interactive *Discussion Threads* allows hundreds of Internet users to communicate with each other about CBC news coverage; the site also provides transcripts. Many other programs, including some regional and some children's programs, also have their own site.

The National Film Board will provide access to its film catalogue and stockshot library through its Internet site. The board has also worked with CHIN and the national museums to develop new Canadian content in other digital media such as CD-ROMs.

Many of the national museums operate Web sites that provide introductory information about collections and special exhibits.

In 1993, the Canadian Museum of Civilization formed a strategic alliance with Kodak Canada Inc. to operate an **Imaging Centre** at the museum. After two years of operation, the centre has created 40 000 photos of artifacts and digitized 150 000 images in the Kodak Photo CD format. The museum is now offering its imaging services to other museums and institutions in Canada and around the world.

In November 1995, the Minister of Industry launched **SchoolNet Books of Remembrance ONLINE**. The Books of Remembrance, which list Canada's war dead, were digitized by high school students and then made available over SchoolNet.

The **SchoolNet Digital Collections program** announced in the March 1996 Budget has already shown the potential to match Canadian content development for the Information Highway with opportunities for young people to develop multimedia and business skills.

During the demonstration phase of the program, more than 30 cameo collections of heritage material from federal and other sources were digitized for display on SchoolNet by teams of young people in all parts of the country working under contract to Industry Canada.

The three-year program will promote access to a wealth of collections in archives, museums, libraries, government departments and agencies and other

institutions across the country while exposing Canadian youth to a unique opportunity to learn and develop job experience.

## COPYRIGHT PROTECTION

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According to experts assembled by the Information Highway Advisory Council, the present *Copyright Act* captures all types of works travelling the Information Highway. However, Canadians need to be more aware of the importance of copyright to both creators and users on the Information Highway. Industry Canada operates a program to raise awareness of copyright responsibilities. In the coming year, Industry Canada will be taking new steps to increase understanding of intellectual property concerns in the context of the Information Highway.

In April 1996, the government tabled its second phase of amendments to the *Copyright Act*. These address the rights of copyright owners and exceptions for users, but not all the issues raised by the new technologies associated with the Information Highway.

*The ministers of Industry and Canadian Heritage will work closely with stakeholders to resolve outstanding copyright issues related to the Information Highway and to reach a determination as to whether there is a need to revise the present Act further.*

Copyright protection is critical to ensuring that content creators, producers and distributors receive compensation for their effort and investment. Without copyright protection, access to content would be seriously hampered.

Also needed are **more efficient enforcement and administration measures** to ensure efficient copyright protection in order to respond to creators' legitimate fears about pirating and unauthorized reproduction of works. For the industries it will also be important to develop ways of **streamlining the clearance of rights** to simplify administration for both users and copyright owners.

## CREATORS AND THE NEW TECHNOLOGIES

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The Information Highway will produce a continuing profusion of new art forms and media. This promise presents exciting opportunities to the creators of Canadian content, but only if they are in a position to acquire the necessary skills.

Given the pace of technological change, these learning opportunities must be flexible, adaptable and available at all stages of a creator's career. Alliances and partnerships will be essential.

For this reason, the **Minister of Canadian Heritage**, with the Minister of Human Resources Development, will encourage collaboration among creators, the information industries and research centres to develop new tools and products and expand the pool of skills needed to create new content. The focus in this initiative will be upon **developing pilot projects** and identifying specific opportunities for training and R&D.

## THE BROADCASTING ACT AND THE CRTC

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The *Broadcasting Act* provides the legislative framework for regulation of the Canadian broadcasting system by the CRTC. Upholding the cultural objectives in the Act has long been one of the most successful tools for supporting Canadian content.

*The Broadcasting Act — a central pillar of cultural policy — must continue to meet the challenges of the new environment.*

*The CRTC will continue to play its important role to ensure the fulfilment of the longstanding cultural policy objectives enshrined in the Broadcasting Act.*

Canada has always been more open to foreign broadcasting signals than any other country in the world, but in the past, geography and scarce bandwidth somewhat limited the flow. These limitations are now disappearing. More important, within the emerging information industry itself, there are signs of growing vertical integration between providers of broadcasting carriage and content services. This trend could ultimately leave providers of Canadian content vulnerable to discrimination. The present policy and regulatory framework may have to take this new reality into account.

The CRTC has already begun addressing this new reality in light of the cultural objectives of the *Broadcasting Act*. For example, the Commission has undertaken a proceeding to ensure that producers of all types of broadcasting services have access to broadcast delivery undertakings such as cable-TV.

# REALIZING THE ECONOMIC AND SOCIAL BENEFITS FOR ALL CANADIANS

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**T**he Information Highway promises great economic and social benefits to Canadians, but only for those who can seize its opportunities. It is not enough simply to build a Canadian Information Highway; it is equally important to make sure that Canadians use this new tool to their own advantage.

Therefore, the federal government is bringing forward measures to ensure that the Information Highway contributes to economic growth, job creation and a positive workplace environment in every sector of the economy.

Similarly, the Information Highway must strengthen the social fabric that underlies a healthy economy and the quality of all our lives together.

Before all Canadians can benefit fully from the Information Highway, certain conditions must be met. **First** and foremost, they must have access. **Second**, Canadians must feel confident their privacy will be protected in this new electronic environment. **Third**, the question of offensive content on the Information Highway must be addressed. The government's plan of action deals with all of these issues.

The Federal Plan for Gender Equality recognizes that policies and programs affect women and men differently, given that each experience different social and economic life circumstances. This action plan calls on all relevant federal departments to undertake a gender-based analysis of Information Highway initiatives, where appropriate.

## REALIZING THE ECONOMIC BENEFITS

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This action plan calls for measures to ensure that economic growth and job creation flow from both the building and the use of Canada's Information Highway. In other words, Canadians must benefit economically

not only from the investment and innovation required to build the Information Highway, but also from its powerful enabling effects.

Some of the most important of these enabling effects derive from the increase in the speed of transactions, the responsiveness to customers and the access to distant markets that will become possible once electronic commerce is widespread. In the next two years, the government plans measures to provide a sound legal and technical foundation for electronic commerce in Canada.

Other enabling effects derive from the growing importance of technology, knowledge and information as factors for success to companies throughout the economy. Between 1986 and 1991, high knowledge intensity characterized nine of the 12 industries that experienced the most growth and the greatest increase in jobs in Canada. The government has already set in motion a number of measures that will raise the knowledge intensity of companies in every industrial sector.

Canada's traditional resource industries will receive particular attention in this economic development effort. Many initiatives already planned or under way will use the Information Highway to encourage sustained growth (and sustainable development) in the resource sector.

Similarly, the challenges of the transition to a new kind of economy will be met by measures to help workers adjust and to sustain the quality of the workplace.

## Creating a solid foundation for electronic commerce

For people and companies that make their artistic creations, information, knowledge and consumer catalogues available on the Information Highway, electronic commerce represents an excellent way to ensure a return on their investment.

## REALIZING THE BENEFITS FOR ALL CANADIANS

INITIATIVES	ACTION	
	TAKEN	UPCOMING
<b>Realizing the Economic Benefits</b>		
Creating the basis for electronic commerce		✓
Preparing Canadian companies for the information age	✓	
Making federal R&D more available	✓	
Technology Partnerships Canada	✓	
More financing for knowledge industries	✓	
Strategis	✓	
Support for strategic intelligence and alliances	✓	
Canadian Technology Network	✓	
Trans-Forum	✓	
The Student Connection Program	✓	
Spirit of Aboriginal Enterprise	✓	
Canadian Spatial Data Infrastructure	✓	
Agricultural and rural development information	✓	
Marine Data Environmental Service		✓
The Green Lane	✓	
Labour adjustment strategies		✓
Labour standards		✓
CanWorkNet		✓
<b>Realizing the Social Benefits</b>		
Building a lifelong learning culture	✓	
Office of Learning Technologies		✓
SchoolNet	✓	
First Nations SchoolNet	✓	
Integrated health information network	✓	
<b>Conditions for Success</b>		
National access strategy		✓
Community Access Program	✓	
Disability Access Program	✓	
Security and public key infrastructure		✓
Framework legislation to protect privacy		✓
Law enforcement and offensive content	✓	

*The spread of electronic commerce will be one of the key benefits from building Canada's Information Highway.*

For consumers, it provides a way to shop electronically from home or office. For manufacturers, it constitutes a way to explore foreign markets and even to cement an export deal electronically. For small and medium-sized enterprises (SMEs) far from large economic centres, it can eliminate distance and geography as barriers to business success.

At present, financial transactions are secure only on private or closed user-group banking networks. Transactions on the Internet are neither straightforward nor completely secure. The identity of the person with whom one is dealing at a remote location is not always clear. Given the public nature of the Internet, security is imperfect, with no guarantees that messages may not be surreptitiously monitored or modified or credit card numbers copied into some third party's database. The legality of electronic transactions is also open to doubt, given that Canadian law may not recognize the validity of signatures in digital form. Moreover, signatures have to be copy-protected and encoded to prevent their replication by anyone else.

The Government of Canada will soon be in a unique position to address these issues. The Treasury Board Secretariat has announced that, in collaboration with other ministers and the private sector, it will continue to accelerate the conversion to electronic commerce as the preferred means for the government to conduct its business, internally and with external clients. Many of the lessons learned in this exercise will be transferable to the private sector.

*The **Minister of Industry** — in cooperation with other ministers and levels of government — will work in partnership with business and other stakeholders to accelerate the development and implementation of the policies and legal and technical standards needed to support widespread electronic commerce by the private sector.*

This strategy will involve working closely with industry to develop and harmonize systems for security and for authenticating the identity of parties to an electronic transaction. Equally important will be the development of standards and protocols to create a seamless Canadian electronic commerce system that can transact business with the world.

The government will consult closely with organizations and other governments at home and abroad on the legislative reforms needed to provide a sound and consistent legal basis for electronic transactions. New laws or amendments to existing legislation may be necessary to address such issues as the legal status of digital signatures, the authentication of parties to a transaction, the need for non-repudiation of such a transaction, the admissibility of electronic documents as evidence in judicial proceedings, and the integrity of messages and transaction records.

#### **Preparing Canadian companies for the information age**

Canadian firms are taking advantage of the infrastructure now in place to find new markets and expand their businesses. For example, an Atlantic Canada bookstore has created a "virtual bookstore" on the Internet, allowing customers from around the world to search its Web site and order books electronically.

Even greater economic benefits will flow when Canadian companies make full use of the Information Highway to increase their knowledge intensity. To this end, the government has set in motion a number of initiatives and even more are under way as a result of the March 1996 Budget. These are intended to make much more federally sponsored research available to the private sector, stimulate R&D by business and make a range of strategic business information available to Canadian firms.

#### ***Making federally sponsored research more available:***

A central focus of the government's Science and Technology Strategy released in March 1996 is ensuring that government laboratories work in closer partnership with the private sector on R&D. Five of the seven operating principles for federally sponsored research underscore the importance of this objective.

The strategy also calls on government laboratories to use Canada's Information Highway to:

- ◆ provide relevant, timely information services to encourage innovation, particularly at the community level
- ◆ collect and disseminate intelligence on international science and technology
- ◆ promote a stronger science culture.

***Technology Partnerships Canada:*** The government announced in March 1996 that its Technology Partnerships Canada program will make available annually by 1998-99 some \$250 million in investment support to encourage technological innovation at the near-market end of the R&D cycle. The enabling technologies part of the program will target SMEs in leading-edge, high-growth companies, including those engaged in selected information technologies. Advanced software technologies, multimedia learnware and information technology in the health sector receive particular attention.

For smaller companies, advanced software technologies mean streamlined administrative processes and improved service to clients. Multimedia learnware means time and cost savings leading to productivity gains in the workplace. The use of information technology in the health sector can produce significant economic benefits because of its size, in addition to providing new opportunities for better-quality care at a time of fiscal restraint.

***Business Development Bank of Canada:*** In the 1996 Budget speech, the Government of Canada announced the **infusion of an additional \$50 million** into the Business Development Bank of Canada so that it could increase its financing for strategic growth sectors, such as new technology. Companies in these sectors will be the engines of growth for the Canadian economy as we make the transition to a knowledge society. The \$50 million could support up to \$350 million in new financing for SMEs.

**Strategis:** Strategis is Canada's largest business Web site, providing easy, direct access to Industry Canada's expertise and information resources, including:

- ◆ 60 000 reports
- ◆ 500 000 pages of searchable text
- ◆ two gigabytes of statistical data
- ◆ hot links to Canadian and international business information databases.

Strategis is available on-line through the Internet at: <http://strategis.ic.gc.ca>. Strategis contains six different information categories, tailored to meet the needs of Canadian business:

- ◆ markets, trade and investment
- ◆ industrial perspectives
- ◆ technology and innovation
- ◆ micro-economic research and analysis
- ◆ managing your business
- ◆ marketplace services.

With the wealth of information to be found in Strategis, business users will be able to make critical decisions about opportunities for growth, explore new markets, find partners, form alliances, find and develop new technologies for processes, and assess the risks of new ventures.

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*"... Strategis has the potential to significantly benefit small businesses. This electronic information source and networking medium promises to be a useful resource for small businesses seeking anything, from information on basic business issues, to export markets and specific industry questions, to networking with other business owners."*

Catherine Swift  
President, Canadian Federation of  
Independent Business

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**Strategic intelligence and alliances:** Industry Canada also uses the Information Highway to publish strategic intelligence on market opportunities at home and abroad. For example, the department in January 1996 published an assessment of markets for multimedia learning materials, identifying opportunities for this Canadian industry. The department also supports efforts by industry groups to build strategic alliances — a condition for success in the knowledge industry — that help SMEs unlock new markets for their products and services. In order to promote economic opportunities in all sectors of the economy, Industry Canada is pursuing new working relationships with other federal departments and provincial governments, focussing in particular on innovation and greater use of information technology and other advanced technologies.

**Trans-Forum:** Another Industry Canada initiative is Trans-Forum, an Internet-based technology that, by providing key information, helps universities and colleges to market technology opportunities and expertise to Canadian firms. Its World Wide Web home page is at: <http://schoolnet.carleton.ca/Trans-Forum/>

**Canadian Technology Network:** Meanwhile, through the Canadian Technology Network (CTN), the National Research Council, working with Industry Canada, is providing a service to match SMEs with sources of technological expertise and related business advice. Already, CTN has recruited more than 300 organizations as members and has its own home page on the World Wide Web.

**The Student Connection Program:** In the 1996 Budget speech, the Government of Canada announced the Student Connection Program. It will subsidize the wages of senior college and university students hired to introduce and train managers of some 50 000 SMEs in business applications on the Information Highway. The program, which is expected to create 2000 summer jobs over its three-year life, will take a proactive approach to the hiring of female and Aboriginal students.

**Regional Development Agencies:** Through the regional development agencies reporting to the Minister of Industry, SMEs have already gained access to a significant number of programs and services related to information technology and the Information Highway. These services include market development, technical information, R&D and entrepreneurship.

**Spirit of Aboriginal Enterprise:** Industry Canada has also supported the creation of several Web sites for Aboriginal business, including the *Spirit of Aboriginal Enterprise*, which is now accessed more than 13 000 times a month. In addition to helping develop electronic information for CD-ROMs and the Internet, Industry Canada has trained hundreds of Aboriginal entrepreneurs and community economic development experts by sponsoring seminars on the Internet.

#### **Sustainable development of natural resources**

Up-to-date information on the location, extent and limits of natural resources is critical to their effective and sustainable development — and a foundation for prosperity in a country that is as dependent on resource development as Canada. The Information Highway provides enormous opportunities for gathering

*Over the next two years, in cooperation with provincial governments, industry and universities, the **Minister of Natural Resources** will lead an effort to create a **Canadian Spatial Data Infrastructure** for the Information Highway. The "GeoExpress" will allow rapid public access to highly informative digital maps through a common electronic window. The maps will portray geographically a large amount of detailed information on Canada's natural resources and environment, as well as economic, social and political data. This new technology constitutes a powerful information tool not only for the Canadian resource industry, but also for industries in many other sectors of the Canadian economy.*

and distributing such information. The government is planning — or has already taken — important initiatives to this end. Clients include the resource industries, governments, urban and rural communities, organizations and the general public.

**Agriculture and Agri-Food Canada** has established an electronic information service (ACEIS), which provides direct access to departmental publications, information and information services. Users may connect via the World Wide Web, telnet or dial-up. Voice and fax on demand are also available. The department is also conducting a pilot project for a **Canadian Rural Information Service (CRIS)**, which will provide a clearing house for information on rural Canada. CRIS, which has its own Web site, carries information on agriculture programs and services, rural success stories, sources of expert advice and details about conferences and workshops on rural issues. Federal, provincial and territorial ministers of agriculture have also established a working group that will identify and evaluate new policies and programs to enable the agricultural and rural sectors to take full advantage of the Information Highway.

**Fisheries and Oceans Canada** operates a **Marine Environmental Data Service** that makes available over the Internet and other media a wide range of oceanographic data gathered from satellites, buoys and research vessels.

**Environment Canada** has already launched its award-winning Web site, the **Green Lane**, which makes available to Canadians a wide range of environmental information — pertaining to human safety and health, environmental industries, environmental assessments and legislation, and scientific data for use in policy making.

These investments in Canada's scientific and technical knowledge infrastructure have already begun to pay off. Our resource industries have benefited directly and have created spinoffs in other industrial sectors. Scientific and technological solutions developed for use here in Canada are now being exported, and Canada is building on its reputation as a world leader in resources management technology and expertise.

Management of this information is itself becoming an industry. SMEs now use **Geographic Information Systems**, which are workstations capable of integrating, processing and displaying digital maps showing a vast range of economic, environmental and health information. Many of these workstations were developed by the federal government and then transferred to industry. These companies are now growing at a rate of 20 to 30 percent a year. The global sales of Canada's geomatics industry now amount to almost \$1 billion, roughly 10 percent of the world market. With the advent of the Information Highway, these markets will expand dramatically.

### **Employment and the workplace**

The new industries that spring up around the Information Highway will generate many thousands of new jobs in Canada. They will also demand new kinds of skills and different types of working arrangements. Inevitably, there will be job losses in some areas and job gains in others. The Government of Canada will carefully track these impacts on employment and ensure that labour standards continue to provide appropriate protection for Canadian workers as new working arrangements evolve.

The ministers will review the relevant recommendations of the Final Report of the Information Highway Advisory Council and the minority report written by the labour representative on the Advisory Council. In order to ensure that these issues receive wide public discussion, they will convene a **national forum** with involvement by the Canadian labour movement.

*As part of this examination, the ministers of Human Resources Development and Labour, in cooperation with provincial/territorial governments, will analyze the impact of information technology on employment, workers and the workplace, with a view to **ensuring that the Canada Labour Code continues to provide Canadian workers, both men and women, with appropriate protection.** A critical concern here is to ensure that protection for "contingent workers" applies to the growing numbers of part-time employees, contractual workers and people working electronically from their homes.*

*In the coming year, the ministers of Human Resources Development and Labour, in partnership with provincial/territorial governments and organized labour, will examine the challenges and opportunities presented by the Information Highway with respect to the workplace, skills and employment, with a view to developing innovative adjustment strategies.*

Already, **Human Resources Development Canada** has launched a pilot project, using the new technology to match job seekers' skills with employers' requirements. Through this new **Electronic Labour Exchange** in the Ottawa-Hull area, registered job seekers can use the Internet to dial up directly or to go to a public terminal to have their skills automatically matched to employers' requirements, and end up with a short list of real job opportunities.

Human Resources Development Canada has also been working closely with government, non-governmental organizations and the private sector to develop **CanWorkNet**, Canada's national electronic directory of Internet sites related to work, career development, labour market information, training, literacy, community development, social services, the workplace and other related topics. The public is invited to participate on-line at: <http://canworknet.ingenia.com/canworknet>.

### **REALIZING THE SOCIAL BENEFITS**

The Information Highway presents a significant opportunity to strengthen the social fabric of Canadian life and help Canadians adjust to a changing workplace. Nowhere is this more evident than in learning, where the Information Highway itself provides a powerful new means of delivering learning opportunities to Canadians. The Information Highway will also allow us to improve both the effectiveness and the efficiency of Canada's health system. This action plan is designed to ensure that Canadians can seize both these opportunities.



## **Lifelong learning and the Information Highway**

In the information society, the knowledge and skills needed for employment and competitiveness in an economy that is becoming ever more globalized are continually changing. It has been estimated that, by the turn of the century, every job and profession will require some form of skills upgrading or training. A flexible, efficient means of developing our human resources will therefore lie at the core of Canada's efforts to ensure economic growth, economic development and job creation.

*The Information Highway can provide the means to give every Canadian access to the learning opportunities so critical to success, both individual and collective.*

Already, new learning technologies such as distance learning and computer courseware can provide a richer learning experience for today's students, equipping them to compete for jobs in the emerging knowledge society. As the Information Highway develops, these learning opportunities must expand as students at all levels gain access to a world of knowledge and learning resources. In the very near future, rather than thinking of learning as an educational experience completed early in life, Canadians will view it as an enriching lifelong process vital to their continuing employment and success. In this way, Canada will move adopt a culture of lifelong learning as an integral part of its evolution to an information society.

Responsibility for education lies within provincial jurisdiction. The federal government's contribution to development of a lifelong learning culture in Canada is primarily in facilitating and fostering cooperation among the provinces, territories, employers and other stakeholders. The role of provincial and territorial governments, individually and through the Council of Ministers of Education, Canada (CMEC), remains pre-eminent in adapting Canada's educational system to the demands of the information age.

*Building a lifelong learning culture:* The Minister of Human Resources Development, in partnership with the provinces, territories and key federal departments and agencies, will **facilitate and foster close collaboration** among governments, learning institutions, sectoral councils, the private sector, business associations, labour organizations, associations for learning technology professionals, women's groups, community groups and other non-governmental organizations.

Human Resources Development's Office of Learning Technologies (OLT) will work with a variety of partners to expand innovative learning opportunities for Canadians using the new learning technologies. OLT intends to contribute to the development of a lifelong learning culture in Canada through a variety of initiatives. Measures include supporting projects that stimulate the use of technologies for lifelong learning by diverse groups of Canadians and that assess effective practices. OLT will work with partners and developers to facilitate demonstrations of learning technologies at locations across Canada, where access would otherwise be lacking.

OLT is also working to develop information databases and a Web site to link to networks, databases and demonstration sites that already exist across Canada. OLT wants to ensure that quality information about the opportunities and challenges of learning technologies is created, made available and disseminated widely across Canada through the Internet and other delivery mechanisms.

*SchoolNet:* A key instrument already in place is SchoolNet, the two-year-old program jointly sponsored by the federal government, provincial/territorial governments and the private sector. Its primary purpose is to provide Canadian students and teachers with exciting electronic services that will develop and stimulate the skills needed in the knowledge society.

Today, SchoolNet serves more than one third of Canada's 16 500 schools with hundreds of on-line services. Under the SchoolNet partnership, the provincial, territorial and federal governments and the Stentor telephone companies recently agreed on a combined nation-wide plan to put all of Canada's schools on-line by June 1997.

*"It's very exciting to see what's going on here in Canada in a number of areas. . . . SchoolNet . . . is the leading program in the world in terms of letting kids get out and use computers."*

Bill Gates  
Founder and President  
Microsoft Corp.

Under the First Nations component of SchoolNet, Industry Canada and the Assembly of First Nations plan to link all 447 Aboriginal schools by fall 1997, using high-speed satellite access donated by Stentor.

### **Health and the Information Highway**

Canadians regard health care as a fundamental right and its provision through medicare as a defining feature of our national community. They are worried about the fiscal strains on our \$70-billion-a-year health system. The Information Highway provides a unique opportunity for more efficient delivery of quality care and improved access to health information.

Judicious use of information technology has the potential to improve the quality of care and the cost-effectiveness of its delivery. For example, it will make possible the timely electronic provision of essential health services and medical expertise in remote areas. It will encourage more efficient and effective management of patient services by hospitals, individual physicians and community and home-based programs. It will make possible improved surveillance of emerging diseases by public health authorities at the municipal, provincial national and international levels. It will facilitate the creation of health information databases

*The **Minister of Health**, in cooperation with provincial and territorial governments, other federal departments, the private sector and professional bodies in the health field, will discuss the development of a **national strategy** to put in place an **integrated health information network** as part of Canada's Information Highway.*

that, under appropriate safeguards for confidentiality, can be used by researchers, health practitioners and policy makers to improve all aspects of health care. Finally, the network will provide patients and consumers of health services and people concerned about their health with ready access to health information ranging from nutritional data to information on disease prevention.

A critical consideration in the development of such a network will be the need to protect the privacy and confidentiality of personal information while ensuring that health information systems are fully interconnected and interoperable.

Such networks are already starting to appear in Canada. The Ottawa-Carleton Health Information Network ties local hospitals together, allowing them to exchange electronic mail and have access to the Internet. In future, the network will be linked to the Ontario Ministry of Health for validation of health cards. It will also provide links to all local doctors and labs, allowing instant access to patient records under appropriate safeguards for confidentiality.

### **CONDITIONS FOR SUCCESS**

The economic and social promise of the Information Highway is conditional. For this potential to become real, all Canadians must have affordable access to the Information Highway. They must also feel confident that their privacy will be protected and that their children won't encounter offensive content there.

#### **Affordable access for all**

Many observers, including the Information Highway Advisory Council, believe that Canada's Information Highway should be at least as accessible and relevant to Canadians as telephones and televisions are today. The growing market for information products and services should work to ensure affordable access to essential Information Highway services in a competitive environment.

Where market forces fail to provide this level of access, the government is prepared to step in to ensure affordable access to essential Information Highway services for all Canadians, regardless of their income or geographic location.

*A national strategy for access to essential services:* By 1997, the ministers of Industry and Canadian Heritage will develop a **national access strategy involving policy, regulatory and other measures to ensure affordable access** by all Canadians to essential communications services. The ministers of Human Resources Development and Health will join the Minister of Industry to bring forward a **framework for action** that supports the use of information technology, information services and networking applications in the areas of learning and health. Developing this national strategy will involve widespread consultations with all interested parties, including provincial/ territorial governments, which have extensive responsibilities in many of these areas.

The goal will be to accelerate the rate at which Canadians move onto the Information Highway. The broad public policy objectives governing Canada's broadcasting and telecommunications systems, and the convergence policy to be released later this year, will anchor this strategy. It will also respond to the evolving needs of Canadians in all regions of the country as reflected in the four access principles enunciated by the Information Highway Advisory Council:

- ◆ universal, affordable and equitable access
- ◆ consumer choice and diversity of information
- ◆ the need for citizens' participation and competency in the technology
- ◆ the importance of open and interactive networks.

A fundamental question to be addressed will be the definition and delivery of essential services on the Information Highway.

In cases where market forces cannot provide such services, the strategy will identify the means — regulatory, financial or otherwise — of providing them to people living in rural, remote and northern communities. For northern communities, special emphasis will be placed on the potential of wireless and satellite services to assure access, particularly in Aboriginal communities.

Measures to ensure that the Information Highway fully reflects Canada's linguistic duality and supports the French language and services in French will be essential. The strategy will also involve steps to ensure

that the Information Highway reflects the diversity of Canada's multicultural society. Equally important, the strategy will take into account the need for analysis to identify how gender, age and other social factors create differences in participating in and benefiting from the Information Highway.

Measures to permit use of the Information Highway by people without private means to do so will also be critical. This is likely to require the establishment of public access points in libraries, community centres, schools, shopping malls and other public buildings.

*Community Access Program:* Industry Canada's Community Access Program provides a prototype for how these access questions might be resolved. The program enables Canadians in rural and remote communities to have access to the Internet.

The program electronically delivers government services and information to these communities and helps them develop skills for the information economy. It provides up to \$30 000 a site for equipment, connections, technical support and training. Some 380 sites are either up and running or under construction.

By 1998, an expected 1500 rural and remote communities across Canada will have access to the Internet through schools, libraries and other community institutions.

*Disability Access Program:* Canadians with special needs require access to the Information Highway on the same terms as everyone else. Industry Canada has set up an office to assist in determining and meeting these needs.

### **Protecting information**

Concerns about the protection of personal data on the Information Highway may well prevent Canadian firms and individuals from taking advantage of electronic commerce or even using the Information Highway for their own benefit. The federal government shares these concerns and recognizes that the right to privacy is a core Canadian value.

*Security of personal data:* There have already been instances of people using the Internet to break into other people's electronic files. To guard against this, proper security procedures are needed. Technologies such as public key cryptography — an economical but difficult-to-crack encryption system — and the public key infrastructure (PKI) to manage it, are now becoming available.

*The Government of Canada, as part of its initiatives to introduce electronic commerce in government, intends to establish a public key infrastructure for government. PKI will be operational internally by 1997 and with external partners by 1998. The **Minister of Industry**, in conjunction with other ministers and levels of government, will work in partnership with industry and other stakeholders to secure the adoption of similar infrastructures across Canada. For electronic transactions to be seamless, it will be critical to ensure that all such infrastructures are interoperable.*

The **Minister of Industry** by the end 1996 will take further steps to limit the use of scanners that decode digital telephony signals from cellular phones, personal communications services and public air-to-ground communications. These measures will involve certifying and selectively licensing scanners.

***Framework legislation to protect personal information:***

The government has recognized that security procedures and technologies cannot do the job alone. The right to privacy must be recognized in law, especially in an electronic world of private databases where it is all too easy to collect and exploit information about individual citizens.

Most governments in Canada have legislated privacy protection for personal data held by government, but only Quebec has passed legislation applying to the private sector. The Canadian Standards Association (CSA) has recently developed a national industry standard for the protection of personal information by

the private sector. Such a standard is only voluntary, of course, although it has won praise from privacy advocates, consumer groups, business and the health care industry.

The standard sets out 10 basic principles for the protection of personal data. Key elements include the following concerns:

- ◆ consumers must be informed and should consent to any use of their personal information
- ◆ the purpose to which such information is put must be clearly identified
- ◆ consumers should be able to examine the accuracy of information held about them and challenge its accuracy
- ◆ no information should be collected beyond what is needed
- ◆ information should be held with appropriate security and not be disclosed except for authorized purposes
- ◆ there should be openness about policies and procedures with respect to the management of personal information
- ◆ organizations must be held responsible for information in their control and designate persons to be accountable with respect to that information.

*As a means of encouraging business and consumer confidence in the Information Highway, the ministers of **Industry** and **Justice**, after consultation with the provinces and other stakeholders, will bring forward proposals for a legislative framework governing the protection of personal data in the private sector.*

### **Offensive content**

Canada's current laws governing hate, obscenity and freedom of expression apply not only to conventional media but also to harmful material on the Internet. Despite this fact, a variety of pornographic and hate materials have already appeared on the Internet and electronic Bulletin Board Systems (BBSs), some generated here in Canada and some coming from abroad. Real enforcement problems arise when illegal material comes from outside Canada or when its originator cannot be identified.

According to the Information Highway Advisory Council, the most effective approach to stemming the flow of offensive materials may be self-regulation and advocacy on the part of parents, educators, community organizations, network operators and providers of information services. For the longer run, electronic

filters such as the v-chip are becoming available to block the entry of such materials onto a home or school system.

The federal government also holds to the view that it has the right, as do all sovereign governments, to intervene with respect to illegal materials. The government is already reviewing law enforcement powers to ensure that criminal abuse and misuse of computer networks can be investigated. Industry Canada is now consulting on this issue with providers of information services on the Internet. The Department of Justice has just issued a consultation paper, "Undue Exploitation of Violence," which seeks public views on the measures that might be taken to respond to the distribution of violent material on electronic networks, including the Information Highway.

# GETTING GOVERNMENT RIGHT

The Government of Canada itself can play a key role in bringing the Information Highway to Canadians. The policies and initiatives described in this action plan — both those in place and those planned — will transform the federal government into a model user and a catalyst for Information Highway developments across Canada.

This change will bring significant benefits to Canadians. Government services will become available through easily accessible electronic windows. Canadians from all walks of life can use the Information Highway to get rapid electronic access to the correct government information, exchange information with the right government office, fill out an application for a benefit or grant, or conduct business electronically through payment or receipt of “digital cash.” In all these changes, the needs and interests of citizens will be paramount.

The shift to provision of government services electronically will bring about a qualitative improvement in the responsiveness and accessibility of government. The new technology also promises to enhance the *affordability* of government, allowing it do more for less — an important consideration in these times of fiscal strain.

By putting in place the electronic information infrastructure needed to support this transformation, the government will not only be turning itself into a model user of this technology, but also, as the largest “business” in Canada, will be acting as a catalyst for the innovative use of the Information Highway throughout the Canadian economy. In this way, the government will help lay the groundwork for job creation and economic growth in the emerging knowledge society.

INITIATIVES	ACTION	
	TAKEN	UPCOMING
<b>Quick and Easy Access</b>		
Seamless electronic government access		✓
Availability of government information at public access		✓
Canada Site on Internet	✓	
Open Bidding Service	✓	
<b>Electronic Commerce by Government</b>		
Electronic commerce strategy for government		✓
Electronic commerce in private sector		✓
Public key infrastructure	✓	
Business Number	✓	
Intelligent transportation border crossing system		✓
Customs Automated Data Exchange	✓	
Optical card for Canada-U.S. travellers		✓
Direct deposit and standard payment systems	✓	
<b>Improved Efficiency in Government</b>		
E-mail across government	✓	
Locally Shared Support Service	✓	
<b>A Common Electronic Information Infrastructure</b>		
Integrated approach to privacy, security and access to information		✓
Technology Standards Program	✓	

## QUICK AND EASY ACCESS

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Over the next few years, the **Treasury Board Secretariat**, in collaboration with **Public Works and Government Services Canada**, will continue to evolve and implement plans for a common electronic information infrastructure to permit seamless electronic access to government services, programs and individuals.

To ensure access by Canadians who lack a computer and modem, the **Minister of Industry** will work closely with provincial and territorial governments through the SchoolNet and Community Access programs, to ensure that government information and services are available through public access points located in community centres, libraries and schools.

The ultimate goal is to ensure quick and easy access to government. Already, the 1994 *Blueprint for Renewing Government Services Using Information Technology* published by the President of the Treasury Board has produced important changes.

In December 1995, the government established its primary site on the Internet (<http://canada.gc.ca>). Hosted by Public Works and Government Services Canada, the bilingual Canada Site provides a single window for Internet users seeking access to government information and services, as well as direct links to other federal and provincial government Internet sites.

Already, a large number of federal departments and agencies and 150 000 public servants have an Internet address. Many departments have their own Web sites, and **Justice Canada** is making all the Statutes of Canada available on its site. **Human Resources Development Canada** can now provide instant electronic access to federal job banks from many government offices and from shopping malls. Canadian companies across the country can obtain information on government contracts electronically through the single electronic window provided by the **Open Bidding Service (OBS)** for **Public Works and Government Services Canada**.

To increase the availability of information in both official languages, **Public Works and Government Services Canada** is distributing *Termium*<sup>®</sup>, its extensive French/English terminology database, on CD-ROM to other departments.

## ELECTRONIC COMMERCE BY GOVERNMENT — A CATALYST FOR THE PRIVATE SECTOR

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As in private sector business, much government business revolves around the internal movement of money as well as the many external transactions with Canadians that involve money, such as taxes, benefits, procurement and grants. Just as electronic commerce will have an enormous enabling effect on the Canadian economy, its emergence in government will lead to a marked improvement in effectiveness and efficiency.

*The Treasury Board Secretariat has indicated that electronic commerce will become by 1998 the preferred means for the government to conduct its business.*

Concerns about authentication, privacy, security and legal validity surround electronic commerce within government, as in the private sector. For this reason, the **President of the Treasury Board** and the **Minister of Public Works and Government Services** will strongly reaffirm the government's commitment to act as a "model" user of information technology. The Treasury Board Secretariat is developing, in cooperation with other departments, a public key infrastructure (PKI) to support privacy, integrity, authentication and non-repudiation.

*In 1996, Public Works and Government Services Canada will introduce government-wide security services such as key management and electronic authorization and identification. With the recent adoption of a PKI strategy, these services will provide the basis for the use of digital signatures and the exchange of electronic documents and forms within the federal government.*

The existence of a government-wide system for electronic commerce and the need to conduct business with the government will serve to stimulate the widespread acceptance of electronic commerce within Canada. The Minister of Industry, in cooperation with other ministers and levels of government, will work closely with industry and other stakeholders to accelerate the development and implementation of policies and legal standards that will support electronic commerce in the private sector.

Action in this area is under way. In 1995, some 3.9 million Canadians filed their income tax returns with Revenue Canada electronically. Another 495 000 made their payments electronically. These numbers will only grow as use of the Information Highway becomes the accepted way of doing business in Canada.

By January 1, 1997, all businesses dealing with Revenue Canada will have a single **Business Number (BN)**, a unique identifier for their dealings with the department's four main business programs and eventually with the government as a whole. This number will allow one-stop service for businesses, simplify their dealings with government, and reduce duplication and paperwork. It is also a necessary building block in the foundation of electronic commerce between government and business. Revenue Canada is already exploring with provincial governments their use of the same Business Number.

In addition, customs brokers and importers can exchange accounting entries with Revenue Canada through **Customs Automated Data Exchange (CADEX)**, an electronic information link. The system allowed the automated processing of 90 percent of the more than 10 million accounting entries received from importers and brokers in 1994.

**Transport Canada, Revenue Canada and Citizenship and Immigration** are now cooperating with their U.S. counterparts in a demonstration test of **intelligent transportation border crossing systems** to speed customs, immigration processing and toll collection at land border crossings. With this system, information on a truck and its cargo will be forwarded electronically for processing before its arrival. When a truck equipped with the appropriate communications device reaches the border, its driver will be able electronically to pay the bridge toll, advise Customs and Immigration of its presence, and — if safe and legal — receive a green light to proceed.

The Government of Canada is also conducting a pilot test of an **optical card** that will allow frequent travellers between Canada and the United States to be processed through customs simply by inserting the card into a specialized computer system.

Within government, **Public Works and Government Services Canada** has already put in place a **direct deposit** system to streamline government financial operations, as well as a **standard payment** system using advanced technology for the issuing of payments by the Receiver General for Canada.

## **IMPROVED EFFICIENCY IN GOVERNMENT**

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Information technology and the Information Highway hold out the promise of significant savings in the delivery of services to Canadians.

The electronic sharing of information across government can save on paperwork and permit a more cost-effective and coordinated approach to the design and delivery of services. The government-wide E-mail system now in place constitutes one of the largest private networks in the world, serving 200 000 public servants across the country. This system has been



extended to provincial public servants in New Brunswick, and negotiations are already under way for similar arrangements with other provinces.

The federal government has introduced a **Locally Shared Support Service Program** that will allow the sharing of common administrative services and facilities. About 250 pilot projects are now under way.

## **A COMMON ELECTRONIC INFORMATION INFRASTRUCTURE**

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A common electronic infrastructure will provide the foundation for improved efficiency, electronic commerce and electronic access to government services. This infrastructure must be nation-wide in scope and it must be a seamless web, so that all the networks and computers across government can talk to each other and with Canadians.

Elements of such an infrastructure are in place. **Public Works and Government Services Canada** now manages an information highway internal to government that includes a digital backbone network, a common intercity voice network, local telephone systems, a frame relay service, an Ottawa-area, fibre-optic network, the Government Enterprise Network, a mobile satellite communications service and a variety of inter-networking technologies.

This infrastructure continues to evolve in accordance with the plan for implementing the *Blueprint* agreed to by Treasury Board ministers in fall 1995. The Treasury Board Secretariat, in collaboration with Public Works and Government Services Canada and other departments, is now taking steps to make a government-wide electronic information infrastructure a reality. These steps include identifying key priorities, establishing implementation plans, suggesting means of funding, taking measures to encourage broad usage and developing an effective policy framework and structure for governance.

Fundamental to this plan will be policy guidelines and application tools for information management, and technologies that allow an integrated approach to privacy, security and access to information questions. A critical concern will be to ensure the delivery of government services and information in both official languages as well as to the elderly, people with special needs and those living in remote and rural areas.

A key element will be encouraging the use of open international standards for interconnection across government, throughout Canada and with the world. To this end, the President of the Treasury Board has already undertaken to strengthen the **Technology Standards Program** and, in concert with the Minister of Industry, will continue to promote the use of open standards in meeting the information technology requirements of government.

# CONCLUSION

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Canada's transition to an information society and a knowledge economy will require concerted action by all levels of government, the private sector and social institutions, and a commitment to ensure that all Canadians share in the benefits of the information society.

Through actions on a broad front, Canadians will be able to move forward into the 21st century and seize the new opportunities offered by the Information Highway.

Only an active partnership among governments, private industry, labour and associations will take full advantage of the enormous potential of the Information Highway as an enabler of economic growth and job creation. Since the impact of information technologies is far-reaching, all levels of government must join

in a national effort aimed at enlarging the capacity of Canadians to capture the benefits of the information society. The federal government therefore places high priority upon close cooperation with provincial and territorial governments in carrying forward a national action plan.

International cooperation is also essential, and Canada will continue to play an active leadership role in efforts to build a global Information Highway.

This action plan has laid out some of the steps that must be taken to facilitate Canada's transition to a knowledge-based society. Others will be added as work on building the Information Highway continues. These will be the subject of further announcements from individual federal government departments and ministers over the coming weeks and months.

# NOTES

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