THE IMPLICATIONS OF OPEN SYSTEMS INTER-
CONNECTION FOR CANADA

Discussion paper

Government of Canada
Department of Communications
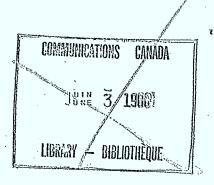
Gouvernement du Canada
Ministère des Communications

Telecommunications Policy Branch

Network Development and Standards Policy

THE IMPLICATIONS OF OPEN SYSTEMS INTERCONNECTION FOR CANADA

Network and Standards Directorate

DISCUSSION PAPER

Canada

NSP - 002

DEPARTMENT OF COMMUNICATIONS

DEPARTMENT OF COMMUNICATIONS ACT

Notice No. DGTP-008-85

The Implications of Open Systems Interconnection for Canada

The need for a standard computer communication architecture known as Open Systems Interconnection (OSI) which will enable computer communication systems to exchange information effectively and efficiently, regardless of manufacturer or country of origin, has become widely recognized. Since 1979, representatives from the Government of Canada and Canadian industry have been working actively with the International Organization for Standardization (ISO) and the International Telegraph and Telephone Consultative Committee (CCITT) of the International Telecommunications Union to develop such standards.

In addition, the Department of Communications has led Canadian participation in a joint initiative with the Departments of Industry of France and the United Kingdom relating to promotion of OSI standards. The Department is aware that France and the United Kingdom, as well as other countries such as the Federal Republic of Germany and the United States, have undertaken significant initiatives in this regard. Indeed, the objectives and commitment in terms of financial and human resources being allocated towards OSI development and implementation by these other countries are impressive. As a result, the Department is examining the need and appropriateness for corresponding activities to be pursued in Canada.

The Department believes that the quick and efficient exchange of information between computer based systems is becoming increasingly vital to Canada's industrial competitiveness and economic development. It regards the early development and adoption in Canada of OSI standards as being essential in ensuring that all required information interchange involving computer based systems of different type and manufacture can be achieved in an orderly and cost-effective manner.

As a result, the Department is concerned that there is a general lack of awareness and commitment in Canadian manufacturers, information providers and users to the implementation of compatible OSI products, systems and services.

In order to assess the level of this awareness and commitment, to consider in more detail the implications and to plan future OSI initiatives to ensure appropriate development and implementation of OSI to meet Canadian needs and objectives, the Department invites suppliers of products which could or will incorporate OSI standards, users of such services or products and other interested parties to provide information and comments in response to the following questions:

1. <u>Potential Impact of OSI on Marketability</u>
   <u>and Competitiveness</u>

   (a) What impact will OSI implementation in Canada and in
       other countries have on the competitiveness of
       Canadian industry in general and your organization in
       particular, in the near term (0-5 years) and in the
       longer term (6-12 years)?

   (b) In your information systems planning and
       implementation with the Canadian telecommunications
       carriers, cable television suppliers of special
       services, information providers and users, to what
       degree are they planning to develop, implement and/or
       utilize OSI-based systems and services?

   (c) Will the OSI-based interconnection of different
       information systems benefit Canada's information
       system/service providers? Will OSI contribute to more
       universal accessibility to and greater use of these
       information systems and services? If so, to what
       extent?

   (d) What impact will OSI have on information users with
       regard to their choice of software and hardware
       supplier and the availability of and access to
       existing and new information databases?

2. <u>Requirements for National OSI Standards</u>

   (a) Will the adoption of <u>national</u> OSI standards be
       essential or incidental to the widespread
       implementation of OSI in Canada?

   (b) Are you aware of or do you or representatives from
       your organization, participate in national OSI
       standards activities such as CNO/CCITT National Study
       Group VII, and Sub-Committees 6 and 21 of the Canadian
       Advisory Committee to ISO/TC97?

   (c) Is there a need for establishing a national committee
       of senior level participants from government,
       suppliers and users to provide direction to support
       the development and use of OSI-based information
       technology products and services (similar to the
       United Kingdom's FOCUS committee)? If so, how should
       such a committee be structured, and what should be its
       mandate and the results of its work?

3. OSI Research, Development and Implementation

   (a) In what areas of OSI research and development should
        greater effort be made in Canada to promote the
        interest of all information system suppliers, and
        users?

   (b) In which organization(s) (for example, private
        industry, user organizations, federal government etc.)
        should this R&D effort be initiated?

   (c) What financial or other deterrents are there, if any,
        to the development and implementation of OSI in
        Canada? If so, what type of corrective measures
        should be considered and over what period of time?

   (d) The British government has established a policy that
        gives preference to procurement to products conforming
        to standards for OSI. Should a similar position be
        adopted by the Canadian government in order to promote
        OSI development and implementation in Canada?

4. Need for OSI Testing and Assessment Facility

   (a) Should a conformance testing service be established
        for OSI protocol implementations, including all seven
        layers? (This service would be aimed at testing for
        conformance in reference to national and/or
        international standards and reporting thereon.
        Note: this would not be a certification service.
        See 6.4 (d).)

   (b) Would one or numerous testing facilities be the
        preferred institutional infrastructure to perform OSI
        conformance testing?

   (c) Which existing organization(s) would be appropriate to
        provide a conformance testing service? What methods
        of cost recovery would be equitable and effective for
        such a conformance testing service?

   (d) What requirements exist or will exist for a
        certification service in Canada for OSI-based products
        or services? How should such a service be structured
        and made available nationally? (Certification implies
        the issuance of a certificate of conformance by an
        accepted authoritative body.)

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5. ADDITIONAL COMMENTS

Any other comments deemed pertinent to the development and implementation of OSI in Canada not covered by responses to the above questions would also be welcomed.

A more detailed discussion of the OSI concept, its definition and importance to Canada, and the implications of the OSI initiatives being taken by other countries is contained in a discussion paper (Document NSP 002) entitled "The Implications of Open Systems Interconnection for Canada." This document, issued in conjunction with this public notice, can be obtained from the Information Services Branch of the Department of Communications at 300 Slater Street, Ottawa, Ontario K1A 0C8 (telephone (613) 990-4842) or any of the Department's regional offices in Vancouver, Winnipeg, Toronto, Montreal or Moncton.

Submissions should be addressed to the Director General, Telecommunications Policy Branch, Department of Communications, 300 Slater Street, Ottawa, Ontario, K1A 0C8. To ensure consideration, submissions must be postmarked on or before March 15, 1986 or received by other means on the same date. All representations must cite the Canada Gazette, Part I, Notice publication date, title and notice reference number.

Take note that all written comments received in response to this Notice will be made available for viewing by the public during normal business hours at the Department of Communications Library, 300 Slater Street, Ottawa, Ontario for a period of one year from the close of comments, and at the Regional Offices of the Department at Moncton, Montreal, Toronto, Winnipeg and Vancouver for a period of six months from the close of comments.

Also take note that approximately two weeks after the close of the comment period, copies of all written comments received in response to this notice will be made available to the public. Copies may be obtained, by mail order or over the counter, from Kwik-Kopy Printing, 249 Slater Street, Ottawa, Ontario, K1P 5H9. Reasonable costs of duplication will be charged.

Dated at Ottawa, this *16* day of *Nov* , 1985.

V. Hill
Director General
Telecommunications Policy Branch
Department of Communications

DISCUSSION PAPER

THE IMPLICATIONS OF OPEN SYSTEMS INTERCONNECTION

FOR CANADA

Department of Communications

Ottawa, Canada

November, 1985

CONTENTS

ABSTRACT

Since 1979, scientific experts and policy advisors of the Department of Communications have participated actively in the works of international organizations fostering the development of a standard computer communication architecture known as Open Systems Interconnection (OSI) which will enable computer communications systems to exchange information effectively and efficiently regardless of manufacturer or country of origin.

The initiatives undertaken by other countries such as France, the United Kingdom and the Federal Republic of Germany towards the early implementation of OSI are impressive. The Department believes it is now appropriate to promote Canadian awareness of the implications for Canada of OSI and to assess the degree of Canadian support and commitment to OSI standards.

Consequently, the Department invites all interested parties to make their views known on the concerns raised in this paper. The procedure for the submission of comments is outlined in Section 8.

1.0   INTRODUCTION

For the past five years, the Department has been fostering the effective and orderly implementation of computer information systems and services. Videotex/Telidon and Office Communications Systems are two specific Departmental initiatives aimed towards this objective.

As the number and complexity of these and other information systems and services increase, however, so do the problems associated with information interchange between systems of different type and manufacture.

The lack of a standard framework for development of information systems and the resultant incompatibilities in implementing such systems has caused computer information users to duplicate investment in equipment or redesign their systems using costly non-standard means in order to facilitate interworking with other computerized devices. Furthermore, incompatibility of system hardware and software of different type and manufacture often has the effect of locking information users to one manufacturer, effectively denying users the opportunity to employ innovative offerings by other software and equipment suppliers at perhaps more competitive rates.

With the dramatic increase in the number of computers and information systems, it is clear that Canada will not be able to afford a proliferation of incompatible systems if it hopes to maintain its position as one of the world leaders in the effective application of communication technology to business and industrial affairs in a world where information has generally become an economic commodity and necessity.

Consequently, computer communications standards are required which will provide Canadian industry the necessary framework for the effective development and application of compatible information system components. The goal of such standards is known as Open Systems Interconnection (OSI), where systems can work together to accomplish effective information transfer and processing by virtue of their mutual adherence to a set of standards.

The Department regards the development of OSI standards at both the national and international levels as a vital element in maintaining a competitive industrial environment in Canada where distributed processing and telecommunications are playing an increasingly important role in national economic development. This is of serious concern, since otherwise, a multitude of incompatible proprietary standards could result, and many potential applications of computers and terminals would never be realized because of basic interconnection problems. The widespread entrenchment of such incompatibility in an information-intensive society could have significant negative effects on national productivity and economic growth.

More specifically, the Department considers the establishment and implementation of OSI standards in Canada as fundamental to the full realization, through interconnection via our public telecommunications networks, of new information services such as the Office Communications Systems, Electronic Payments, Messaging, Trade Data Interchange Systems, National Library Bibliographic Network and Telidon/Videotex Systems.

2.0   DEFINITION OF OPEN SYSTEMS INTERCONNECTION

Open Systems Interconnection standards are designed to allow the exchange of information between computer systems regardless of manufacturer or geographical location. The standards cover both interconnection and interworking, but are independent of the actual applications – word processing, database access, process control, financial transactions etc. – which are subject to additional specialized standards.

Much of the initial standardization activity was concerned with the development of a seven layer Reference Model, into which the many new standards would fit, defining the functions of each standard and the relationship between them. This model is now the accepted framework of the two international standards bodies – the International Organization for Standardization (ISO) and the International Telegraph and Telephone Consultative Committee (CCITT).

The OSI model consists of seven layers, each layer building upon the one preceding to make additional facilities available. A brief description of the basic function of each layer of the model follows:

1. The Physical Layer, which deals with the physical connection to communication lines.

2. The Data Link Layer, which provides transfer and control of data over communciation lines, error correction etc.

3. The Network Layer, which adds destination switching, routing and relaying functions, enabling the establishment of end-to-end connections where no direct data link connection is possible.

Thus, the above three layers provide reliable interconnection across a variety of interlinked networks – both of the wide area and local area type.

4. The Transport Layer, which provides transparent user-to-user services, including multiplexing, to make the most effective use of the network facilities. In addition, it enhances the quality of the service to that necessary for the application.

5. The Session Layer, which controls the dialogues between the users, access authentication, synchronization etc.

6. The Presentation Layer, which allows for the selection of the representation of data resolving differences in code, layout and control characters between terminals and systems.

7. The Application Layer, which provides the interface to the user type applications and common services such as file transfer and terminal support between systems.

Since 1979 Canada has maintained a high level of participation in and has made a substantial contribution to the extensive study activities presently taking place in the ISO and the CCITT in developing a Reference Model for OSI. To date, the main Canadian participants have been representatives from Canada's telecommunications carriers, the Department of Communications, the Government EDP Standards Committee and some representatives from Canadian industry as well as the banking and academic community.

An international standard (IS 7498) for the Reference Model has been established within the ISO, while the CCITT has also developed an international recommendation (X.200) for it's Reference Model on OSI which is fully aligned with that of the ISO. In addition, fully compatible specifications for the protocols and services of the first five layers of the Reference Model have been approved in the CCITT and are in the final stages of approval in the ISO. Intense work continues in both the ISO and CCITT to complete the service definition and protocols of the remaining two layers of the Reference Model, namely the Presentation and Application layers. Thus an internationally accepted approach for the orderly evolution of standards for OSI has now been established and continues to evolve.

3.0 INTERNATIONAL INITIATIVES

Since 1979, the Department has led Canadian participation in a joint initiative with the Departments of Industry of France and the United Kingdom relating to the early development of OSI standards. These liaison activities have identified common national objectives which include the orderly development of national networks, and the early adoption/implementation of OSI standards to avoid the costly link-up of computer based information systems through non-standard ad hoc means. A subject of extensive discussion has been the means for providing a testing and assessment environment meeting the different needs of users, manufacturers, and information providers.

Participation in these joint activities has made the Department aware of the significant initiatives that both France and the United Kingdom, as well as some other countries, have undertaken in this regard. In 1978, the Minc-Nora report presented to the President of France stimulated a $625 million French Department of Industry program which declared work towards Open Systems information technology as one of its aims. More recently France organized an "Agence de l'informatique" (ADI) and the Bureau d'orientation de la normalisation en informatique (BNI) to pursue, at policy and technical levels, the development of OSI standards.

In 1982, the French Telecommunications Administration decided to base the whole of its policy for development of telematic services on a unified architecture of telematic protocols and interfaces, open to public networks and informatic systems. This architecture, referred to as ARCHITEL, is based on the OSI standards jointly developed by the ISO and the CCITT.

The United Kingdom has implemented an "Intercept Strategy" which aims to facilitate the rapid development and deployment of information technology standards to the advantage of both suppliers and users by bringing OSI standards into use as quickly as possible. It follows a recommendation by the Department of Trade and Industry's "Focus" committee and results from extensive consultations with suppliers and users. Its purpose is to support the development and use of OSI-based information technology products but not to direct or determine them. The United Kingdom is presently spending some £50 million per year in applying this intercept strategy to promote the early development and implementation of OSI services and protocols. This includes the direct funding by the government of up to 50 per cent of costs to national industries engaged in the development of OSI products and services, as well as extensive funding of OSI standardization activities.

In October 1984, the United Kingdom's Treasury's Central Computer and Telecommunications Agency (CCTA) issued a Statement of Intent on support of standards for OSI. The statement was intended to inform suppliers of Information Technology (IT) systems "that central government departments are moving increasingly to the use of OSI standards." The statement reflects "the belief that this is the most effective way of ensuring the widest possible choice of products and suppliers, while at the same time ensuring that the government departments are able to achieve their overall aim of using Information Technology effectively and efficiently and securing the best long-term value for money." By early 1986, the CCTA expects that it will become mandatory in the vast majority of the Operation Requirements (ORs) of the government departments, for suppliers to have implemented existing OSI standards, and to provide implementation to progressively higher levels of the ISO model as they are fully defined. Certification by national and international product validation schemes is expected to play a key part in the United Kingdom's government acceptance procedures.

In the Federal Republic of Germany, the concept of High-Level Communication Protocol standards has been adopted as an interim solution for Layers 4, 5 and 6 of the Reference Model. By the end of 1984, some 2000 computers were to have been connected to this system. In the Federal Republic of Germany the transition from the interim solution to the definitive standard solution is to be made in one step. The concept for the transition to the standard solution is being developed in close co-operation involving users, standardization bodies, the Deutsche Bundespost, the research centres, data processing manufacturers and associations.

The National Bureau of Standards (NBS) of the United States is very active in the implementation of OSI protocols as well as developing protocol measurement and testing procedures. With regard to this latter initiative, the NBS is holding co-operative research activities with France, the United Kingdom and the Federal Republic of Germany, all of whom are committed to the establishment of national protocol testing and assessment facilities. An important aim of the NBS in establishing a protocol testing laboratory is to make these tools available to interested parties free of charge, thereby encouraging organizations to use these tools and adopt similar, and preferably identical, testing approaches.

Furthermore, 12 leading information technology manufacturers in Europe - AEG, BULL, CGE, ICL, NIXDORF, GEC, OLIVETTI, PHILIPS, PLESSEY, SIEMENS, STET and THOMPSON - have jointly proposed to the European Commission a program for the implementation of OSI standards from 1985 onwards. The proposal is by the ESPRIT Industry Group to the Commission of the European Economic Community, for establishing a European Information Technology Standards policy. ESPRIT stands for "European Strategic Programme for Research and Development in Information Technology."

The 12 companies have expressed their common agreement to a selection of appropriate OSI standards. They have committed themselves to the implementation of the selected standards in their products beginning in 1985 and they intend to provide a full catalogue of competitive interworking products. This selection will be based on CCITT, ISO or European Computer Manufacturers Association (ECMA) OSI standards.

The objectives and commitment in terms of financial and human resources being allocated towards OSI development and implementation by these other countries is impressive. As a result the Department is examining the need and appropriateness of what corresponding activities should be pursued in Canada in this regard. An outline of Canadian activities initiated to date is described in the following section.

4.0 NATIONAL OSI ACTIVITIES

4.1 Standardization Activities

Canada continues to maintain a high level of interest and participation in the study efforts taking place in the CCITT and ISO to complete the standards for the upper layers of the Reference Model.

At the national level, procedures are underway to adopt as a Canadian standard, the Reference Model for OSI based on the ISO International Standard 7498 and CCITT Recommendation X.200.

Furthermore, a national working group has recently been established to provide Canadian contributions to the work of Working Group 4 of ISO TC68/SC5 - OSI Application in Banking.

In addition, the National Library of Canada is currently proposing that appropriate mechanisms and procedures take place so that OSI Application Layer protocols for bibliographic and other library applications can be introduced as Canadian national standards, through the establishment of a national Technical Committee under the auspices of the Canadian Standards Association.

4.2 OSI Activities in the Department of Communications

In addition to the policy-oriented interest and work in OSI, there is a very active OSI program being conducted in the Research Sector of the Department of Communications. The original research work began in 1979 in the Technology and Systems R&D group, concentrating on development of the Reference Model and the general structure of layer protocols. This has since expanded and is now carried on in two separate but complementary branches of the Research Sector as described in the following.

The Technology and Systems Branch continues its OSI work but with a particular focus on establishment and use of Formal Description Techniques (FDTs), and development of methodologies and testing tools for conformance testing of OSI specifications and implementations. This group has been particularly active in supporting the development of a Pascal-based FDT (Estelle) standard, and in promoting harmonization of FDT standardization efforts in ISO and CCITT. It has also completed implementation of Transport Classes 0, 2 and 4, as well as the Session prototol (Basic Activity Subset) with corresponding test suites. This group has also supported the development of a FDT compiler based on Estelle. Its present FDT program will support the development and stabilization of LOTOS, and the establishment of translation tools for semi-automatic implementation of protocols from LOTOS specifications.

The Technology and Systems group is also carrying out a program of work in OSI conformance testing and is active in the ISO and CCITT work to establish standard conformance testing methodologies and test suites. The work is carried on in collaboration with a number of other laboratories, both in Canada and internationally. This collaborative activity frequently encompasses other OSI related work such as implementation and testing of the Message Handling Systems (MHS) protocols and their adaptation to banking and bibliographic information interchange applications.

In early 1985, DOC opened an additional research facility, the Canadian Workplace Automation Research Centre (CWARC). Among the components of its comprehensive program is a well focused activity in OSI. In keeping with its strong industry support mandate, CWARC will provide to Canadian industry a focal point for OSI implementations-oriented activities. It is expected to provide a basic testing and assessment environment for OSI protocols, tools for implementation from FDT specifications, and test-bed facilities for interworking experiments. These will be available to industry users on a scheduled basis. Note that the CWARC program is not intended to fulfill a protocol validation or certification role, but rather to provide an aid to industry groups that wish to adopt or explore the OSI approach. The resultant synergism is expected to significantly accelerate widespread adoption and use of OSI in Canada. Of prime concern to the Department is whether conformance testing and/or certification is required and if so, how it should be structured and made available nationally. One aspect of the structure to be considered is whether the product of such a service or services would be a report or a certificate of conformance.

4.3 The National Library Network

The National Library of Canada was one of the first organizations to foresee the benefits of the OSI aproach to library systems interconnection, and to initiate a comprehensive program for the development of OSI Application Layer protocols required to support distributed library applications in a decentralized, nationwide, and open interworking environment. The Task Group on Computer/Communciation Protocols for Bibilographic Data Interchange was formed in late 1980 to advise the National Library on international developments and strategies pertinent to OSI in general and to library and information applications in particular. The task group's membership is broad and includes experts from the telecommunications, data processing, research, publishing and library applications sectors.

This program is now beginning to bear fruit in the form of several application protocols that are currently at various stages of implementation, testing and refinement, as described below:

- The File Transfer protocol allows users to transfer files between host systems. This protocol has been implemented by individual institutions on a variety of computers including IBM, CDC, Geac and Honeywell.

- The Interlibrary Loan protocol allows users to exchange messages such as inter-library loans, overdue notices, cancellations, recall notices, etc. Nine institutions are currently testing this protocol, which was implemented in prototype on stand-alone IBM PC workstations.

- The Acquisitions protocol allows libraries to submit purchase orders, return requests, claims etc., to vendors and to receive machine-readable invoices and status reports. A field trial of this protocol is scheduled tentatively for late 1985 or early 1986.

- With the Directory protocol, users will be able to determine what services are available from which organizations and under what conditions. A prototype implementation of this complex protocol is under development.

- The Search and Transfer protocol is an intersystem information query protocol which will complement file transfer by enabling users to transfer from source databases to applications such as inter-library loans, acquisitions and cataloguing.

These protocol specifications, representing as they do a substantial investment in effort and expense, are aimed at making interconnection and resource sharing feasible and attractive to all libraries - large and small. Their specification within the OSI framework ensures their usability wherever the OSI approach is followed. The objective is to adopt these specifications as Canadian national standards, with the possibility of submitting them to ISO TC 46 for acceptance as ISO standards.

However, these proposals are at a relatively early stage of their evolution. Before they achieve long-term stability a great deal of work will have to be done in refining, testing and validating them. Much of this work falls within the scope of the National Library's network development program.

4.4 OSI In Banking

In December 1983, a Task Force was established by the Canadian Advisory Committee on Banking Procedures (CAC/ISO/TC68) to assess the viability and suitability of OSI as a Reference Model for banking applications. The objective of this work was to compare ISO/TC97 and related communication standards to banking industry communication requirements and decide if, how, and when it should be endorsed by ISO TC68 as an architecture, to be used for formatting of banking messages.

The principal conclusions of this work completed in the fall of 1984, are that the existing ISO TC68 draft standards are basically compatible with OSI concepts, but require extension to more completely describe the communication environment for banking messages and that the top-down methodology used for the development of OSI standards can be successfully applied to the banking environment.

A second study is presently underway to select a standardized design methodology for the development of banking-specific OSI communications standards, including functional modeling and descriptive techniques for services, protocols and data syntax. This work is considered to be crucial, since it is felt that little understanding of how to develop OSI application layer protocols exists among the banking community. This effort will be based on research work done in Canada. It is expected that the functional modeling, service conventions, formal description techniques and conformance testing work being done in ISO SC21 will form the basis for the methodology for ISO TC68.

This work will form the basis for contributing to the orderly evolution of diverse, incompatible systems into an interconnected, national banking architecture. It will also help to promote the future interconnection of an Electronic Payments System with other national information systems as in the case of electronic home banking services being provided through, for example Telidon/Videotex technology.

5.0 NATIONAL OBJECTIVES

The Department believes that the quick and efficient exchange of information between computerized systems is becoming increasingly vital to Canada's industrial competitiveness and economic development. It regards the early development and adoption in Canada of OSI standards as being essential in ensuring that all required information interchange involving computerized systems of different type and manufacture can be achieved in an orderly and cost-effective manner.

It is essential, therefore, that OSI standards be developed and implemented so as to contribute to the following objectives:

- the interoperability of all computerized systems required to interwork, both within and between, like and unlike computer information systems. This would contribute to the full realization of national information systems such as the National Library Information Network, Telidon/Videotex and office communications systems, electronic payment, messaging and trade data interchange systems;

- efficient and effective information interchange with minimum need to resort to costly ad hoc means and procedures (black box and conversion programs) to effect this interchange;

- the competitiveness in both domestic and foreign markets of
  Canada's computer communications industry by providing a
  standardized framework for the development and application
  of compatible information system components. This would
  include the necessary OSI specifications for the cable and
  telecommunication carriers, terminal and mini-computer
  manufacturers, as well as software and information
  providers;

- equitability of access where economically and functionally
  possible to all information users, including access by the
  public to government information systems and services;

- provision of a basis for the future inter-networking between
  Canadian data networks for the linking of computerized
  systems served by these different networks.

6.0   CRITERIA FOR PUBLIC COMMENT

With the above objectives in mind, the Department is concerned
that there is a general lack of awareness and commitment in Canadian
manufacturers, information providers and users to the implementation of
compatible OSI products, systems and services.

In order to assess the level of this awareness and commitment,
to consider in more detail the implications and to plan future OSI
initiatives to ensure appropriate development and implementation of
Open Systems Interconnection to meet Canadian needs and objectives, the
Department invites suppliers of services of products which could or
will incorporate OSI standards, users of such services or products and
other interested parties to provide information and comments in
response to the following questions:

6.1   Potential Impact of OSI on Marketability
and Competitiveness

(a)   What impact will OSI implementation in Canada
      and in other countries have on the competitiveness of
      Canadian industry in general and your organization in
      particular, in the near term (0-5 years) and in the
      longer term (6-12 years)?

(b)   In your information systems planning and
      implementation with the Canadian telecommunications
      carriers, cable television suppliers of special
      services, information providers and users, to what
      degree are they planning to develop, implement and/or
      utilize OSI-based systems and services?

(c) Will the OSI-based interconnection of different information systems benefit Canada's information system/service providers? Will OSI contribute to more universal accessibility to and greater use of these information systems and services? If so, to what extent?

(d) What impact will OSI have on information users with regard to their choice of software and hardware supplier and the availability of and access to existing and new information databases?

6.2 Requirements for National OSI Standards

(a) Will the adoption of national OSI standards be essential or incidental to the widespread implementation of OSI in Canada?

(b) Are you aware of or do you or representatives from your organization participate in national OSI standards activities such as CNO/CCITT National Study Group VII, and Sub-Committees 6 and 21 of the Canadian Advisory Committee to ISO/TC97?

(c) Is there a need for establishing a national committee of senior level participants from government, suppliers and users to provide direction to support the development and use of OSI-based information technology products and services (similar to the United Kingdom's FOCUS committee)? If so, how should such a committee be structured, and what should be its mandate and the results of its work?

6.3 OSI Research, Development and Implementation

(a) In what areas of OSI research and development should greater effort be made in Canada to promote the general and particular interest of information system suppliers, and users?

(b) In which organization(s) (for example, private industry, user organizations, federal government etc.) should this R&D effort be initiated?

(c) What financial or other deterrents are there, if any, to the development and implementation of OSI in Canada? If so, what type of corrective measures should be considered and over what period of time?

(d) The British government has established a policy that gives preference to procurement of products conforming to standards for OSI. Should a similar position be adopted by the Canadian government in order to promote OSI development and implementation in Canada?

6.4 Need for OSI Testing and Assessment Facility

(a) Should a conformance testing service be established for OSI protocol implementations, including all seven layers? (This service would be aimed at testing for conformance in reference to national and/or international standards and reporting thereon. Note: this would not be a certification service. See 6.4 (d).)

(b) Would one or numerous testing facilities be the preferred institutional infrastructure to perform OSI conformance testing?

(c) Which existing organization(s) would be appropriate to provide a conformance testing service? What methods of cost recovery would be equitable and effective for such a conformance testing service?

(d) What requirements exist or will exist for a certification service in Canada for OSI-based products or services? How should such a service be structured and made available nationally? (Certification implies the issuance of a certificate of conformance by an accepted authoritative body.)

7.0 ADDITIONAL COMMENTS

Any other comments deemed pertinent to the development and implementation of OSI in Canada not covered by responses to the above questions would also be welcomed.

8.0 PROCEDURAL MATTERS

A period of 120 days will be allowed for the submission of comments on this discussion paper after the announcement of its availability in the Canada Gazette. In accordance with the normal practice of the Department, the submissions received will be available for inspection at the Department's five regional offices and in the departmental library in Ottawa.

Comments on this discussion paper should be addressed to the undersigned and received no later than March 15, 1986.

The Director General
Telecommunications Policy Branch
Department of Communications
300 Slater Street
Ottawa, Ontario
K1A OC8

Persons wishing further information regarding the discussion paper or OSI activity are invited to write to Mr. G. Dallaire, Manager Data Communications Policy, at the above address, or to call (613) 998-4494.

APPENDIX A

RELEVANT OSI STANDARDS

1. CCITT 1984 "Red Book" Recommendations:

    X.200 – Reference model of Open Systems Interconnection for CCITT Applications

    X.210 – OSI Layer service definition conventions

    X.213 – Network service definition for Open Systems Interconnection for CCITT applications

    X.214 – Transport service definition for Open Systems Interconnection for CCITT applications

    X.215 – Session service definition for Open Systems Interconnection for CCITT applications

    X.224 – Transport protocol specification for Open Systems Interconnection for CCITT applications

    X.225 – Session protocol specification for Open Systems Interconnection for CCITT applications

2. ISO International Standard 7498 – Information processing systems – Open Systems Interconnection – Basic Reference Model.

APPENDIX B

LIST OF ABBREVATIONS

ADI   — Agence de l'informatique

BNI   — Bureau d'orientation de la normalisation
          en informatique

CCITT   — International Telegraph and Telephone
          Consultative Committee

CCTA   — Central Computer and Telecommunications Agency

CWARC   — Canadian Workplace Automation Research Centre

ECMA   — European Computer Manufacturers Association

EEC   — European Economic Community

ESPRIT — European Strategic Programme for Research
          and Development in Information Technology

FDT   — Formal Description Technique

ISO   — International Organization for Standardization

IT   — Information Technology

ITU   — International Telecommunications Union

NBS   — National Bureau of Standards

OSI   — Open Systems Interconnection