Recommendation of the Council concerning Guidelines for Cryptography Policy

OECD Legal Instruments

BETTER POLICIES FOR BETTER LIVES

This document is published under the responsibility of the Secretary-General of the OECD. It reproduces an OECD Legal Instrument and may contain additional material. The opinions expressed and arguments employed in the additional material do not necessarily reflect the official views of OECD Member countries.

This document, as well as any data and any map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

For access to the official and up-to-date texts of OECD Legal Instruments, as well as other related information, please consult the Compendium of OECD Legal Instruments at http://legalinstruments.oecd.org.

Please cite this document as:
OECD, *Recommendation of the Council concerning Guidelines for Cryptography Policy*, OECD/LEGAL/0289

Series: OECD Legal Instruments

Photo credit: © Adobe Stock/Cousin_Avi

Background Information

The Recommendation concerning Guidelines for Cryptography Policy was adopted by the OECD Council on 27 March 1997 on the proposal of the Committee for Information, Computer and Communications Policy (now called Digital Policy Committee, DPC). It provides high-level policy principles to promote the use of cryptography to foster confidence in the global digital environment without unduly jeopardising public safety, law enforcement and national security.

The need for a standard on cryptography policy

Cryptography is a discipline that embodies principles, means, and methods for the transformation of data in order to hide its information content, establish its authenticity, prevent its undetected modification, prevent its repudiation, and/or prevent its unauthorised use. It is one of the technological means to provide security for data on information and communications systems as well as trust in economic and social activities that rely on such data.

Cryptography can be used to protect the confidentiality of data, such as financial or personal data, whether that data is in storage or in transit. Cryptography can also be used to verify the integrity of data by revealing whether data has been altered and identifying the person or device that sent it. These techniques are critical to the development and use of digital technologies for economic and social purposes.

In the 1990s, OECD Members undertook to develop and implement policies and laws relating to cryptography; in many countries these were still in the process of being developed in 1997. Considering that disparities in policy could create obstacles to the evolution of national and global digital networks and hinder the development of international trade, OECD Members recognised the need for an internationally co-ordinated approach to facilitate the smooth development of an efficient and secure information infrastructure.

The OECD is playing a key role in this regard by developing consensus about specific policy and regulatory issues relating to digital networks and technologies, including cryptography issues.

Process for developing the Recommendation

In early 1996, the OECD initiated a project on cryptography policy by forming the ad hoc Group of Experts on Cryptography Policy Guidelines (‘‘ad hoc Group’’) under the auspices of the Committee for Information, Computer and Communications Policy, today called the DPC.

The ad hoc Group, under the chairmanship of Mr. Norman Reaburn of the Attorney-General’s Department of Australia, was charged with drafting guidelines for cryptography policy to identify the issues which should be taken into consideration in the formulation of cryptography policies at the national and international level. The ad hoc Group had a one-year timeline to accomplish this task and it completed its work in December 1996. Thereafter, the draft Guidelines for Cryptography Policy (“Guidelines”) were embodied in the Recommendation as adopted by the OECD Council on 27 March 1997.

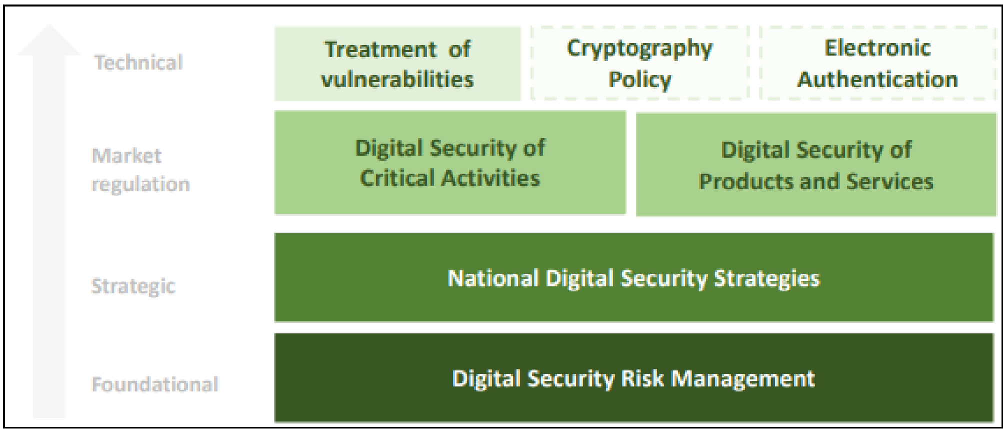
Scope of the Recommendation

The Guidelines in the Annex to the Recommendation, which is an integral part hereof, are broad in nature and reflect the diversity of views among Adherents. They are intended to promote the use of cryptography to foster confidence in digital technologies and in the manner in which they are used, without unduly jeopardising public safety, law enforcement, and national security.

They also aim to raise awareness of the need for compatible cryptography policies and laws; to promote co-operation between the public and private sectors in the development and implementation of national and international cryptography policies, methods, measures, practices and procedures; to facilitate international trade by promoting cost-effective, interoperable, portable and mobile cryptographic systems; and to promote international co-operation among governments, business and research communities, and standards-making bodies in achieving co-ordinated use of cryptographic methods.

OECD Policy Framework on Digital Security

The Framework has been developed by the OECD Secretariat with the aim of bringing together in a coherent narrative the various aspects covered in digital security Recommendations.


Technical
Market regulation
Strategic
Foundational
Treatment of vulnerabilities
Cryptography Policy
Electronic Authentication
Digital Security of Critical Activities
Digital Security of Products and Services
National Digital Security Strategies
Digital Security Risk Management

Note: Cryptography policy and Electronic authentication will be addressed in the next version of the Framework.
Source: OECD

The Framework primarily targets policy makers and is presented in a user-friendly format. It makes references to and introduces the digital security Recommendations. It also helps identify linkages with other OECD legal instruments such as the Recommendation concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data [OECD/LEGAL/0188], work carried out in DPC, other OECD committees, and beyond the OECD, as appropriate.

The Framework provides a modular approach that can scale with the potential future addition of digital security Recommendations, as appropriate, but may also be amended as necessary to ensure coherence with new developments.

Next steps

The DPC, through its Working Party on Digital Security, supports the implementation and dissemination of the Recommendation. A joint report to the Council on the implementation, dissemination and continued relevance of all digital security-related Recommendations (including this Recommendation) will be prepared in 2027.

For further information please consult: https://www.oecd.org/digital/digital-security/.
Contact information: digitalsecurity@oecd.org.

Implementation

Regular reviews of relevance of the Recommendation by the DPC

In adopting the Recommendation concerning Guidelines for Cryptography Policy, the OECD Council instructed the Digital Policy Committee (DPC) to review the Guidelines at least every five years with a view to improving international co-operation on issues relating to cryptography policy. Accordingly, for the first review in 2002, a questionnaire was circulated among the Adherents inquiring whether there were needs for modifications, additions or deletions of certain parts of the Guidelines. A similar questionnaire has been reused in the reviews of 2007, 2012 and 2017. All reviews done so far came to the overall conclusion that the existing Guidelines are adequate to address the issues and purpose for which they were formulated and that there was no need to revise them.

2024 review

In 2024, the WPDS carried out the review on the basis of a background report developed to provide up-to-date information about developments related to cryptography since 1997, in particular in relation to emerging technical trends such as homomorphic cryptography and quantum information technologies.

While some Adherents pointed out that technologies such as quantum information technologies and fully homomorphic encryption might have an impact on the Recommendation's relevance when they are more mature, they concluded that it would be premature at this stage to find that such technologies had altered the relevance of the Recommendation.

As a result, the review came to the same conclusion as previous reviews, namely that the Recommendation continued to be adequate to address the issues and purpose for which it was developed and that it did not need to be revised.

THE COUNCIL,

HAVING REGARD TO:

The Convention on the Organisation for Economic Co-operation and Development of 14 December 1960, in particular, Articles 1 b), 1 c), 3 a) and 5 b) thereof;

The Recommendation of the Council concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data of 23 September 1980 [C(80)58(Final)];

The Declaration on Transborder Data Flows adopted by the Governments of OECD Member countries on 11 April 1985 [Annex to C(85)139];

The Recommendation of the Council concerning Guidelines for the Security of Information Systems of 26-27 November 1992 [C(92)188/FINAL];

The Directive [95/46/EC] of the European Parliament and of the Council of the European Union of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data;

The Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Goods and Technologies agreed on 13 July 1996;

The Regulation [(EC) 3381/94] and the Decision [94/942/PESC] of the Council of the European Union of 19 December 1994 concerning the control of the export of dual-use goods;

The Recommendation [R(95)13] of the Council of Europe of 11 September 1995 Concerning Problems of Criminal Procedural Law Connected with Information Technology;

CONSIDERING:

That national and global information infrastructures are developing rapidly to provide a seamless network for world-wide communications and access to data;

That this emerging information and communications network is likely to have an important impact on economic development and world trade;

That the users of information technology must have trust in the security of information and communications infrastructures, networks and systems; in the confidentiality, integrity, and availability of data on them; and in the ability to prove the origin and receipt of data;

That data is increasingly vulnerable to sophisticated threats to its security, and ensuring the security of data through legal, procedural and technical means is fundamentally important in order for national and international information infrastructures to reach their full potential;

RECOGNISING:

That, as cryptography can be an effective tool for the secure use of information technology by ensuring confidentiality, integrity and availability of data and by providing authentication and non-repudiation mechanisms for that data, it is an important component of secure information and communications networks and systems;

That cryptography has a variety of applications related to the protection of privacy, intellectual property, business and financial information, public safety and national security, and the operation of electronic commerce, including secure anonymous payments and transactions;

That the failure to utilise cryptographic methods can adversely affect the protection of privacy, intellectual property, business and financial information, public safety and national security and the operation of electronic commerce because data and communications may be inadequately protected from unauthorised access, alteration, and improper use, and, therefore, users may not trust information and communications systems, networks and infrastructures;

That the use of cryptography to ensure integrity of data, including authentication and non-repudiation mechanisms, is distinct from its use to ensure confidentiality of data, and that each of these uses presents different issues;

That the quality of information protection afforded by cryptography depends not only on the selected technical means, but also on good managerial, organisational and operational procedures;

AND FURTHER RECOGNISING:

That governments have wide-ranging responsibilities, several of which are specifically implicated in the use of cryptography, including protection of privacy and facilitating information and communications systems security; encouraging economic well-being by, in part, promoting commerce; maintaining public safety; and enabling the enforcement of laws and the protection of national security;

That although there are legitimate governmental, commercial and individual needs and uses for cryptography, it may also be used by individuals or entities for illegal activities, which can affect public safety, national security, the enforcement of laws, business interests, consumer interests or privacy; therefore governments, together with industry and the general public, are challenged to develop balanced policies;

That due to the inherently global nature of information and communications networks, implementation of incompatible national policies will not meet the needs of individuals, business and governments and may create obstacles to economic co-operation and development; and, therefore, national policies may require international co-ordination;

That this Recommendation of the Council does not affect the sovereign rights of national governments and that the Guidelines contained in the Annex to this Recommendation are always subject to the requirements of national law;

On the proposal of the Committee for Information, Computer and Communications Policy;

RECOMMENDS that Member countries:

1. Establish new, or amend existing, policies, methods, measures, practices and procedures to reflect and take into account the Principles concerning cryptography policy set forth in the Guidelines contained in the Annex to this Recommendation (hereinafter ''the Guidelines''), which is an integral part hereof; in so doing, also take into account the Recommendation of the Council concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data of 23 September 1980 [C(80)58(Final)] and the Recommendation of the Council concerning Guidelines for the Security of Information Systems of 26-27 November 1992 [C(92)188/FINAL];

2. Consult, co-ordinate and co-operate at the national and international level in the implementation of the Guidelines;

3. Act on the need for practical and operational solutions in the area of international cryptography policy by using the Guidelines as a basis for agreements on specific issues related to international cryptography policy;

4. Disseminate the Guidelines throughout the public and private sectors to promote awareness of the issues and policies related to cryptography;

5. Remove, or avoid creating in the name of cryptography policy, unjustified obstacles to international trade and the development of information and communications networks;

6. State clearly and make publicly available, any national controls imposed by governments relating to the use of cryptography;

7. Review the Guidelines at least every five years, with a view to improving international co-operation on issues relating to cryptography policy.

ANNEX

GUIDELINES FOR CRYPTOGRAPHY POLICY

I. Aims

The Guidelines are intended:

- To promote the use of cryptography:
  - To foster confidence in information and communications infrastructures, networks and systems and the manner in which they are used;
  - To help ensure the security of data, and to protect privacy, in national and global information and communications infrastructures, networks and systems;
- To promote this use of cryptography without unduly jeopardising public safety, law enforcement, and national security;
- To raise awareness of the need for compatible cryptography policies and laws, as well as the need for interoperable, portable and mobile cryptographic methods in national and global information and communications networks;
- To assist decision-makers in the public and private sectors in developing and implementing coherent national and international policies, methods, measures, practices and procedures for the effective use of cryptography;
- To promote co-operation between the public and private sectors in the development and implementation of national and international cryptography policies, methods, measures, practices and procedures;
- To facilitate international trade by promoting cost-effective, interoperable, portable and mobile cryptographic systems;
- To promote international co-operation among governments, business and research communities, and standards-making bodies in achieving co-ordinated use of cryptographic methods.

II. Scope

The Guidelines are primarily aimed at governments, in terms of the policy recommendations herein, but with anticipation that they will be widely read and followed by both the private and public sectors.

It is recognised that governments have separable and distinct responsibilities for the protection of information which requires security in the national interest; the Guidelines are not intended for application in these matters.

III. Definitions

For the purposes of the Guidelines:

"Authentication" means a function for establishing the validity of a claimed identity of a user, device or another entity in an information or communications system.

"Availability" of data, information, and information and communications systems means that they are accessible and usable on a timely basis in the required manner.

"Confidentiality" of data or information means that it is not made available or disclosed to unauthorised individuals, entities, or processes.

"Cryptography" means the discipline which embodies principles, means, and methods for the transformation of data in order to hide its information content, establish its authenticity, prevent its undetected modification, prevent its repudiation, and/or prevent its unauthorised use.

"Cryptographic key" means a parameter used with a cryptographic algorithm to transform, validate, authenticate, encrypt or decrypt data.

"Cryptographic methods" means cryptographic techniques, services, systems, products and key management systems.

"Data" means the representation of information in a manner suitable for communication, interpretation, storage, or processing.

"Decryption" means the inverse function of encryption.

"Encryption" means the transformation of data by the use of cryptography to produce unintelligible data (encrypted data) to ensure its confidentiality.

"Integrity" of data or information means that it has not been modified or altered in an unauthorised manner.

"Interoperability" of cryptographic methods means the technical ability of multiple cryptographic methods to function together.

"Key management system" means a system for generation, storage, distribution, revocation, deletion, archiving, certification or application of cryptographic keys.

"Keyholder" means an individual or entity in possession or control of cryptographic keys. A keyholder is not necessarily a user of the key.

"Law enforcement" or "enforcement of laws" refers to the enforcement of all laws, without regard to subject matter.

"Lawful access" means access by third party individuals or entities, including governments, to plaintext, or cryptographic keys, of encrypted data, in accordance with law.

"Mobility" of cryptographic methods only means the technical ability to function in multiple countries or information and communications infrastructures.

"Non-repudiation" means a property achieved through cryptographic methods, which prevents an individual or entity from denying having performed a particular action related to data [such as mechanisms for non-rejection of authority (origin); for proof of obligation, intent, or commitment; or for proof of ownership].

"Personal data" means any information relating to an identified or identifiable individual.

"Plaintext" means intelligible data.

"Portability" of cryptographic methods means the technical ability to be adapted and function in multiple systems.

IV. Integration

The principles in Section V of this Annex, each of which addresses an important policy concern, are interdependent and should be implemented as a whole so as to balance the various interests at stake. No principle should be implemented in isolation from the rest.

V. Principles

1. Trust in Cryptographic Methods

Cryptographic methods should be trustworthy in order to generate confidence in the use of information and communications systems.

Market forces should serve to build trust in reliable systems, and government regulation, licensing, and use of cryptographic methods may also encourage user trust. Evaluation of cryptographic methods, especially against market-accepted criteria, could also generate user trust.

In the interests of user trust, a contract dealing with the use of a key management system should indicate the jurisdiction whose laws apply to that system.

2. Choice of Cryptographic Methods

Users should have a right to choose any cryptographic method, subject to applicable law.

Users should have access to cryptography that meets their needs, so that they can trust in the security of information and communications systems, and the confidentiality and integrity of data on those systems. Individuals or entities who own, control, access, use or store data may have a responsibility to protect the confidentiality and integrity of such data, and may therefore be responsible for using appropriate cryptographic methods. It is expected that a variety of cryptographic methods may be needed to fulfil different data security requirements. Users of cryptography should be free, subject to applicable law, to determine the type and level of data security needed, and to select and implement appropriate cryptographic methods, including a key management system that suits their needs.

In order to protect an identified public interest, such as the protection of personal data or electronic commerce, governments may implement policies requiring cryptographic methods to achieve a sufficient level of protection.

Government controls on cryptographic methods should be no more than are essential to the discharge of government responsibilities and should respect user choice to the greatest extent possible. This principle should not be interpreted as implying that governments should initiate legislation which limits user choice.

3. Market Driven Development of Cryptographic Methods

Cryptographic methods should be developed in response to the needs, demands and responsibilities of individuals, businesses and governments.

The development and provision of cryptographic methods should be determined by the market in an open and competitive environment. Such an approach would best ensure that solutions keep pace with changing technology, the demands of users and evolving threats to information and communications systems security. The development of international technical standards, criteria and protocols related to cryptographic methods should also be market driven. Governments should encourage and co-operate with business and the research community in the development of cryptographic methods.

4. Standards for Cryptographic Methods

Technical standards, criteria and protocols for cryptographic methods should be developed and promulgated at the national and international level.

In response to the needs of the market, internationally-recognised standards-making bodies, governments, business and other relevant experts should share information and collaborate to develop and promulgate interoperable technical standards, criteria and protocols for cryptographic methods. National standards for cryptographic methods, if any, should be consistent with international standards to facilitate global interoperability, portability and mobility. Mechanisms to evaluate conformity to such technical standards, criteria and protocols for interoperability, portability and mobility of cryptographic methods should be developed. To the extent that testing of conformity to, or evaluation of, standards may occur, the broad acceptance of such results should be encouraged.

5. Protection of Privacy and Personal Data

The fundamental rights of individuals to privacy, including secrecy of communications and protection of personal data, should be respected in national cryptography policies and in the implementation and use of cryptographic methods.

Cryptographic methods can be a valuable tool for the protection of privacy, including both the confidentiality of data and communications and the protection of the identity of individuals. Cryptographic methods also offer new opportunities to minimise the collection of personal data, by enabling secure but anonymous payments, transactions and interactions. At the same time, cryptographic methods to ensure the integrity of data in electronic transactions raise privacy implications. These implications, which include the collection of personal data and the creation of systems for personal identification, should be considered and explained, and, where appropriate, privacy safeguards should be established.

The OECD Guidelines for the Protection of Privacy and Transborder Flows of Personal Data provide general guidance concerning the collection and management of personal information, and should be applied in concert with relevant national law when implementing cryptographic methods.

6. Lawful Access

National cryptography policies may allow lawful access to plaintext, or cryptographic keys, of encrypted data. These policies must respect the other principles contained in the guidelines to the greatest extent possible.

If considering policies on cryptographic methods that provide for lawful access, governments should carefully weigh the benefits, including the benefits for public safety, law enforcement and national security, as well as the risks of misuse, the additional expense of any supporting infrastructure, the prospects of technical failure, and other costs. This principle should not be interpreted as implying that governments should, or should not, initiate legislation that would allow lawful access.

Where access to the plaintext, or cryptographic keys, of encrypted data is requested under lawful process, the individual or entity requesting access must have a legal right to possession of the plaintext, and once obtained the data must only be used for lawful purposes. The process through which lawful access is obtained should be recorded, so that the disclosure of the cryptographic keys or the data can be audited or reviewed in accordance with national law. Where lawful access is requested and obtained, such access should be granted within designated time limits appropriate to the circumstances. The conditions of lawful access should be stated clearly and published in a way that they are easily available to users, keyholders and providers of cryptographic methods.

Key management systems could provide a basis for a possible solution which could balance the interest of users and law enforcement authorities; these techniques could also be used to recover data, when keys are lost. Processes for lawful access to cryptographic keys must recognise the distinction between keys which are used to protect confidentiality and keys which are used for other purposes only. A cryptographic key that provides for identity or integrity only (as distinct from a cryptographic key that verifies identity or integrity only) should not be made available without the consent of the individual or entity in lawful possession of that key.

7. Liability

Whether established by contract or legislation, the liability of individuals and entities that offer cryptographic services or hold or access cryptographic keys should be clearly stated.

The liability of any individual or entity, including a government entity, that offers cryptographic services or holds or has access to cryptographic keys, should be made clear by contract or where appropriate by national legislation or international agreement. The liability of users for misuse of their own keys should also be made clear. A keyholder should not be held liable for providing cryptographic keys or plaintext of encrypted data in accordance with lawful access. The party that obtains lawful access should be liable for misuse of cryptographic keys or plaintext that it has obtained.

8. International Co-operation

Governments should co-operate to co-ordinate cryptography policies. As part of this effort, governments should remove, or avoid creating in the name of cryptography policy, unjustified obstacles to trade.

In order to promote the broad international acceptance of cryptography and enable the full potential of the national and global information and communications networks, cryptography policies adopted by a country should be co-ordinated as much as possible with similar policies of other countries. To that end, the Guidelines should be used for national policy formulation.

If developed, national key management systems must, where appropriate, allow for international use of cryptography.

Lawful access across national borders may be achieved through bilateral and multilateral co-operation and agreement.

No government should impede the free flow of encrypted data passing through its jurisdiction merely on the basis of cryptography policy.

In order to promote international trade, governments should avoid developing cryptography policies and practices which create unjustified obstacles to global electronic commerce. Governments should avoid creating unjustified obstacles to international availability of cryptographic methods.

Related documents

REPORT ON BACKGROUND AND ISSUES OF CRYPTOGRAPHY POLICY[1]

The Secretariat has prepared this ***Report*** *on Background and Issues of Cryptography Policy to explain the context for the* ***Guidelines*** *for Cryptography Policy and the basic issues involved in the cryptography policy debate. The Report explains the need for international action and summarises related work carried out so far by the OECD and certain other organisations. The Report is an information document intended to assist public discussion of the Guidelines, as opposed to influencing the interpretation of the Guidelines. While it provides more detail on the breadth of the issues covered in the Guidelines,* ***the Report does not vary the meaning of the Guidelines and must not be used as an interpretative guide****. The Report has been drafted by the Secretariat, which has benefited from discussions with a number of national experts. However, the Report was only discussed very briefly during the meetings of the Ad hoc Group.*

I. GENERAL BACKGROUND

Transition to Electronic Transactions

Information is becoming more valuable, and the production, distribution and use of information is an increasingly important economic activity. Information is often exchanged as a commodity and may be protected by intellectual property law. Information producers seek access to distribution channels while consumers demand access to a broad range of information sources. Furthermore, the free flow of information is a fundamental element of democracy.

Traditional telephone, broadcast and cable television, and radio systems have long used electronic means to distribute information in analogue form; however, the shift to digital technology is revolutionising the way that information is created and handled. Digital computer processing and network technologies are replacing traditional methods for producing, storing, transmitting and disseminating information. Combining different kinds of information representations -- such as text, audio, images and video -- is easy with digital technology, and the distinctions between different types of information production and distribution are becoming less clear. Furthermore, emerging information and communications networks and technologies are changing the way people communicate and do business, and they have a widespread impact on the public and private sectors, necessitating changes in a variety of basic commercial, legal and other structures.

The convergence of previously separate information and communications systems into a global network of networks is creating mechanisms for new ways of conducting transactions and will soon allow virtually unlimited access to information, education and entertainment resources. This access brings with it new intellectual property issues that are peculiar to the emerging medium. While open information and communications networks make electronic transmission of all kinds of digitised data fast, cheap and simple, the ability to make and distribute perfect copies of all kinds of data creates a number of challenges for the protection of intellectual property. Trade in creative content can provide economic incentives to fuel the development of information and communications technologies, and intellectual property protection is essential to stimulate the production of, and trade in, high-quality content.

[1] This report was made public in 1997 and has not been updated since then. The opinions expressed and arguments employed in this report do not necessarily reflect the official views of OECD Members.

Electronic commerce offers great opportunities for the business community and consumers, however it also brings with it some significant risks. The explosive world-wide growth of open networks has raised a legitimate concern with respect to the adequacy of security and privacy measures for information and communications systems and the data which is transmitted and stored on those systems. The developing information infrastructure is a fertile environment for all kinds of computer-related crime, including fraud and privacy infringement, and electronic business will not advance until effective data security measures are adopted and trusted by users and consumers. Both technical and legal solutions are required to replace in the electronic world the physical security of the paper-based world. It is important that solutions are trustworthy and that consumers have confidence in them.

II. SECURITY OF INFORMATION SYSTEMS AND CRYPTOGRAPHY

The importance of information and communications systems for society and the global economy is intensifying with the increasing value and quantity of data that is transmitted and stored on those systems. At the same time those systems and data are also increasingly vulnerable to a variety of threats, such as unauthorised access and use, misappropriation, alteration, and destruction. Proliferation of computers, increased computing power, interconnectivity, decentralisation, growth of networks and the number of users, as well as the convergence of information and communications technologies, while enhancing the utility of these systems, also increase system vulnerability.

Security of information and communications systems involves the protection of the availability, confidentiality and integrity of those systems and the data that is transmitted and stored on them. Availability is the property that data, information, and information and communications systems are accessible and useable on a timely basis in the required manner. Confidentiality is the property that data or information is not made available or disclosed to unauthorised persons, entities and processes. Integrity is the property that data or information has not been modified or altered in an unauthorised manner. The relative priority and significance of availability, confidentiality and integrity vary according to the information or communication systems and the ways in which those systems are used. The quality of security for information and communication systems and the data that is stored and transmitted on them depends not only on the technical measures, including the use of both hardware and software tools, but also on good managerial, organisational and operational procedures.

Cryptography is an important component of secure information and communications systems and a variety of applications have been developed that incorporate cryptographic methods to provide data security. Cryptography is an effective tool for ensuring both the confidentiality and the integrity of data, and each of these uses offers certain benefits. However, the widespread use of cryptography raises a number of important issues. Governments have wide-ranging responsibilities, several of which are specifically implicated in the use of cryptography, including protecting the privacy rights of their citizens; facilitating information and communications systems security; encouraging economic well-being by, in part, promoting electronic commerce; maintaining public safety; raising revenues to finance their activities; and enabling the enforcement of laws and the protection of national security. Although there are legitimate governmental, commercial and individual needs and uses for cryptography, it may also be used by individuals or entities for illegal activities, which can affect public safety, national security, the enforcement of laws, business interests, consumer interests or privacy. Governments, together with industry and the general public, are challenged to develop balanced policies to address these issues.

The diverse interests which can be affected by the use of, or the failure to use, cryptography make the development of balanced cryptography policy both complex and critical. Traditionally, cryptography was most often used only by governments. However in recent years -- as cryptography has become more accessible and affordable, and as users have become more aware of the benefits of using it and the risks of failing to do so -- cryptography has also come to be used as a matter of course by individuals and businesses for a variety of purposes. The increasing availability of cryptography to the general public has fuelled the current debate on these issues.

Secret Key Cryptography

Historically, cryptography has been used to encode information to conceal secret messages from unauthorised parties and, as such, it is important for military and national security use. Cryptography uses an algorithm to transform data in order to render it unintelligible to anyone who does not possess certain secret information (the cryptographic "key") necessary for decryption of the data. Today, the increased calculation power arising from the development of digital computing makes it possible to use complex mathematical algorithms for encryption of data.

The development of information and communications technologies that allow vast quantities of data to be transmitted, copied and stored quickly and easily has prompted a growing concern for the protection of privacy and the confidentiality of data, including personal data, government administrative records, and business and financial information. Effective cryptography is an essential tool in a network environment for addressing these concerns. It is also used to protect classified government information.

Public Key Cryptography

In the mid-1970's a new development in cryptography introduced the "public key" concept, which allows parties to exchange encrypted data without communicating a shared secret key in advance. Rather than sharing one secret key, this new design uses two mathematically related keys for each communicating party: a "public key" that is disclosed to the public, and a corresponding "private key" that is kept secret. A message that is encrypted with a public key can only be decrypted by the corresponding private key. In this way, a confidential communication encrypted with the recipient's public key and decrypted with the recipient's private key could only be understood by the recipient of the message. [2]

An important application for public key cryptography is "digital signature", which can be used to verify the integrity of data or the authenticity of the sender of data. In this case, the private key is used to "sign" a message, while the corresponding public key is used to verify a "signed" message. Public key cryptography offers the benefits of confidential transmissions and digital signature in an open network environment in which parties do not know one another in advance. This development allows for broader applications of cryptographic methods, and this -- together with increases in computer power and decreases in computer prices -- has moved cryptography into the private sector domain.

Public key cryptography plays an important role in developing information infrastructures. Much of the interest in information and communications networks and technologies centres on their potential to accommodate electronic commerce; however, open networks such as the Internet present significant challenges for making enforceable electronic contracts and secure payments. In connection with certifying the integrity of data, public key cryptography offers technological solutions for both of these problems by providing mechanisms for establishing the validity of a claimed identity of a user, device or another entity in an information system ("authentication") and for limiting the ability of an individual or entity to effectively deny having performed a particular action related to data ("non-repudiation").

Digital Signature

There is a tremendous potential for fraud in the electronic world. Transactions take place at a distance without the benefit of physical clues that permit identification, making impersonation easy. The ability to make perfect copies and undetectable alterations of digitised data complicates the matter. Traditionally hand-written signatures serve to determine the authenticity of an original document. In the electronic world, the concept of an "original" document is problematic, but a digital signature can verify data integrity, and provide authentication and non-repudiation functions to certify the sender of the data. If a document itself has been altered in any way after it has been "signed", the digital signature will so demonstrate. Similarly, once a document is "signed" with a cryptographic key, the digital signature provides proof that the document was "signed" by the purported author, and the sender cannot easily deny having sent the document or claim that the information has been altered during transmission.

[2] For a more detailed description of how public key cryptography works, see:

"Cryptography's Role in Securing the Information Society", Computer Science and Telecommunications Board, United States National Research Council, National Academy Press, Washington, DC, 1996.

"Cryptography FAQ: Public Key Cryptography"; Oxford University Libraries Automation Service, World Wide Web Server, www.lib.ox.ac.uk/internet/news/faq/archive/cryptography-faq.part06.html

"PUBLIC-KEY CRYPTOGRAPHY", United States National Institute of Standards and Technology's Computer Security Resource Clearinghouse, NIST Special Publication 800-2, http://csrc.ncsl.nist.gov/nistpubs/800-2.txt.

Cryptography can also provide technical solutions for the protection of intellectual property in digital form. For example, a digital signature together with a verifiable time-stamp can give authors some control over their work, by tying an electronic document to the issuer and ensuring that the document is not modified without detection. The same technology can be applied to ensuring the authenticity and integrity of documents archived electronically.

Electronic Payments

Secure payment systems are necessary in order for electronic commerce on open networks to flourish. One way to make electronic payments is to utilise a modified version of the existing credit card system. Cryptography can be used to protect the confidentiality of a message containing a credit card number and to confirm that the message was indeed sent by the cardholder. While this method is currently being used, it leaves the credit card number vulnerable to improper use after the message containing it has been decrypted. Another design involves verifiable security mechanisms for the transaction to occur electronically which are not simply based on the exchange of a credit card number -- such as independent confirmation by digital signature -- as well as an authorisation process that is not tied to any proprietary network so that purchases can be made on open networks.

Several schemes for other kinds of electronic payment systems are in various stages of development, including a number of different “digital money” systems. Digital money systems use cryptography to create a unique electronic representation that is redeemable for payment or which can constitute legal tender that is storable, transferable and unforgeable. Most of these systems operate much like credit cards, debit cards or checks, offering varying degrees of traceability and anonymity; others act more like “digital cash”, accommodating completely anonymous transactions like coins do. While the ability to conduct untraceable and anonymous electronic transactions offers particular advantages for the protection of privacy in the electronic environment, it also raises a number of concerns for governments -- particularly tax authorities -- in connection with tax collection and money laundering.

Certifying Public Key Relationships

Affirming the relationship between an individual or entity and its associated public key is important to guard against impersonation in an electronic environment. In order for public key systems to work in the public domain, not only must the public key be freely accessible, but also senders and receivers must have a reliable way of determining that public keys are truly the keys of those parties with whom they wish to interact. This can be accomplished directly if the parties know one another in advance, or alternatively a formal mechanism to “certify” keys could be established. With that in mind, two basic types of solutions have emerged: an informal “web of trust” arrangement based on pre-existing relationships between parties, and a more formalised approach based on “certificate authorities”. These methods of certifying public key relationships act much like the existing means for identifying parties for social and commercial interaction.

The informal web of trust operates when keys are validated from person to person or from organisation to organisation in the context of established relationships. In this way, confidence in the relationship between an individual or entity and its associated public key extends from parties which have a direct relationship to those which do not as credentials are established through many individual instances of trust. This method of certifying public keys is currently used mainly for exchange of encrypted data among personal acquaintances, but as electronic commerce develops this method may evolve into an important element of business relationships as well.

The other basic type of solution to address this problem is a public key infrastructure where certificate authorities authenticate public keys. A certificate authority is a “trusted” entity that provides information about the identity of a keyholder in the form of an authenticated “key certificate”. The certificate is used to verify the identity of the parties exchanging encrypted information over a network. Certificate authorities can also perform other functions, such as notary and time-stamp services. Certificate authorities can be established by either the public or private sector, and they may operate either “in-house” for an individual organisation or for the public at large.

Furthermore, the certificate authority itself must be reliable, so the certifier may need to be certified. This issue could be addressed by both a hierarchy of certificate authorities and a system of cross-certified certificate authorities. At the international level, independent international management frameworks for public key certification may be useful. The distinction between the web of trust and certificate authority methods becomes less clear when organisations which provide certificate functions cross-certify one another. Many studies have shown that the full potential of electronic commerce will not be realised until public key infrastructures emerge which generate sufficient trust for businesses and individuals to commit their information and transactions to the emerging public networks. Few jurisdictions have adopted specific legislation for certificate infrastructures at present; however, a number of Member countries are looking at this issue and considering regulation and licensing procedures for certificate authorities.

III. SPECIAL ISSUES FOR CONSIDERATION WITH CRYPTOGRAPHY POLICY

User Trust

Increasingly, individuals, enterprises and governments are affected by electronic information and communications systems, and there is an increasing dependence on their uninterrupted proper functioning. Concomitant with this is a mounting need for confidence that these systems will continue to be reliable and secure, particularly as electronic commerce and electronic payment systems develop. Lack of security or lack of confidence in the security of these systems may hinder the development and use of new information and communication technologies.

Just as in the real world -- where credit cards are forged, and cash is stolen -- the “virtual world” will never be completely secure. While security methods and services should be trustworthy so that the users of information and communications systems can have confidence in them, ultimately, electronic transactions will involve a calculated risk. Consumers will embrace electronic commerce when its value is greater than the perceived risks. The question then becomes not are transactions absolutely secure, but are they sufficiently secure for consumer transactions? There is a need to build consumer confidence in data security mechanisms, like cryptography, so that they will be widely used for electronic commerce.

Uncertainties may be met and confidence fostered by building consensus about use of information and communications systems. The challenge is threefold: developing and implementing the technology; planning for avoiding and meeting the failures of the technology; and gaining public support and approval of use of the technology. Public education on the issues and technologies, including a full discussion of cryptography in the context of electronic commerce, could help raise consumer confidence. In that context, it is also important for users to understand the legal framework which governs their use of cryptography, particularly in light of the “borderless” nature of information and communications networks.

User Choice

Solutions to protect against the diverse threats to information and communications systems and the data that is stored and transmitted on them can take a number of different forms. There is considerable choice of cryptographic methods available to meet a wide variety of user requirements for systems and data security, including both hardware and software solutions, which can stand alone or be integrated into related products, and which can offer a certain level of strength and complexity depending on the algorithm and the product. Cryptographic methods can be designed to provide any combination of mechanisms to achieve confidentiality, authentication or non-repudiation and ensure data integrity. Users will choose different kinds of cryptographic methods for different purposes and to fulfil different data and systems security requirements. Furthermore, where systems for management of keys are developed, they too will offer a variety of functions for users to choose from.

Some governments have implemented regulations -- and others may do so in the future -- on the use of cryptography, including export controls, rules concerning key management systems, or requirements for minimum levels of protection for certain kinds of data. These regulations may have an impact on the kinds of cryptographic methods which are available for users to choose from. However, it is commonly agreed that, within these limitations, it is important for a wide variety of cryptographic methods to be available to meet the diverse needs for data and systems security. Broad options for choice of cryptographic methods will encourage the development of a wide range of products.

Market-Driven Development

Because the private sector is a critical partner in the development of the information infrastructure -- and primarily responsible for its construction -- most experts agree that industry should develop products and determine standards based upon market needs. Although it is recognised that governments may influence product development by expressing, like any user, the need for a certain type of product, some believe governments should be careful not to drive markets in a particular direction. Others believe that governments ought to guide the market to meet their responsibilities for protecting public safety and privacy. Nevertheless, governments are also aware that if the requirements they impose on the use of cryptography are too burdensome, users of information and communications systems will not use cryptography and industry will not develop products that incorporate cryptographic techniques.

Standardisation

Standardisation is an important ingredient of security mechanisms. In the rapid-paced development of the information infrastructure, standards for security mechanisms, including cryptographic methods, emerge quickly, whether they be de-facto, through market dominance, or through national or international standards-setting bodies. It is important for governments and industry to work together to provide the necessary architecture and standards so that information and communications systems can reach their full potential. A common description of an effective standards-setting process is one that is industry-led, voluntary, consensus-based and international.

For cryptography to function effectively as a security measure for information and communications systems, networks and infrastructures, it is important that cryptographic methods be interoperable, mobile and portable at the global level. Interoperability means the technical ability of multiple cryptographic methods to function together. Mobility means the technical ability of cryptographic methods to function in multiple information and communications infrastructures. Portability means the technical ability of cryptographic methods to be adapted and function in multiple systems. National and international standards for cryptographic methods can help to facilitate the development of these technical abilities.

Protection of Privacy

The respect of privacy and the confidentiality of personal information are important values in a democratic society. However, privacy is now at greater risk because in the emerging information and communications infrastructure neither open networks, nor many types of private networks, were designed with confidentiality of communications and storage of data in mind. However, cryptography forms the basis for a new generation of privacy enhancing technologies. The use of effective cryptography in a network environment can help protect the privacy of personal information and the secrecy of confidential information. The failure to use cryptography in an environment where data is not completely secure can put a number of interests at risk, including public safety and national security. In some cases, such as where national law calls for maintaining the confidentiality of data, or protecting critical infrastructures, governments may require the use of cryptography of a minimum strength.

At the same time, the use of cryptography to ensure the integrity of data in electronic transactions can also have implications for privacy. The use of networks for all kinds of transactions will increasingly generate vast quantities of data that can be easily and cheaply stored, analysed, and reused. When these operations require proof of identity, the transactional data will leave detailed and perhaps irrefutable trails of an individual’s commercial activity, as well as paint a picture of private, non-commercial activities such as political associations, participation in online discussions, and access to specific types of information in online libraries or other databases. The key certification process also has implications for privacy because data can be collected when a certification authority binds an individual to a key pair.

Lawful Access

A critical issue presented by cryptography -- perhaps the most widely debated aspect of cryptography and the one most likely to lead to disparate national policies -- is the perceived conflict between confidentiality and public safety. While the use of cryptography is important for the protection of privacy, there may be a need to consider appropriate mechanisms for lawful access to encrypted information. For example, in many countries, law enforcement can lawfully access stored data or intercept communications (or both) under certain conditions. Both of these important law enforcement tools could be curtailed by the use of cryptography which can prevent lawful access to either plaintext or cryptographic keys of encrypted data. In some cases, encryption of stored data can make law enforcement access impossible, while in other cases, the data can be lawfully accessed elsewhere (such as obtaining financial records from a bank rather than a person's home computer), or the key could be obtained to decrypt the data. For countries that permit either technique, balancing concerns for the protection of privacy and the confidentiality of business information with the needs of the law enforcement and national security communities is politically difficult.

Furthermore, the need for third party access is not limited to governments. Individuals and businesses may need to gain access to encrypted information also: for instance, if a keyholder dies leaving encrypted information but no key to decrypt it, or if an employee who has encrypted a file resigns without leaving information concerning the decryption key. Individuals or businesses that encrypt data may wish to store a copy of cryptographic keys in a repository which would allow lawful access in such cases.

It is important to note the difference between cryptographic keys used for confidentiality and those used for authentication, data integrity and non-repudiation purposes only. The problem of lawful access to cryptographic keys is more relevant in the context of cryptography used to keep data confidential, where information is concealed. Cryptography used only to authenticate or ensure integrity of data does not necessarily conceal the information, but merely verifies the data. In this case, the information itself may be available, or the data could be lawfully obtained another way, so it would be unnecessary to gain access to the private key. An important implication of private keys used only for authentication or ensuring integrity of data is that when such a key is compromised "electronic impersonation" is possible. Since public keys are designed to be placed in the public domain, these issues do not generally apply to access to public keys.

If lawful access is to be preserved, exactly how this should be done is unclear. Governments are following different approaches and are seeking innovative solutions from industry. One approach which could provide a basis for a possible solution to balance the interests of users and law enforcement authorities would consist of using a key management system where a copy of the private cryptographic key used for confidentiality purposes would be "stored" with a "trusted third party" (TTP) 3. Other approaches could provide lawful third-party access to the plaintext of encrypted data. Among the variety of approaches, some could also be used to recover data when keys are lost. Again, it is important to recognise the distinction between keys which are used to protect confidentiality and keys which are used for other purposes only. Keys which are used for authentication, data integrity verification, and non-repudiation purposes would not be subject to the same kinds of lawful access by third parties.

In this context, other issues that may need to be addressed include where keys will be stored, who will be allowed to hold keys, and what will be the responsibilities and the liabilities of keyholders. Such key storage systems are distinct from public key infrastructures for certification of public keys -- another kind of trusted service which a TTP could provide -- although the two services could be combined.

Liability

Like many things in life, information and communications technologies do not always work perfectly: firewalls may fail to keep out intruders, networks may break down, routers may send data to the wrong destination. Moreover, human error can also play a role, for example when data is deleted by mistake or passwords are not kept secret. In the context of cryptography, system failure or human error that results in cryptographic keys being compromised can have significant and far-reaching consequences, because the strongest cryptography becomes ineffective if keys are compromised. If

[3] A TTP is an independent party, which may be either a public or private sector entity, that provides trusted services for information and communications networks. In this case, the trusted services of the TTP would be to hold the key for safekeeping subject to certain terms and conditions and upon agreement of the parties involved. Under such a system, the keys, or plaintext of encrypted data if appropriate, could be accessed pursuant to legal authority, such as a legal warrant or court order issued by the proper authority.

cryptographic keys are compromised, users must assume that their encrypted data is no longer secure, and they run the risk that documents or transactions will be forged in their name. Where a certificate authority is compromised, there could be catastrophic consequences. Moreover, the process for revoking keys and key certificates can be complicated.

Secure handling of keys is very important for both individual users and organisations; key management systems generally have strict procedures for protecting and monitoring the use of keys to prevent keys from being compromised. However, if these practices fail and keys are compromised, it is important to know which parties must take responsibility and the extent to which they can be held liable for the repercussions. This issue is particularly important for key management services or trusted third parties, which hold or access cryptographic keys on behalf of others, given the significant impact of liability if their systems are compromised. Setting out provisions for liability can be addressed by either contract or legislation, at the individual or governmental level. Moreover, it may be important to consider liability implications at both the national and international levels.

International Co-operation

The increasingly global flow of data on information and communications networks highlights the need for an internationally co-operative approach to addressing these matters. Enforcement of existing legal regimes is based on geographically defined borders, but in the emerging network environment, information and commercial transactions may move freely across national and jurisdictional boundaries. In framing national strategies and designing regulatory structures for the information infrastructure, including those relating to cryptography, all governments are recognising that the impact of such activities will, in many instances, extend far beyond their frontiers.

Disparate national policies may impair the development of global networks and technologies, compelling the use of numerous, possibly incompatible, products to communicate and transact business, when one might suffice. Such an environment may also create barriers to international trade. Given the inherently global nature of developing information and communications networks and the difficulties of defining and enforcing jurisdictional boundaries in this environment, these issues may most effectively be addressed by international consultation and co-operation. This is particularly relevant in the case of cryptography.

IV. GOVERNMENT ACTIVITIES RELATED TO CRYPTOGRAPHY POLICY

National Level Activities

Many OECD Member countries undertook the development of policy and laws relating to cryptography in the mid 1990s. National policies began to be developed in isolation from one another, however, it was recognised early on that disparities in laws could create obstacles to the development of national and global information and communications networks. When the OECD was called upon to examine cryptography policy in 1995, several OECD Member countries already had laws which addressed some aspects of cryptography policy (specifically digital signature and export regulations). Many other countries had legislative initiatives pending or were studying the problems with a view to preparing law. These national efforts and a discussion of national experiences were brought to the drafting table at the OECD to help clarify the problems and the implications of cryptography policy, and they provided a solid basis for international co-operation in this area.

Cryptography Policy at the OECD

The OECD provides an appropriate forum in which to review matters of common interest with regard to cryptography policy, since it has continuing experience in addressing policy issues that combine economic, technological and legal aspects as well as in building awareness and international consensus on issues related to security of information systems, protection of personal data and privacy, and information, computer and communication technologies. The OECD has already served in previous years as a forum for discussion of cryptography technologies and the economic and social policy issues related to the use of cryptography.

Both the 1980 OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data and the 1992 OECD Guidelines for the Security of Information Systems identified the need for technological means to assure protection of personal data and privacy and security of information systems. Since 1989, the OECD Information, Computer and Communications Policy (ICCP) Committee has included cryptography technologies and policies in its work on security and privacy. The 1989 report by the OECD Secretariat, Information Network Security, included a review of cryptography technology and policy issues. These issues were discussed at the OECD Meeting on Information Security in March 1990. The Meeting of Experts on Recent Developments in Protection of Personal Data and Privacy, held on 10-11 December 1992, was the first OECD meeting to examine cryptography technologies and policies in depth. Speakers from the private sector and academia introduced cryptography, described various cryptography technologies, and discussed the relevant policy considerations. The Meeting of Experts on Information Infrastructures, which was held at the OECD on 30 November - 2 December 1994, included a session on cryptography policy. The Meeting emphasised the links between cryptography policy, protection of personal data and privacy, security of information systems, and protection of intellectual property, and stressed that the goals of security, privacy and intellectual property protection must be achieved in balance, and that solutions to one should not vitiate another or create unjustified obstacles to trade.

The OECD Ad hoc Meeting of Experts on Cryptography Policy, held on 18-19 December 1995, focused attention on the issues and gave Member countries an opportunity to discuss and compare their national positions on cryptography policy. The Meeting was attended by a diverse group of government representatives -- including representatives of trade, industry and telecommunication ministries, data protection authorities, law enforcement and national security agencies -- as well as members of the private sector, many of whom were technology experts. The discussion emphasised the need for internationally-harmonised and compatible national solutions that strike the appropriate balance between data protection and law enforcement.

The private sector played an important role in the development of guidelines on cryptography policy at the OECD. In accord with the 1995 OECD Ministerial mandate that non-governmental partners be included in activities relating to global information infrastructure, the first Business-Government Forum on Global Cryptography Policy was held on 19-20 December 1995, co-organised by the International Chamber of Commerce (ICC), the Business and Industry Advisory Committee to the OECD (BIAC) and the OECD, in conjunction with the Ad hoc Meeting. At the Forum, the private sector presented its perspective and outlined a number of business initiatives for global cryptography policy.

The OECD Group of Experts on Security, Privacy and Intellectual Property Protection in the Global Information Infrastructure, which met for the first time on 9 February 1996 in Canberra, Australia, approved the United States' proposal for the OECD to draft guidelines on cryptography policy. At the 29th Session of the ICCP Committee on 27-29 March 1996, the Ad hoc Group of Experts on Cryptography Policy Guidelines was established.

The Communiqué that was issued following the 21-22 May 1996 Meeting of the OECD Council at the Ministerial Level specifically mentioned cryptography policy in its Guidelines for the Work of the Organisation:

> "15. To facilitate the implementation of their commitments, bearing in mind the requirement to fit new work within a constrained budget, by concentrating on core priorities, Ministers request the OECD to:
>
> (iv) -- deepen its work on a comprehensive policy framework to facilitate further development of the Global Information Infrastructure and related products and services, including the development of cryptography policy guidelines which would enhance security and protect intellectual property rights in this area, and analyse the economic and social impacts;".

With the issues gaining public prominence, the guidelines drafting process officially began with the First Meeting of the Ad hoc Group of Experts held in Washington DC, on 8 May 1996. A second ICC/BIAC/OECD Business-Government Forum on Global Cryptography Policy held on 7 May 1996 gave Members of the Ad hoc Group another opportunity to discuss the issues with business representatives. The work continued through the year with three more meetings of the Ad hoc Group in June, September and December 1996. Prior to the September meeting, members of the Ad hoc Group participated in a public symposium, organised by the Electronic Privacy Information Center, which provided an opportunity to hear from leading cryptographers, technical experts, and human rights advocates regarding recent developments in cryptography policy. More than 100 delegates from governments, industry, and advocacy groups attended each meeting of the Ad hoc Group.

At its second meeting on 27-28 January 1997, the Group of Experts on Security, Privacy and Intellectual Property Protection in the Global Information Infrastructure reviewed and approved the draft Guidelines. The ICCP Committee gave its approval to the draft Guidelines at it 27-28 February 1997 meeting and forwarded the document to the Council. The Council adopted the Guidelines as a Recommendation of the Council concerning Guidelines for Cryptography Policy on 27 March 1997.

Relevant National and International Activities Related to Cryptography Policy

Data protection and privacy laws have been implemented in a number of countries and in the European Union in recent years. Directive [95/46/EC] of the European Parliament and of the Council of the European Union of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, for example, requires the implementation of appropriate technical and organisational measures to protect personal data against accidental loss, alteration, or unauthorised disclosure or access, in particular where data is transmitted over a network. This Directive raises specific concerns in the cryptography policy debate, because cryptography is an important means to protect the confidentiality of data.

Cryptographic products and technologies have historically been subject to export controls. The current basis for export controls is the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (agreed on 13 July 1996), which includes cryptography products on its control lists for export. The Arrangement is implemented in national regulations. Regulation [(EC)3381/94] and Decision [94/942/PESC] of the Council of the European Union of 19 December 1994 on the control of the export of dual-use goods are also applicable to the export of cryptography products. Some individual states have imposed other specific controls on such exports, which are subject to continuing debate.

The Council of Europe has devoted considerable resources to studying the subject of computer-related crime, issuing the Recommendation [R(95)13] of the Council of Europe of 11 September 1995 concerning problems of criminal procedural law connected with information technology, and is considering suggesting an international convention to address the issue. Such a convention could address matters such as exchange of information among government agencies in cases involving the use of cryptography.

At the G7 Summit meeting on anti-terrorism in July 1996, G7 governments announced that consultations would be accelerated, “in appropriate bilateral or multilateral fora, on the use of encryption that allows, when necessary, lawful government access to data and communications in order, inter alia, to prevent or investigate acts of terrorism, while protecting the privacy of legitimate communications”.

In May 1996 the US National Research Council’s Computer Science and Telecommunications Board published the report “Cryptography’s Role in Securing the Information Society”. This interagency study assesses the effect of cryptographic technologies on US national security, law enforcement, commercial and privacy interests, and reviews the impact of export controls on cryptographic technologies. This authoritative report provides a comprehensive review of the cryptography policy issues faced by the US Government.

None of these efforts, however, has attempted to address comprehensively international cryptography policy, or to identify the various interests which must be balanced in the context of international cryptography policy. In this area, these OECD Guidelines for Cryptography Policy are intended to be of assistance to Member countries by raising these issues for their consideration.

V. OTHER ISSUES

Non-Member Countries

The Recommendation is addressed to Member countries. Widespread recognition of the Guidelines is, however, desirable and non-Member countries should be encouraged to adhere to the

Recommendation. In view of the development of global information and communications networks and the need to ensure concerted solutions, efforts will be made to bring the Guidelines to the attention of non-Member countries and appropriate international organisations.

The Broader Policy Perspective

Given the role of cryptography in the information and communications infrastructure and in developing electronic commerce, cryptography policy overlaps with economic, legal and political aspects of a number of related fields, including security of information systems, protection of privacy and personal data, and intellectual property protection. In order for information and communications networks and technologies to reach their full potential, national governments should address those issues related to cryptography which impede secure electronic commerce, including the lack of standards and the role of certification authorities.

The Mandate of the Ad hoc Group required it to develop guidelines on basic issues to be taken into consideration in the development of cryptography policy. The Guidelines constitute a new instrument complementing existing international instruments governing such issues as human rights, international trade, copyright, telecommunications, and various information services. If the need arises, the principles set out in the Guidelines could be further developed within the framework of activities undertaken by the OECD in the area of information, computer and communications policies.

About the OECD

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD Member countries are: Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, the United Kingdom and the United States. The European Union takes part in the work of the OECD.

OECD Legal Instruments

Since the creation of the OECD in 1961, around 460 substantive legal instruments have been developed within its framework. These include OECD Acts (i.e. the Decisions and Recommendations adopted by the OECD Council in accordance with the OECD Convention) and other legal instruments developed within the OECD framework (e.g. Declarations, international agreements).

All substantive OECD legal instruments, whether in force or abrogated, are listed in the online Compendium of OECD Legal Instruments. They are presented in five categories:

- **Decisions** are adopted by Council and are legally binding on all Members except those which abstain at the time of adoption. They set out specific rights and obligations and may contain monitoring mechanisms.

- **Recommendations** are adopted by Council and are not legally binding. They represent a political commitment to the principles they contain and entail an expectation that Adherents will do their best to implement them.

- **Substantive Outcome Documents** are adopted by the individual listed Adherents rather than by an OECD body, as the outcome of a ministerial, high-level or other meeting within the framework of the Organisation. They usually set general principles or long-term goals and have a solemn character.

- **International Agreements** are negotiated and concluded within the framework of the Organisation. They are legally binding on the Parties.

- **Arrangement, Understanding and Others**: several other types of substantive legal instruments have been developed within the OECD framework over time, such as the Arrangement on Officially Supported Export Credits, the International Understanding on Maritime Transport Principles and the Development Assistance Committee (DAC) Recommendations.