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OPEN NETWORK PROVISION

ANALYSIS REPORT ON

- INTELLIGENT NETWORK FUNCTIONS**
- NETWORK MANAGEMENT**
- LOCAL LOOP**
- BROADBAND COMMUNICATIONS**

IN ACCORDANCE WITH COUNCIL DIRECTIVE 90/387/EEC

Brussels, 7 July 1994

ANALYSIS REPORT ON SELECTED AREAS OF OPEN NETWORK PROVISION

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SUMMARY OF THE REPORT

Background and Purpose

This Analysis Report is issued in accordance with Directive 90/387/EEC which defines the framework for the application of the European Union's policy of Open Network Provision (ONP).¹ In particular, the Report is required by Article 4 which directs the Commission to study and analyse the progressive application of Open Network Provision principles to a defined number of areas of telecommunications, listed in Annex I of the Directive. In this context, the areas so far addressed include Leased Lines, Packet Switched Data Services and ISDN,² and a common position has been agreed by the Council in 1994 on a Directive on the application of Open Network Provision to voice telephony.

In completing the analysis of areas listed in Annex I, two general areas of study remained to be considered:

- new types of access to the network, including those involving intelligent networks, network management and the local loop;
- access to the Broadband network.

The Commission has also considered two specific aspects relating to voice telephony and ISDN. These are respectively, the question of harmonising audible tones used in the telephony service in Europe, and new types of access to ISDN.

Accordingly, the Commission undertook a series of studies in these areas during 1992 and 1993, the results of which were publicly presented. The studies are listed in Appendix 2, and this Analysis Report should be read in conjunction with the study reports, which are available on request.

The purpose of this Analysis Report is to elicit comments from all interested parties on the areas addressed, in accordance with Article 4 of Directive 90/387/EEC. Such comments will contribute positively to the Commission's task of preparing appropriate measures, and will help ensure their acceptance and effectiveness within the sector.

¹ Council Directive of 28 June 1990 on the establishment of the internal market for telecommunication- services through the implementation of open network provision (90/387/EEC; OJ L192/1, 24.07.90).

² ISDN - Integrated Services Digital Network. See Glossary in Appendix 2 for list of commonly-used acronyms

Structure and content of the Report

The report is structured into two parts: a main body, followed by two appendices. The body of the report contains a separate chapter for each main area of study, in which are summarised the principal conclusions reached during the study process, the standardisation activities which arise therefrom, and where appropriate, a set of conclusions derived by the Commission for consideration by interested parties. The Appendices cover the same study areas, but reproduce the principal recommendations made by the study consultants, together with the comments the Commission wishes to make at this stage.

With regard to the content of the chapters, actions proposed by the Commission reflect the need at this stage to concentrate on encouraging the development of European standards. This is largely in recognition of the more fundamental discussion to take place later this year, of the examination of Open Network Provision in the context of the regulatory reform required by the Council Resolution of July 1993 which is to be presented by 1 January 1996 in preparation for the full liberalisation of voice telephony services in 1998.³ Proposals for the introduction of new legislation, for the modification of existing directives and recommendations, will only be taken up if it appears during the consultation period that there is sufficient demand to justify such measures prior to the preparation of the 1996 reform package.

It should be noted that this Analysis Report in no way replaces the debate which will take place in the context of the future of Open Network Provision and the associated legislative measures. However, where appropriate, comments received will assist the Commission in proposing a future orientation for Open Network Provision.

³ Some countries have been granted an additional transition period of up to five years in the maximum case.

1. INTRODUCTION AND BACKGROUND TO THE REPORT

The objectives of Open Network Provision (ONP) are to promote European-wide telecommunications services through appropriate harmonisation, and to create conditions for open and fair competition in telecommunications services. The principles of Open Network Provision were described in the ONP Framework Directive, which lays down procedures for the progressive introduction of Open Network Provision measures to different network/service areas.

This Analysis Report is produced in accordance with the requirements of Article 4 of the ONP Framework Directive, in particular with Article 4.4(a) which requires that the Commission shall "*initiate detailed analysis , in consultation with the committee referred to in article 9 [the ONP Committee], and draw up reports on the results of this analysis;..*"

Over the period 1990-1994, the concept of Open Network Provision has been developed and incorporated into EU Member States' national law. The adoption of ONP Framework Directive in 1990 was followed by measures applying Open Network Provision principles to Leased Lines, Packet Switched Data Services and ISDN. Annex I of the ONP Framework Directive identifies eight areas for which Open Network Provision conditions may be drawn up, and six of these have already been subjected to the procedure defined in Article 4 of the Directive (see Table 1). Accordingly, the Commission undertook a series of studies during 1992 and 1993 in the two remaining areas, designated areas 7 and 8 in the Annex.

In accordance with Article 4 of the Framework Directive the results of the analysis are to be offered for public comment for a period of not less than three months. The Commission, in consultation with the ONP Committee, will then consider appropriate proposals, taking due account of representations made during the public comment period. In cases where such proposals involve the development of new standards, the Commission will prepare appropriate mandates to ETSI for the production of the necessary standards, pursuant to Article 4.4.(c) of the Directive. Initiatives may also be taken to promote pan-European services e.g. by encouraging cooperation through MoUs, where such initiatives have the support of the market players.

The Commission has also considered two specific aspects relating to voice telephony and ISDN. These are respectively, the question of harmonising audible tones used in the telephony service in Europe, and new types of access to ISDN.

This Analysis Report pays due attention to the changes which have taken place in the regulatory environment over the four years since the ONP Framework Directive was issued. In this respect also, full account has been taken of Council Resolution 93/C.213/01⁴, which envisages consolidation of existing regulatory measures and a phased liberalisation of the telecommunications market environment.

⁴ Council Resolution of 22 July 1993 on the review of the situation in the telecommunications sector and the need for further development in that market (93/C 213/01; OJC213/1, 06.08.93)

Some of the recommendations in the individual study reports have already been taken into account by the Commission with respect to actions in the designated Open Network Provision areas. This is the case for the Mobile and Personal Communications area for which a Green Paper is expected to be issued early in 1995. For the satellite area studies have been completed, as a result of which legislative measures have either been adopted or are in preparation.

Table 1: Areas of application of Open Network Provision according to Annex I of the ONP Directive

1	Leased Lines	Directive issued ⁵
2	Packet Switched Data Services	Recommendation issued ⁶
3	ISDN	Recommendation issued ⁷
4	Voice Telephony Services	Draft Directive in Codecision process ⁸
5	Telex Services	Service in decline, no further action to be taken
6	Mobile Services	Studies have been undertaken and the results considered in the recent Mobile Green Paper.
7	New types of access to the network ⁹	Subject of this Report.
8	Access to the Broadband network ¹⁰	Subject of this Report.

This Analysis Report is thus directed at the latter two areas. It aims to bring about a broad consultation across all concerned parties (network operators, service providers, equipment and terminal manufacturers, users, consumers and trade unions) on actions resulting from the studies listed in Appendix 2 and on the feasibility and appropriateness of incorporating these into the regulatory framework.

⁵ Council Directive of 5 June 1992 on the application of Open Network Provision to Leased Lines (92/44/EEC; OJ L165/27, 19.06.92).

⁶ Council Recommendation of 5 June 1992 on the application of Open Network Provision to public packet switched data services (92/382/EEC; OJ L200/1, 18.07.92).

⁷ Council Recommendation of 5 June 1992 on the application of Open Network Provision to ISDN (92/383/EEC; OJ L200/10, 18.07.92).

⁸ Common Position confirmed by Council, 20 June 1994.

⁹ "...new types of access to the network, such as access, under certain conditions, to the circuits connecting subscriber premises to the public network exchange ('data over voice') and access to the network's new intelligent functions, according to progress on definition and technological development;

¹⁰ "...access to the Broadband network, according to progress on definition and technological development..."

Comments on this report are therefore invited from interested parties. Such comments will contribute positively to the Commission's task of preparing appropriate measures, and will help ensure their acceptance and effectiveness within the sector.

The report is structured into two parts: a main body, followed by two appendices. The body of the report contains a separate chapter for each main area of study, in which are summarised:

- the principal conclusions reached during the study process,
- the standardisation activities which arise therefrom, and
- where appropriate, a set of conclusions derived by the Commission for consideration by interested parties.

Appendix 1 covers the same study areas, but reproduces the principal recommendations made by the study consultants, together with the comments the Commission wishes to make at this stage in the overall process of consultation.

2. NEW TYPES OF ACCESS TO THE NETWORK: ONP FRAMEWORK DIRECTIVE ANNEX I, AREA 7

2.1 The Application of Open Network Provision to Intelligent Network Functions

Studies undertaken

A study on this area conducted by *KPMG Peat Marwick*¹¹ on behalf of the Commission was concluded in March 1993. The objective of the study was to recommend regulatory measures based on Open Network Provision that would promote competition in the provision of intelligent network (IN) services and encourage their proliferation on a pan-European basis.

The conclusions of the study were based on a consideration of both the market for IN services and the underlying technology.

Based on its assessment of the market, the study identified a number of advanced services (Freephone, Virtual card calling, Premium rate, VPNs and UPT) for which revenues were expected to grow to some 10-15 billion ECU by the end of the decade. It was further considered that:

- competition goals can only be met if non-discriminatory access to voice telephony infrastructure and to IN functions is made generally available.
- the current dependence on manufacturers' proprietary architectures and protocols means that it is unrealistic to suppose that harmonised pan-European services can be based in the short term on standard implementations; such services would therefore best be provided on an interim basis by collaborative agreements between IN service providers.

The technical conclusions supported the results of the market study, stating that full open interface standards are needed to facilitate both harmonisation between services and interconnection between service providers. However, because of the lengthy time needed to develop such standards, interim solutions for special access to IN functions would be needed for the medium term.

Views expressed at a public workshop held on the study findings in March 1993 generally supported the conclusions reached by the Consultant.

In addition, the Commission is aware of the potential convergence between intelligent networks and personal and mobile communications, referred to in the Green Paper recently issued on the subject.¹²

¹¹The application of Open Network Provision to Intelligent Network Functions, KPMG Peat Marwick, March 1993

¹²Green Paper on a common approach in the field of mobile and personal communications in the European Union. Annex A thereof refers.

Standardisation Activities

In January 1994 the Commission, in consultation with the ONP Committee, issued a standardisation Mandate to ETSI for the development of voluntary standards for Intelligent Networks, based on the conclusions of the Consultant's study.

The Mandate requires that existing ITU-T and ETSI standards be taken beyond their current single-operator orientation towards one based on a competitive environment. Under the mandate, standards-making will be preceded by a study phase addressing the following:

- formulation of standard definitions for key IN services (Freephone, Virtual card calling, Premium rate, VPNs and UPT);
- resolution of issues relating to the interaction between services;
- identification of optimal technical procedures which will allow separate organisations to compete or cooperate in providing IN services;
- study of the feasibility for short term solutions using mediation devices or functions;
- preparation of a detailed standardisation work plan proposal.

The study phase is expected to be completed by December 1994.

The final stage of the work is expected to be the production of voluntary standards on the basis of both the conclusions of the study phase and subsequent consultation with the ONP Committee.

In the preparation of this mandate special emphasis has been placed on essential requirements, in particular on the maintenance of network integrity. In this respect it should be noted that a separate study on network integrity has been launched by the Commission, the results of which will be forwarded to ETSI as an input to their work on IN standardisation.

It is intended that the standards produced as a result of this process will be included in the ONP List of Standards published in the Official Journal.

Conclusions

The KPMG study recommended a number of specific regulatory measures aimed at promoting IN services. These are shown in Appendix 1 alongside the Commission's own comments. The views of interested parties on these recommendations is now sought, bearing in mind that the Commission will concentrate for the moment on the standards aspects, and will ensure that the relevant provisions of the proposed Voice Telephony Directive are fully applied to this area. The package of measures envisaged for the 1998 liberalisation of voice telephony may include provisions which cover additional IN regulatory requirements where necessary.

2.2 The Application of Open Network Provision to Network Management

Studies undertaken

A study was undertaken on behalf of the Commission by *NERA* (National Economic Research Associates) in association with *MITA* (Mondiale Information Technology Associates Ltd.),¹³ and completed mid-1992. The objective of the study was to investigate the Open Network Provision requirements in the area of Network Management (NM).

In assessing possible Open Network Provision measures in the area of Network Management, the study focused both on the network management needs of telecommunications users and on the conditions necessary for independent providers of network management services to compete on equal terms with TOs and their subsidiaries.

The main conclusion of the report centred on the need to ensure that competitive equality exists between TOs providing network management services to their customers and value-added service providers wishing to provide the same kind of services. There is an inevitable risk that TOs, in providing such services, could make use of privileged access to their own internal network management systems without granting similar non-discriminatory access to their competitors.

Further conclusions in the study report included:

- the need for a harmonised set of network management services, with initial emphasis on application to leased lines, and on manual rather than electronic availability of network management information;
- as a future framework for standardisation of network management services, the need to encourage synergies with TMN (TO internal network management) standardisation
- the need for a pro-active role by the Commission in encouraging interest groups and fora in the coordinated development of network management services.

Conclusions

The non-discrimination requirements have a clear basis in both the competition rules of the Treaty and the ONP Framework Directive, and as such would have the unambiguous support of the Commission. On this basis, and in view of relevant similar provisions in the Leased Lines and proposed Voice Telephony Directives, it is considered that sufficient regulatory safeguards exist in the short term. Reference to specific network management functions in the associated technical annexes may need to be reviewed in the future, and possible refinements thereof may be proposed for discussion with the ONP Committee at a later stage.

¹³Study of the Application of Open Network Provision to Network Management, NERA, May 1992

2.3 The Application of Open Network Provision to the Local Loop

Studies undertaken

A study on this area conducted by *Analysys Ltd.*¹⁴ on behalf of the Commission was concluded in November 1993. The aims of the study were to analyse the structure, development, services and evolution of the local loop in order to identify any constraints on service provision, and to recommend measures to alleviate these constraints by enabling open and efficient access.

The Local Loop is understood to be that part of the public network which provides the customer with access to the core telecommunications network. It therefore comprises the distribution and access network connecting the customer premises to the relevant local exchange building.

The study covered a review of relevant new technologies, an analysis of constraints on market demand imposed by Local Loop provisioning bottlenecks, and recommendations for suitable regulatory action. Regulatory policies applied in Japan and the U.S.A. were also considered. The conclusions reached may be summarised as follows:

- The end of the voice service monopoly in 1998 implies a change in the structure of TOs, in which service retailing may develop separated from network infrastructure operations.
- Transparency and stability of prices for access to infrastructure, and particularly to the Local Loop, are important to service providers. TOs should be required to publish a tariff for use of the local loop.
- Core network selection from the local loop and collocation are bottlenecks which will become more serious as competition is introduced in all services.
- A consistent regulatory distinction between broadcasting and telecommunications services needs to be made in such a way that individual user-selected audio and video signals are included in the scope of telecommunication services;
- Local Loop standards based on the V5.x ETSI series need to be formalised and further developed to include network management facilities and alternative core network selection; additional standards will be needed for high data rates (including ADSL and HDSL, for example for video-on-demand services), and possibly plain copper-based leased lines.

A public workshop held in October 1993 generally confirmed the consultant's findings.

¹⁴Open Network Provision applied to the Local Loop, *Analysys*, November 1993

Standardisation activities

In the light of the Consultant's recommendations, the Commission, in consultation with the ONP Committee, has given a Mandate to ETSI for the development of voluntary standards for the Local Loop.

The mandate calls for an ETSI Technical Report to be submitted to the Commission prior to the commencement of standards preparation. The Report will cover:

- standardisation requirements for interfaces between an access network and a core network, taking into account the regulatory situation after 1998, where these interfaces could serve as a boundary of responsibility between a local access network provider and a telecommunications service provider;
- analysis of the V5 series interface specifications as a basis for these standards and identification of any additional specifications required to take account of core network selection and network management aspects;

Conclusions

The *Analysys* study recommendations for specific regulatory measures aimed at removing Local Loop bottlenecks are shown in Appendix 1, alongside the Commission's own remarks. Comments are sought on the measures proposed.

The Commission's work will concentrate on follow-up of the standards development with ETSI. The Commission intends that any proposals for new legislation regarding the Local Loop will be made in the context of the forthcoming Green Paper on Infrastructure.

3. ACCESS TO THE BROADBAND NETWORK FRAMEWORK DIRECTIVE ANNEX I, AREA 8

Studies undertaken

For the purposes of this Analysis Report the area of Broadband has been addressed in a single Study conducted by Fischer & Lorenz and OVUM¹⁵ on behalf of the Commission. The Study was completed in September 1993.

Frame Relay, ATM, SDH, MANs, TMN are evolving technologies and standards which, individually or collectively, may be applied to support Broadband services. As such, they constitute an area for which Open Network Provision conditions may be drawn up in accordance with Article 4 and Annex I of the ONP Framework Directive.

Broadband technologies and networks are still at an embryonic stage at present. In general, while Frame Relay, CBDS/SMDs and various MAN technologies are seen to have significant applications, especially in the short to medium term, the study identifies ATM as the predominant future-proof technology for Broadband networks in the long term.

The Study concludes that for the next five years the Broadband market will be concentrated on data applications, principally for LAN interconnect, with ubiquity of access, quality of service and low costs being the primary considerations supporting a decision to subscribe to Broadband services on the part of many prospective users. After five years, when more extensive Broadband networks have been deployed, other applications currently being defined in the context of B-ISDN (IBS), including video and multimedia applications, should become significant.

The Study contends that the market for Broadband services is at present supply-constrained and that regulatory actions will be necessary to ensure that suppressed demand is released. In particular the study indicates that *"the availability of digital leased lines, tariffed in a truly cost-oriented manner is the single most important factor for the take off of Broadband services in Europe, both in terms of demand and in terms of supply"*. The Commission takes particular note of this conclusion in its evaluation of the Study and considers that it should be an important factor in deciding on the appropriate measures required to ensure the early development of Broadband services in the EU.

Conclusions

The Commission will place mandates with ETSI for new standards for access to leased High Speed Digital Bandwidth (34, 140 and 155 Mbit/s) based on both PDH and SDH technologies. The Commission, considering the length of time to produce standards, will consult the ONP Committee on the possibility of using existing international standards whilst awaiting finalisation of the ETSI standards.

¹⁵The Application of ONP to MAN, Frame Relay and Advanced Transmission Networks and their Services, Fischer & Lorenz/Ovum, November 1993

The Commission supports the development and proliferation of new Broadband services by means of MoUs in order to stimulate the market in appropriate cases. The Commission will discuss with ETSI and the ONP Committee whether it would be appropriate and desirable to issue mandates in other Broadband areas (frame relay, ATM, etc.) in order to expedite the production of standards.

4. ADDITIONAL NETWORK FUNCTIONS

4.1 Audible Tones in the Telephone Service in the EU Countries

Studies Undertaken

A report on this subject prepared by Professor Diodato Gagliardi¹⁶ on behalf of the Commission was completed in April 1993. The study was launched in accordance with Annex I of the ONP Framework Directive, item 4 of which addresses the voice telephony service. It examined the possible difficulties caused to users by the lack of harmonisation of audible tones used for the Voice Telephony service in Europe.

The study distinguishes users at home and users travelling in Europe, and concludes that:

- for users temporarily staying in another EC country, the tones most likely to cause misinterpretation or confusion are those for second dial-tone, call-in-progress, congestion, number unobtainable and pay prompt.
- for users needing to make calls to other Community countries from their home base, the tones which may cause confusion are those indicating call-in-progress, ringing (only for users of UK and Ireland), congestion and number unobtainable.

While in general a willingness exists on the side of the Operators to adopt ITU-T-and/or ETSI-proposed values for audible tones, and while in new exchanges the change from one tone to another is neither difficult nor expensive, the transition problems, and in some cases the existence in a small part of the network of particular tones in use with older equipment, has been a serious obstacle for the adoption of recommended values.

In order to solve the difficulties of users temporarily staying in another Community country or needing to make calls to other Community countries, the report recommended to initiate standardisation of the following telephone tones: dial tone; ringing tone; busy tone; special information tone; call waiting tone; intrusion tone and pay tone.

Standardisation activities

In February 1994 the Commission, in consultation with the ONP Committee, issued a mandate to ETSI for the development of voluntary standards for network-generated tones, in the light of the Gagliardi study.

The mandate requires the production on an ETSI Technical Report (ETR) to study and investigate the most appropriate technical characteristics of a set of telephone tones

¹⁶Report on the Audible Tones in the Telephone Service in the EC Countries, Prof. D. Gagliardi, April 1993

generated by public networks, so as to achieve their harmonisation in the future. The following ten tones have been considered in the mandate: dial tone; ringing tone; busy tone; special information tone; call waiting tone; pay tone; special dial tone; positive indication tone; intrusion tone and congestion tone. The mandate does not preclude standardisation of other tones. The study phase is expected to be completed by April 1995.

The second phase of the mandate will address the production of voluntary standards on the basis of the conclusions of the study phase and subsequent consultation with the ONP Committee. This phase is scheduled to be completed by April 1996.

Conclusions

It is considered that the standardisation activity described above contributes to the harmonisation objectives of the Common Position on the proposal for a Voice Telephony Directive.¹⁷

4.2 Application of Open Network Provision to New ISDN Interfaces

The ISDN ONP Recommendation calls for the study of future access arrangements for their possible inclusion in the minimum set.¹⁸ Current access arrangements are limited to the so-called S/T interface, while those to be considered to be added in the future are the M- and U-type interfaces. The U-interface applies to the termination point at the customer premises, and as such postulates a shift of the NTP further towards the network than is implied by the present S/T-interface. The M-interface is intended to provide access to specialised service providers by including a higher level of functionality than that currently available through existing user interfaces.

4.2.1 U-interface

Two studies were conducted for the Commission on this subject. The study *Application of the Principles of Open Network Provision to the ISDN U interface*,¹⁹ focusing mainly on the economical aspects, was conducted by Fischer & Lorenz and OVUM Ltd, while ETSI conducted the *ONP Study on Possible new interfaces at the network side of an NT1*,²⁰ mainly focusing on the technical aspects. Some overlap was found to exist in the areas covered by the two studies, resulting in fruitful discussions between the two teams.

¹⁷Op. cit.

¹⁸Council Recommendation of 5 June 1992 on the provision of harmonised ISDN access arrangements and a minimum set of ISDN offerings in accordance with ONP principles. 92/383/EEC, Annex I.

¹⁹Application of the Principles of Open Network Provision to the ISDN U-interface, OVUM/Fischer& Lorenz, May 1993

²⁰ONP Study on Possible new Interfaces at the Network side of an NT1, ETSI Technical Report 119, December 1993

The first study concludes in favour of the standardisation of an ISDN U-type interface. The primary arguments for this recommendation are the expected cost advantages resulting from NT1 integration in equipment and from competitive supply of the NT1 function in general, and the success of this approach in the US market. The study predicts that the cost advantages would result in a major reduction of investments necessary for and therefore a faster introduction of ISDN. The use of 2 wires by a U-interface (versus 4 for the S/T interface) is seen as an additional advantage. Further, the study expects a harmonising effect on the terminal to (ISDN-) PABX interconnection market, where proprietary U-type interfaces are common.

The ETSI study advises against standardisation of an ISDN U-type interface. The study sees important disadvantages in a competition between U-type interfaces and the S/T interfaces for ISDN, it points at the technical difficulties for maintenance functions and the technology dependency introduced. The study is of the opinion that there may be cost advantages, but it sees these as less pronounced and with a dependency on the terminal configuration. The study further points at the time required to develop the necessary standards that it estimates at several years, and sees little interest in the industry for standardisation of the interface for terminal to PABX use.

A Workshop was held in November 1993 on the findings and recommendations of the two studies. On the basis of the Workshop, and of subsequent discussions in the ONP Committee, it was concluded that no consensus exists at this time for the introduction of a harmonised U-type interface in ISDN. The topic was however considered of sufficient importance to be kept under review for further possible action at a later date.

4.2.2 M-interface

OVUM and Fischer & Lorenz also studied the M-interface as part of their overall contract to examine new types of ISDN access.²¹ This part of their study was accorded a lower priority than that of the U-interface, and consequently less resources were dedicated to it. It became evident, however, that there is little real interest on the part of service providers for the standardisation of this kind of access. In the first place, no additional functionalities beyond those provided by existing user interfaces could be identified in the short term. Much more importance is attached to the need to define clearly TMN and IN functionalities (see section 2 above) which could and should be made available to the service provider community. Once this has been accomplished, it would then be possible to be more precise on the way in which access methods such as ISDN could be harnessed as transport vehicles for getting such functionality to the service providers. In this regard, ISDN is recognised as one of several possible transport vehicles, however potent. The others include the PSTN, X.25 PSDS and Leased Lines.

In view of the findings in the consultant's study, it is felt that there is insufficient basis for a standardisation effort until the TMN/IN context has been more clearly defined. The matter will therefore be reviewed for possible action at a later date.

²¹ Application of the principles of Open Network Provision to the ISDN M-interface, Ovum/Fischer & Lorenz, May 1993

APPENDIX 1 :

DETAILED STUDY RECOMMENDATIONS

1.1 INTRODUCTION

This Appendix reproduces in detail the main recommendations of the studies carried out on behalf of the Commission and which form the basis of the present report. The selection of recommendations from the studies is based on the Commission's current perception of the priority and the importance it attaches to the issues addressed, but it is in no way intended to prejudice the judgement of the parties to whom the report is directed. As stated earlier, this report is intended to be read in conjunction with the study reports which are available on request.

To help the reader navigate through the Appendix, the study recommendations are presented in the order they are addressed in the main body of the report. In each subject area, the study recommendations are first reproduced, followed by the Commission's remarks. These remarks reflect the Commission's initial views, and will be supplanted by consolidated positions upon completion of the consultation process.

1.2 NEW TYPES OF ACCESS TO THE NETWORK: ONP FRAMEWORK DIRECTIVE ANNEX I, AREA 7

1.2.1 Intelligent Network Study Recommendations

A study on the application of Open Network Provision to Intelligent Network Functions was carried out by *KPMG Peat Marwick*¹ on behalf of the Commission and concluded in March 1993. The objective of the study was to recommend regulatory measures based on Open Network Provision principles that would promote competition in the provision of intelligent network (IN) services and encourage their proliferation on a pan-European basis.

Study Recommendation 1 (Functional Model)

The Commission of the EC should request ETSI to develop a full functional model applicable to the regulatory interfaces involved in IN, with completion by 1995.

Study Recommendation 2 (Advanced Service Definitions)

¹The application of Open Network Provision to Intelligent Network Functions, KPMG Peat Marwick, March 1993

ETSI should create standard definitions of advanced services, suitable for pan-European use and for competitive supply. Completion should be phased from now to 1996.

Study Recommendation 3 (Open IN Standards)

ETSI should develop (i) standards and conformance tests, based on the intelligent networks application part of signalling system no. 7 to permit open provision of key IN applications accessing TO and INO switching infrastructure, and (ii) specifications and compliance tests for essential requirements between key IN elements, in particular for protection of network integrity with full completion by 1997.

Comments: The three recommendations are considered together as a basis for appropriate standardisation actions in the IN field.

It is important that standards developed in this area be based on open interfaces in order to ensure equitable access for competing players in the market. To achieve this objective the Commission, following consultation with the ONP Committee, has placed a standardisation mandate with ETSI for the development of appropriate IN standards. These standards will define open and harmonised procedures with a view to allowing separate organisations to compete or cooperate in the provision of IN-based services.

Though ITU-T (CS-1 Recommendations) and ETSI (proposed CORE INAP) IN standards have been developed, these standards are oriented towards the exploitation of one IN-based infrastructure by a single operator and do not take sufficient account of the need to maintain integrity of the network.

According to the mandate to ETSI the work is required to be implemented in two consecutive steps. Step 1 calls for an ETSI Technical Report (ETR) addressing the following tasks:

- specification of standard definitions for freephone, VPN, virtual card calling, premium rate and UPT IN-based services;
- resolution of service interaction issues;
- identification of the best technical procedures to allow separate organisations to compete and/or cooperate to provide these services using IN;
- study of the feasibility for short term solutions by means of mediation devices or functions.

The ETR produced as result from the Step 1 will analyse all relevant requirements for future standardisation work and present a separate management document containing the step 2 standardisation workplan.

Step 2 contemplates the production of voluntary standards on the basis of the Step 1 conclusions and subsequent consultation with the ONP Committee.

In the preparation of this mandate special emphasis has been placed on the essential requirements aspects, and in particular on the maintenance of 'network integrity'. In this respect it should be noted that a separate study for the definition of network integrity is being carried out on behalf of the Commission and the results of this study will be made available to ETSI for their work on the IN mandate.

The Commission will also consider the best way to speed up the IN standardisation process. The schedule for production of the ETR (Step 1) is December 1994 (a task force to coordinate the work amongst the different STCs involved has been proposed in the mandate).

The work on this mandate will be encouraged by the Commission, and ETSs produced as a result of this process will be published in the ONP List of Standards in the OJ.

Study Recommendation 4 (Pan-European Service Targets)

Member States should be encouraged to offer pan-European service interworking for freephone by 1996 and cashless calling by early 1997. Premium rate, virtual private network and mobility service targets should be 1998/9, but subject to review by 1996.

Comments: Targets for pan-European service availability should be established in consultation with the ONP Committee in the context of the implementation of the proposed Voice Telephony Directive on the basis of Articles 25 (Provisions for Community-wide convergence) and 9 (Provision of advanced facilities). These targets should take account of the state of development of networks, market demand and the progress of standardisation. Nevertheless, collaboration between interested parties may enable earlier pre-standard pan-European services to be offered.

Study Recommendation 5 (IN Operator Licensing)

The Commission through appropriate consultation should recommend harmonised licence principles for IN operators, embodying Open Network Provision principles. Member States should be obliged to implement these harmonised principles by 1995. Guidance on conditions should also be published for agreements between INOs and TOs; INOs and INOs; INOs and IN service providers, and IN service providers and users. Key INO licence principles include:

- criteria for balancing open access with constraints like network integrity,*
- period of licences, and obligations to migrate to open specifications,*
- non-discrimination, including pricing principles for interconnect and access to functions,*
- conditions of appeal against licensing decisions and for resolution of disputes.*

Study Recommendation 6 (Interconnect Pricing)

Interconnection tariffs and access prices to dominant operators should be cost-based. Detailed principles should be set at EC level in conjunction with INO licensing principles.

Comments: These recommendations should be placed in the wider context of interconnection and licensing requirements. The proposed Voice Telephony Directive, on the basis of special network access (Article 10) and Open Network Provision principles will give sufficient guarantees that service providers and users be granted access in response to reasonable requests to IN infrastructure owners.

Furthermore, studies currently being carried out on behalf of the Commission on interconnection, cost allocation and cost accounting, and network integrity will bring more light to the interconnection issue. It is expected that future legislation on interconnection, licensing and service provision in the context of the liberalisation of voice telephony in 1998 will address the IN service scenarios in a wider context than in that of any specific regulation applicable solely to IN.

Study Recommendation 7 (Separate Accounting)

Member States should oblige TOs to implement specific annual reporting procedures by 1995, distinguishing costs and revenues of voice telephony and advanced services. The EC should recommend the extent and nature of harmonisation of these procedures.

Comments: No accounting or reporting procedures specific to IN other than those covered by Article 13 (cost-accounting principles) and Article 26 (notification and reporting) of the proposed voice telephony Directive are envisaged at this stage. Nevertheless, the results of the Cost Accounting and Interconnection studies might provide useful guidance for NRAs to ensure that adequate accounting systems and reporting procedures for IN are implemented in Member States.

Study Recommendation 8 (Collaborative Funding)

Funding under existing EC RACE and Trans-European Networks (TENS) programmes should be considered for:

- *collaborative development by industry of mediation devices, for open access to INs*
- *coordinated development of terminal equipment and services for cashless calling and mobility applications, probably integrating mobile (GSM) smartcard technology.*

In the proposals for the Fourth European Community Framework Programme,² IN aspects are considered in the area of advanced communications technologies and services. These include mobility and personal communications networks, intelligence in networks and service engineering. The development of IN-based pan-European services will also be considered in the context of the Trans-European networks referred to in the Commission's recent White Paper.³

²Proposals for Council Decisions concerning the specific programmes implementing the Fourth European Community Framework Programme for Research, Technological Development and Demonstration Activities (1994-1998), COM(94)68 final, 30 March 1994.

³"Growth, competitiveness and employment. The challenges and ways forward into the 21st century", White Paper, European Commission, 1994. ISBN 92-826-7423-1, 92-826-7071-6

Study Recommendation 9 (Other Collaborative Activities)

The EC should invite industry, through the ONP Consultation and Coordination Platform (ONP-CCP), to collaborate on the following programmes:

- *establishment of a pan-European settlements network for telecommunications, run by a body representing the organisations involved,*
- *programmes to implement an open 'platform' on which IN applications can run, and to develop innovative applications.*

Comments: The concept of a 'clearing house' network for the settlement of accounts between interconnected IN parties is an interesting one that should be taken further in the general context of network interconnection, currently under study in the Commission. The liberalisation of voice telephony would appear to provide the occasion for a review of the structure of accounting arrangements for intra-community voice traffic. The Commission will be actively pursuing this issue in its preparation of the 1996 reform package. In the short term, bilateral arrangements between IN players should be adequate.

The recommendation for the Commission to become involved in industry initiatives to provide an open IN platform is accepted only insofar as developing the appropriate standards is concerned. The marketplace should determine when, and in what form, such platforms are created.

1.2.2 Network Management Study Recommendations

The study undertaken on behalf of the Commission by NERA (National Economic Research Associates) in association with MITA (Mondiale Information Technology Associates Ltd.)⁴ was to investigate the Open Network Provision requirements in the area of Network Management (NM) by focusing on 2 areas:

- the network management needs of telecommunications users
- the conditions necessary for independent providers of network management services to compete on equal terms with TOs and their subsidiaries.

The Recommendations of the study are detailed below, followed by the Commission's comments where appropriate.

Study Recommendation 1

The Commission should ensure that the general principles of Open Network Provision apply to the provision of network management services, in particular those that ensure competitive equality between TOs and independent VASPs⁵, and those that ensure cost-oriented, unbundled and non-discriminatory tariffs.

⁴Study of the Application of Open Network Provision to Network Management, NERA, May 1992

⁵VASPs - Value Added Service Providers

Comments: It is felt that the ONP Framework Directive, together with the Leased Lines and proposed Voice Telephony Directives, already covers these requirements. Reference to specific NM functions in the relevant technical annexes may need to be reviewed in the future, and possible refinements thereof may be proposed for discussion with the ONP Committee at a later stage.

Study Recommendation 2

The Commission should introduce Open Network Provision measures to ensure TOs provide the NM information and functions identified in the [following] table, with highest priority on introducing measures for leased lines within the next two years.

Comments: The issues addressed in this recommendation are considered to be relevant for the Quality of Service parameters for leased lines. A mandate has been placed with ETSI to develop such parameters for general application, including those for leased lines.

Table: Open Network Provision supply conditions proposed by the study⁶⁷

	Immediate Notification	On Request
Pre-Service		
Order Acknowledgement	X	
Estimated installation lead-time	X	
Reasons for installation delay		X
Status of installation / order process		X
Actual installation date	X	
In-Service		
For all faults / outages:		
- Nature of fault / outage		X
- User's circuits affected	X	
- Estimated time to repair		X
- Status of fault repair / outage		X
- Time of fault repair	X	
Notification of planned outages	X	
Regular downtime / availability reports ⁸	X	
Itemised rebates with bill		X
Current routing		X
Changes to routing		X

Study Recommendation 3

The Commission should introduce Open Network Provision measures to ensure that TOs provide systematic manual access to NM by the mid-1990s, followed by electronic access by the late 1990s.

Comments: Access to NM is of prime importance. However, attention should be given to the implementation diversity in Member States, and therefore to the date from which manual access may be feasible throughout the EU.

Electronic access to NM by the end of the 1990's should be strongly encouraged; it is proposed that the required functionality and the access method be first investigated and then defined on the basis of ETSs or ITU-T Recommendations. In a later stage a

⁶Based on NM applied for leased lines. NM for other services may differ.

⁷Other services, such as bit error rates, access to alarm reports and requests for tests, should be separately tariffed and offered only when it is economic to do so.

⁸Where technically possible.

modification to the Leased Lines Directive could be drafted, and the NRAs could be asked to set targets for the availability of this information by electronic means. Access to NM specifically for VT could be defined as a subset of the generic access to NM; input in the form of requirements is expected from the 1994 Network Integrity study.

The need for a mandate to ETSI for the investigation of the standardisation requirements, and for subsequent standardisation for electronic NM access is under consideration.

Study Recommendation 4

The EC should encourage, via ETSI and other appropriate bodies, further assessment of TMN as the future framework for NM.

Comments: The progress of the TMN work in general, and the timing of mandates to be issued for the development of Open Network Provision TMN standards will be discussed with ETSI in the ETSI/ONP Co-ordination Group.

Work on X.2 TMN, and X.3 TMN interfaces (between User and TO, and SP and TO respectively), needs to be encouraged and speeded up, and a specific mandate may be appropriate. Publication of the relevant ETSS in the ONP List of Standards is expected.

Study Recommendation 5

The EC should urgently set up an initial group to examine how best to develop an NM co-ordination or liaison function. We would expect this co-ordination to involve:

- *regular contact with the most important bodies working on NM (e.g. ECMA and OSI/NMF), so as to keep an up to date register or database on who is doing what;*
- *circulation of regular information to interested parties on the current status of research and standardisation work;*
- *holding periodic workshops at which progress would be reported and new ideas discussed;*

Comments: There was little support for this recommendation at the public workshop, in view of the many existing fora. The Commission does not plan to follow up on this recommendation.

Study Recommendation 6

The EC should encourage the setting up within TEDIS of an interest group to address the use of EDI for NM functions.

Comments: There is now an interest group for EDI in telecommunications within TEDIS. It is noted here that the relation with EDI may be applicable only to specific parts of Network Management, in particular those related to billing and accounting information.

Study Recommendation 7

The EC should encourage standards bodies and their feeder organisations (EWOS, the Western European EDIFACT Board) to undertake discussions with NM standards bodies to determine the scope for use of EDI in the longer term and its relationship to TMN and OSI standards. We observe that TMN could potentially 'borrow' EDI for administrative functions.

Comments: It is not considered that in the context of Open Network Provision the Commission has a specific role with regard to this recommendation.

1.2.3 Local Loop Study Recommendations

This section of Appendix 2 reproduces the main conclusions of the Local Loop study conducted by *Analysys Ltd.*⁹ on behalf of the Commission. The aims of the study were to analyse the structure, development, services and evolution of the Local Loop in order to identify any constraints on service provision, and to recommend measures to alleviate these constraints. The study covered a review of relevant new technologies, an analysis of constraints on market demand imposed by Local Loop provisioning bottlenecks, and recommendations for suitable regulatory action. Regulatory policies applied in Japan and the U.S.A. were also considered.

Study Recommendation 1

By 1 January 1996, Article 12 of the Voice Telephony Directive should be modified to include a requirement that all TOs subject to Open Network Provision must publish, by 1 January 1998, a tariff for use of the local loop by telephony service providers (which will also apply to lines used by the TO's own telephony service).

Comments: The need for a published tariff for use of the Local Loop is entirely consistent with Open Network Provision principles. However, the proposed Voice Telephony Directive must be given an opportunity to be fully applied to this area before a modification to it can be contemplated. The issue should rather be addressed as part of the 1996 reform package of legislative measures envisaged for the liberalisation of Voice Telephony in 1998. Furthermore, use for other services and different types of use of the Local Loop have to be taken into consideration, and for different types of access different tariffs may be appropriate:

- 'time-shared' access, where different service providers gain access to the loop at different moments in time; time shared access could be the type of access used by an alternative telephony service provider;
- 'bandwidth-shared' access, where different service providers have simultaneous access to the local loop but use different and well separated frequency ranges; 'data over voice' is an example of this type of access;
- a combination of time-shared and bandwidth-shared access;

⁹Open Network Provision applied to the Local Loop, *Analysys*, November 1993

- exclusive access; this type of access can be seen as using the local loop as a leased line;

Study Recommendation 2

By 1 January 1996, the European Commission should work with the NRAs to produce standard definitions and initial measurements of the elements included in the scheme of specific compensation - also known as access deficit charges - for each Member State. Sufficient detail of the methodology and underlying audited information should be published to enable an informed debate, and give all customers confidence in the equity and stability of the local-loop tariff.

Comments: This recommendation is related to the issues of universal service obligation and access deficit charges, both of which are the subject of specific studies currently being carried out on behalf of the Commission. The studies are scheduled for completion by the end of 1994, and their results will form an essential input to the preparation of new legislation. It is noted here that the definition of access deficit charges as used in the study may need some refinement, and that access deficit charges constitute a possible but not exclusive scheme for supporting the universal service obligation.

Study Recommendation 3

The European Commission should review with ETSI the rate of progress in standardisation of the Q3 and other network management standards. These standards are necessary to facilitate pan-European interworking of local loop and core networks. The purpose of the review will be to ensure that such standards are both timely and of an appropriate form.

Comments: The access to Network Management functions and information is one of the key developing areas of standardisation. The general Network Management aspects are more appropriately dealt with in the context of the Network Management study. For the specific requirements of the Local Loop-to-Core Network boundary, it is considered that the corresponding network management functions should be covered in the context of the V5.x standards on the basis of the Q3 specifications. The draft standardisation mandate referred to in the relevant part of Section 2.3 directs ETSI to proceed on this basis.

Study Recommendation 4

The European Commission should mandate ETSI to ensure that its future standardisation work reflects the requirement for customers to be able to select alternative core networks from the access network in a straightforward manner. One way in which this might be done is to define a 'V5.Sel'¹⁰ interface incorporating digit recognition and consequent delivery to a designated interface in the local loop as the basis for a call-by-call selection of core network (or other carrier). As far as possible, signalling and management capability should be included in the local loop and related standards to support call-by-call, semi-permanent and permanent choices of alternative networks from the local loop.

Comments: Extension of the V5.x interface standards to enable selection of alternative core network or service provider at the level of these interfaces is seen as an important and necessary capability. The selection mechanism should not unnecessarily restrict the number of service providers that can simultaneously offer their services to a customer, however. The draft mandate referred to herein specifically requires ETSI to investigate and standardise such extension in order to support Core Network carrier selection on a call-by-call, semi-permanent and permanent basis.

Study Recommendation 5

The European Commission should reference ETSI V5.1 and V5.2 standards in the Official Journal of the European Communities as being recommended standards for the Local Loop / Core Network interface.

Comments: Initial discussions have taken place between the Commission and ETSI on the V5.1 and V5.2 interfaces, given the advanced state of their development. A comprehensive Mandate to ETSI has been drafted recently requesting ETSI in particular to develop specifications for interfaces at the boundary between the Local Loop and the Local Exchange on the basis of these specifications. Subsequent publication in the ONP List of Standards is foreseen.

Study Recommendation 6

By 1 January 1996, the phrase "including video or audio signals where individually selected by the user" should be added to Article 2.4 of the ONP Framework Directive. This will explicitly include access on demand to entertainment (i.e. entailing switching within the network) in the definition of a telecommunications service.

Comments: Considering the fact that this point touches on issues and items related to TV broadcasting, additional investigations and consultations will be required. This point will further be taken into consideration in relation with the forthcoming Infrastructure Green Paper. Current interpretation by national regulators would appear to support the notion that such signals are regarded as telecommunications rather than broadcast signals.

¹⁰It should be noted that reference in the study to a 'V5.3' interface in this context has been found to lead to misunderstandings, and the term 'V5.Sel' has been introduced in its place for clarification.

Study Recommendation 7

Article 8.2 of the Leased Lines Directive should be modified. A statement should be added to the effect that, where collocation is a technical prerequisite to offering a service which is open to competition, then the TO must provide such access in a non-discriminatory fashion and at a cost-oriented tariff. The requirement to provide non-discriminatory access should be limited to cases where collocation is a technological prerequisite for offering a specific service; either physical, or virtual collocation is acceptable.

Comments: The requirements for collocation have to be studied in a wider context than suggested in this recommendation, and collocation requirements arising from access to the Local Loop should be examined as a particular case. Whereas virtual collocation in general is seen as an alternative to physical collocation, the technical characteristics of services for which access is required may be a determining factor on whether virtual collocation is feasible. Collocation will be more fully addressed in the context of the Interconnection study.

Study Recommendation 8

ETSI should complete standardisation of ADSL transmission for Europe as soon as possible. The standard will form the basis for

- (i) TO video dial tone access used by service providers, and*
- (ii) consumer electronics terminal equipment.*

The European standard should be based on the recommendations of the American National Standards Institute (ANSI) working group T1E1.4 and Bellcore, with the absolute minimum modification.

Comments: Standardisation of alternative, high data rate local loop protocols, such as ADSL and HDSL, needs to be considered. Attention needs to be given at least to the elements transmission protocol, user-network interface, and service provider point of access. The access mechanisms should not unnecessarily restrict the number of service providers that can simultaneously offer their services to a customer. The Commission will discuss possible mandates with the ONP Committee and ETSI. The issue is also relevant to the Infrastructure Green Paper and related collocation requirements.

Study Recommendation 9

Article 10.1 (b) of the Leased Lines Directive should be modified to include separate periodic rental charges for each of the local ends and for the intermediate transmission link (where a local end of the leased line is defined as that part of the leased line supported by the local loop).

Comments: It is seen as essential that leased lines be offered on the basis of cost based rental charges. However, the requirement of this recommendation is largely fulfilled by Recommendation 1 (publication of a Local-Loop tariff), and no additional provision is deemed necessary.

Study Recommendation 10

The forthcoming Open Network Provision study of interconnection should consider the technical and commercial aspects of non-discriminatory access to the ISDN D channel by service providers for the purpose of data transport.

Comments: In the ISDN environment, access to the D-channel is considered an important element of access to the local access network. This is therefore an issue to be addressed as part of a broader consideration of non-discriminatory access.

Study Recommendation 11

The European Commission should ensure that customers can request dark fibre access from a TO. Dark fibre should be made available under the general contractual conditions, and at a price related to cost, as prescribed by the Leased Line Directive.

Comments: The need for a 'dark fibre' leased line type is to be further investigated with the ONP Committee. It also is a point to be addressed in the forthcoming Infrastructure Green Paper. Furthermore, it will be necessary to define 'dark fibre' in technical terms in cooperation with ETSI, for which an appropriate mandate may be considered. For the time being it is not considered necessary to include dark fibre provision in the minimum set of leased lines pursuant to Article 7 of the Leased Lines Directive.

Study Recommendation 12

The European Commission should mandate ETSI to investigate the possible definition of a plain copper based leased-line standard, probably based on NET4 and PT33V. When produced, the standard should be added to the minimum set of leased lines listed in Annex II of the Leased Lines Directive. The standard should specify limits on the frequency and spectral energy transmitted on the line.

Comments: The need for a 'dark copper' leased line type is to be further investigated with the ONP Committee. It also is a point to be addressed in the forthcoming Infrastructure Green Paper. Furthermore, 'dark copper' will have to be defined in technical terms, with the help of ETSI. Therefore, a Mandate to ETSI may be considered for discussion with the ONP Committee.

1.3 ACCESS TO THE BROADBAND NETWORK: ONP FRAMEWORK DIRECTIVE ANNEX I, AREA 8

Study Recommendations on MANs, Frame Relay and Advanced Transmission Networks and their Services

The area of Broadband has been addressed in a single Study conducted by Fischer & Lorenz and OVUM¹¹ on behalf of the Commission. The Study was completed in September 1993.

Frame Relay, ATM, SDH, MANs, TMN are evolving technologies and standards which, individually or collectively may be applied to support Broadband services. As such, they constitute an area for which Open Network Provision conditions may be drawn up in accordance with Article 4 and Annex I of the ONP Framework Directive.

Broadband technologies and networks are still at an embryonic stage at present. In general, while Frame Relay, CBDS/SMDS and various MAN technologies are seen to have significant applications, especially in the short to medium term, the study identifies ATM as the predominant future-proof technology for Broadband networks in the long term.

The Study concludes that for the next five years the Broadband market will be concentrated on data applications, principally for LAN interconnection, with ubiquity of access, a suitable set of quality of service parameters and low cost per volume being the primary considerations supporting a decision to subscribe to Broadband services on the part of many prospective users. After five years, when more extensive Broadband networks have been deployed, other applications currently being defined in the context of B-ISDN or IBS, including video and multimedia applications, should become significant.

The Study contends that the market for Broadband services is at present supply-constrained and that regulatory actions will be necessary to ensure that suppressed demand is released. In particular the study indicates that *"the availability of digital leased lines, tariffed in a truly cost-oriented manner is the single most important factor for the take off of Broadband services in Europe, both in terms of demand and in terms of supply"*. The Commission takes particular note of this conclusion in its evaluation of the Study and considers that it should be an important factor in deciding on the appropriate measures required to ensure the early development of Broadband services in the EU.

Individual numbers have been given to all the Recommendations in this Appendix. Cross references to the relevant sections of the Fischer Lorenz/Ovum Study has been added.

¹¹The Application of ONP to MAN, Frame Relay and Advanced Transmission Networks and their Services, Fischer & Lorenz/Ovum, November 1993

Study Recommendation 1 (Study Section 6.1)

A clear distinction (with respect to regulation) should be made between the provision of underlying infrastructure, in most cases High speed Leased lines HS-LLs (at the NTP) and the provision of Broadband services (at the SPP). The NTP is currently at the limit of the TO monopoly in most Member States and appropriate regulatory measures may therefore include certain obligations at this point. The SPP is in the competitive domain where market forces should normally take precedence over regulatory obligations.

(Study Section 6.5.3)

The Commission should refine the definition of "public telecommunications networks":

in order to more clearly delineate the extent of exclusive or special rights for the construction and operation of telecommunications infrastructures, compatible with Community Law.

in order to allow progress in the definition of Open Network Provision for conditions for network access in ways other than as a leased line if applicable.

Until the implementation of measures on Open Network Provision for infrastructure (other than in the form of leased lines), the Commission should ensure that Users who cannot have their justified needs met by TO's at reasonable cost, are allowed to build their own infrastructure to satisfy those needs, or they may be allowed to use infrastructure provided by others.

Comments : These are important and related issues identified in the in the Study in the context of the approach which should be adopted to providing more open access to public network infrastructure in the Community. These recommendations will be used as an input consideration for the Reform package proposed for 1996. In particular the need to refine the definition of public telecommunications networks once special and exclusive rights have been removed is fully accepted.

Study Recommendation 2 (Study Section 6.5.1)

The Commission shall ensure the early availability of digital leased lines at cost-oriented tariffs, internationally and in all major conurbations in Europe. The emphasis should be initially on 64 Kbit/s and 2 Mbit/s, with 34 Mbit/s to follow later.

Comments: The study report concludes (Section 5.2.2) that:

"The availability of digital leased lines, tariffed in a truly cost-oriented manner, is thus the single most important factor for the take-off of Broadband services in Europe, both in terms of demand and in terms of supply."

The Commission generally shares the conclusions of the Study in this respect and therefore considers the timely implementation of the ONP Framework Directive and the Leased Line directive to be imperative. It is of concern to the Commission that there exists within the Community a demand (especially for high-capacity leased bandwidth) that is not being fulfilled, and that this supply deficiency has undesirable consequences for the development of the Broadband services market in the Community. It is considered essential that actions in the context of existing

Community legislation required to ensure availability of digital leased-line offerings be taken by individual Member States.

Comments are requested on appropriate actions which may be undertaken at Community Level in order to ensure the availability of cost-based leased lines throughout the Community.

Study Recommendation 3 (Study Section 6.4.2 Integrated Broadband Services)

The Commission shall add the preparation of a proposal for a Council Recommendation on the Harmonised Provision of Integrated Broadband Services in accordance with Open Network Provision principles to its ONP Work Programme for 1994.

Comments: Such a Council Recommendation would have to be sufficiently comprehensive to include all services, including ATM, Frame Relay and CBDS services, which may be supported on the envisioned B-ISDN network (IBC for Europe). It may also be appropriate to consider the incorporation of existing Recommendations on PSDS (92/382/EEC) and ISDN (92/383/EEC) in an umbrella Recommendation on B-ISDN services. The provision of pan European Broadband networks and services (Trans-European Networks) is a major requirement identified in the White Paper.¹²

The Commission propose that appropriate actions with respect to this recommendation will be considered in the context of a general review of Open Network Provision which is planned for 1995/1996.

Study Recommendation 4 (Study Section 6.3)

ETSI is recommended to reinforce its standardisation activities in several areas concerned with Frame Relay, ATM and BB Services and related Network Management issues.

Comments While the Commission considers that ETSI is already working on most of the issues identified in this recommendation, it still considers that speeding up the standardisation process and accounting for users' and service providers' needs are important issues to be discussed with ETSI. The Commission, in consultation with the ONP Committee, consider with ETSI the extent to which existing standardisation activities are meeting requirements for evolving Broadband (switched) services.

The Commission will also consider with ETSI the best means of achieving consistency between information models developed in different standardisation fora in relation to Network Management issues. The application of management system capabilities to provide bandwidth-on-demand and customer-controlled configuration services will also be considered in this context.

The Commission in consultation with the ONP Committee will prepare ETSI mandates for Broadband services where specific requirements have been identified by the ETSI/ONP Group.

¹²Op. cit.

The Commission will arrange for publication in the OJ of the resulting ETSI standards in the ONP List of Standards.

Study Recommendation 5 (Study Section 6.4.1)

The ONP Leased Line Directive 92/44/EEC shall be amended to include the following High-Speed Leased Line (HS-LL) offerings:

34 Mbit/s structured and unstructured

140 Mbit/s structured and unstructured

155 Mbit/s (STM-1)

Comments: The most immediate and important requirement is that appropriate standards are available for high-speed leased lines (HS-LLs). In this respect the Commission is rather concerned about the Community-wide non-availability of cost-oriented high-speed leased lines in the short term, and with the fact that ETSI standardisation seem to be well behind market demands in this area. Where new standards require new equipment developments then still more time (a transition period) will be required before services are generally available throughout the Community.

In the short term the Commission will seek the advice of the ONP Committee in identifying possible actions which may be taken to expedite the provision of intra-Community HS-LLs before ETSI standards become available (e.g. the possibility of providing intra-Community HS-LLs based on existing international standards).

For the present, it is not proposed that HS-LL types shall be added to the mandatory list in Directive 92/44/EEC but rather they shall be included in the non-mandatory set in the ONP List of Standards. Comments are invited on the advisability of adding further leased line types to the mandatory list of Directive 92/44/EEC.

An ETSI mandate already has been placed for 34 Mbit/s and 140 Mbit/s Leased lines. A future mandate will be proposed for an SDH leased digital bandwidth service which will include 155 Mbit/s (STM-1) offerings. It is intended that this mandate will take account of the possibility of providing enhanced service features made possible by advances in technology and standards as envisaged by Article 4 and Annex 1 of the Framework Directive (90/387/EEC) applied to Broadband networks.

Study Recommendation 6 (Study Section 6.2)

For both Frame Relay and Integrated Broadband Services (IBS), initiatives to encourage development should be taken by means of appropriate MoUs.

Comments It is not the Commission's intention to set specific requirements for service introduction, but rather to create a framework for interworking and for agreeing a voluntary minimum set of services. It is accepted that the recommendation indicates an appropriate way of achieving these objectives. In pursuing their response to this recommendation, the Commission will also take account of activities such as of the Frame Relay Forum and of the ATM Forum. The Commission, by means of the RACE programme, is actively supporting the development of technologies for these services and contributions to relevant standards bodies and fora.

The Commission can play a role in the encouragement of MoUs for IBS including ATM and Frame Relay, and can advise on the application of guidelines for such MoUs to ensure compliance with the Treaty competition rules.

Study Recommendation 7 (Study Section 6.5.3 - Collocation)

The Commission shall ensure that the principle of non-discrimination clearly takes account of any advantages from collocation or other forms of technical integration with monopoly services or infrastructure which TOs may enjoy when providing competitive services.

Comments Technology and service evolution, including the increasing trend towards system, network and service integration and the deployment of fibre in the access and distribution networks, may put service providers at a competitive disadvantage vis-à-vis the TOs and other network providers, by making access to network resources more restrictive. In an environment of increasing competition it is important that no supplier of services enjoys an unfair competitive advantage by virtue of being the predominant provider of network resources or services.

This Recommendation will be considered in the context of the 1995/1996 ONP Reform Package and particularly as an input for the proposed Infrastructure Green Paper. For the present no regulatory actions are proposed.

1.4 ADDITIONAL NETWORK FUNCTIONS

1.4.1 Analysis of Audible Tones in the Voice Telephony Service¹³

Study Recommendation 1

The Commission should encourage a rapid start of a process leading to a gradual standardisation of the tones in the EC countries, taking into consideration that the standardisation will allow to solve the difficulties of human users (temporarily staying in another Community country, or needing to make calls to other Community countries). The following set of seven tones is proposed: dial tone; ringing tone; busy tone; special information tone; call waiting tone; warning/intrusion tone and pay tone.

Study Recommendation 2

While the Operators consider a distinction between Congestion and Busy tones useful for the evaluation of the quality of service of a network, it seems questionable that for the human users a distinction between the two tones is possible and necessary, taking into account the influence on the behaviour of the human users.

Study Recommendation 3

The second dial tone and the call in progress tone can cause some confusion to human users. Their gradual abolition, already underway, should be encouraged.

Study Recommendation 4

An important first step of the harmonisation of tones useful for the human users could be represented by the unification in the EC Countries of the types of tone utilised, independent of the characteristics of these tones.

Comments: Based on the conclusions of this study the Commission, in consultation with the ONP Committee agreed to send a standardisation mandate to ETSI on the specification of characteristics of a harmonised set of telephone tones generated by public networks. The work covered in this mandate will be done in two steps. Step 1 will produce an ETR taking as a reference the works currently under development by ETSI. The ETR produced will be analysed by the Commission in consultation with the ONP Committee. On the basis of the outcome of step 1, Step 2 will allow the production of voluntary standards to allow the gradual harmonisation of network-generated tones in the EU Member States and the rest of Europe.

Taking into account the limited ability of an average user to distinguish and remember different tones, the mandate gives maximum priority to the standardisation of the following six tones: *dial tone, ringing tone, busy tone, special information tone, call waiting tone and pay tone*. Four more tones were considered also very important:

¹³Report on the Audible Tones in the Telephone Service in the EC Countries, Prof. D. Gagliardi, April 1993

special dial tone, positive indication tone, intrusion tone and congestion tone. The identification of these ten tones does not preclude standardisation of other tones.

Although different tones are proposed for busy and congestion situations, there should nevertheless be some resemblance between the main characteristics of these two tones so that users can assimilate them as a single tone.

The fulfilment of the schedule proposed in the mandate which envisages ETR completion by April 1995 (and ETS adoption by April 1996) will be encouraged by the Commission and ETSs produced as a result of this process will be published in the ONP List of Standards in the OJ.

1.4.2 Study Recommendations on new ISDN Interfaces

OVUM Report on the proposed ISDN U-interface¹⁴

Study Recommendation 1

The principal conclusions are that:

- *a European standard for the ISDN U-interface should be developed as soon as possible;*
- *there appear to be considerable advantages to TOs and users in the voluntary provision of the ISDN U-interface as well as the S interface from about 1995;*
- *TO arrangements behind the U-interface (such as the provision of a so called 'U-box') should not be restricted by regulation.*

Study Recommendation 2

It is particularly important that a European standard for the ISDN U-interface should be developed as soon as possible. The reason is that we have identified substantial economic benefits from the U-interface.¹⁵

Study Recommendation 3

These economic benefits are sufficiently great that it is inevitable that one or more European TOs will give their customers access to the U-interface before long. If no European standard is available, we shall be back in the position where different countries have different user-network interfaces for ISDN - and the Commission's excellent work in creating a Euro-ISDN standard will be severely undermined. Early agreement of a standard U-interface is the only way to avoid this damaging outcome.

¹⁴Application of the Principles of Open Network Provision to the ISDN U-interface, OVUM/Fischer & Lorenz, May 1993

¹⁵These were quoted as approximately ECU 800M by the year 2000

Study Recommendation 4

A European U-interface would have the additional benefits of:

- *increasing the efficiency of European TOs' NT1 procurement through the economies of scale which arise from a common interface specification.*
- *providing a standard two wire interface for adoption behind ISDN PBXs - the only way to end the current proliferation of proprietary interfaces*

Study Recommendation 5

Our research indicates that introduction of the U-interface by 1995 could increase the penetration of ISDN in the European Community achieved by 2000 by almost 50 %. The reason is that providing ISDN with the U-interface could reduce the cost of provision sufficiently for it to be attractive at many locations currently served by one or two PSTN lines. If the S interface is retained as the only user-network interface, ISDN is likely to be attractive at many fewer small sites.

Study Recommendation 6

This analysis suggests that, if the U-interface is made available by 1995, over ten million ISDN basic access lines could be expected to be in use in EC countries by the year 2000. If only the S interface is available, only seven million could be expected.

Study Recommendation 7

The approach we have taken to this study rests on two major assumptions:

- *that ISDN should be the digital successor of the telephone network. It should be inexpensive, so that the benefits of advanced communications can be made available as widely as possible throughout Europe;*
- *the boundaries of the TO monopolies should be drawn so as to make the benefits of competition (in particular, lower prices and faster innovation) available to users.¹⁶*

Study Recommendation 8

Once the standard has been defined it should also be the basis for a U-interface offered to ISDN users. Our analysis indicates that making the U-interface available for ISDN basic access will lead to a reduction in the cost of providing ISDN, particularly to small business and residential users. By the year 2000, users with only one or two PSTN exchange lines would find ISDN economically attractive if the U-interface was available. Without the U-interface, ISDN would be unattractive to most such users.

¹⁶See recital 13 of Terminal Directive, 88/301/EEC, par 13

ETSI Report on the proposed ISDN U-interface¹⁷

Study Recommendation 1

A few configurations have been identified which may encourage the introduction of a U-interface:

- *connection of a unique ISDN multi-application terminal (e.g. a video-telephone) in a point-to-point configuration between the exchange and the customer terminal;*
- *connection of a terminal adapter for multiple existing terminals in a point-to-point configuration between the exchange and the customer terminal adapter.*

However, in both cases no extension is possible without a change of customer in-house installation, and the creation of an NT1 and S-bus configuration. The use of both S- and U-interfaces requires two different families of terminals, one to be connected to the S, and the other to be connected to the U. This contrasts with the existing situation where the same terminals can be used at both S and T interfaces;

an interest has been identified inside the PABX, for solving specific problems such as connection of dedicated terminals, use of a simpler transmission system, use of the existing cabling, however this was outside the mandate of the group and the interest of a standard would be, if and only if, this standard is used to open the terminal market also in the private networks;

Study Recommendation 2

The transmission systems so far defined are only for copper wires and the following points need to be taken into account in the evaluation:

- *the network evolution from copper to fibre or other media*
- *the definition of an interface either as an 'internal network interface' or as a "user-to-network" interface.*

Study Recommendation 3

Additionally, two major issues have been identified:

- *the definition of 'U-box' and the cabling characteristics between the U-box and the terminal with integrated NT1, or a customer owned NT1;*
- *the maintenance and associated parameters which need to be redefined with the existing testing equipment to be redesigned.*

In conclusion, unless the economical studies prove the benefit of having the U-interface defined, based on the results of the technical evaluation the Task Group believes that, unless there are solid arguments to support economic and market benefit of introducing a U-interface, there seems to be no reason to create an alternative U-interface standard, and, as based on this Comments it appears to offer little technical merit.

¹⁷ONP Study on Possible new Interfaces at the Network side of an NT1, ETSI Technical Report 119, December 1993

Comments: In view of the absence of an industry wide consensus, it is not felt appropriate to take initiatives at this moment in time. However, both the Commission and the ONP Committee have expressed the view that developments in this field should be closely watched, and that initiatives may be required at a later stage.

APPENDIX 2 : LIST OF STUDIES & GLOSSARY

2.1 List of Open Network Provision Studies referenced

	Study Title	Study Contractor	Date of publication
	New types of access and access to IN		
1.	The application of Open Network Provision to Intelligent Network Functions	KPMG Peat Marwick	March 1993
2.	Open Network Provision applied to the Local Loop	Analysys	November 1993
3.	Study of the Application of Open Network Provision to Network Management	NERA	May 1992
	Access to the Broadband network		
4.	The Application of Open Network Provision to MAN, Frame Relay and Advanced Transmission Networks and their Services.	Fischer & Lorenz/Ovum	November 1993
	Studies complementing previous work		
5.	Report on the Audible Tones in the Telephone Service in the EC Countries.	Prof. D. Gagliardi	April 1993
6.	Application of the Principles of Open Network Provision to the ISDN U-interface	Ovum/Fischer & Lorenz	May 1993
7.	Open Network Provision Study on Possible new Interfaces at the Network side of an NT1	ETSI	December 1993
8.	Application of the principles of Open Network Provision to the ISDN M-interface	Ovum/Fischer & Lorenz	July 1994

2.2 Glossary - List of Acronyms used in the Report

Acronym	Meaning	relates to
ADSL	Asymmetric Digital Subscriber Loop	
ATM	Asynchronous Transfer Mode	B-ISDN
ATM-CC	ATM Cross Connect	ATM
B-ISDN	Broadband Integrated Services Digital Network	ISDN
CBDS	Connectionless Broadband Data Service	B-ISDN
CCITT	the International Telegraph and Telephone Consultative Committee [now ITU-T]	ITU
ETR	ETSI Technical Report	ETSI
ETS	European Telecommunications Standard	ETSI
ETSI	European Telecommunications Standards Institute	
FR	Frame Relay	(B-)ISDN
HDSL	High-bitrate Digital Subscriber Loop	
HS-LL	High Speed Leased Line	
IBS	Integrated Broadband Services	B-ISDN
IN	Intelligent Network	
INAP	Intelligent Network Application Protocol	IN
INO	Intelligent Network Operator	IN
ISDN	Integrated Services Digital Network	
ITU	International Telecommunication Union	
MAN	Metropolitan Area Network	B-ISDN
MoU	Memorandum of Understanding	

Acronym	Meaning	relates to
NM	Network Management	
NRA	National Regulatory Authority	
NT1	Network Termination point 1	ISDN
ONP	Open Network Provision	
ONP-CCP	ONP Consultation and Coordination Platform	
PABX	Private Automatic Branch eXchange	
QoS	Quality of Service	
SDH	Synchronous Digital Hierarchy	B-ISDN
SMDS	Switched Multi-megabit Data Service	B-ISDN
SP	Service Provider	
STC	Sub-Technical Committee	ETSI
TC	Technical Committee	ETSI
TMN	Telecommunications Management Network	NM
TO	Telecommunications Organisation	
UPT	Universal Personal Telecommunications	IN
VPN	Virtual Private Network	IN