La normalisation

La normalisation est un acte primordial dans le domaine de la communication. En effet, il faut que tout utilisateur connecté au réseau soit apte à recevoir et à transmettre des informations destinées à l'ensemble des participants ou tout au moins au groupe d'utilisateurs qui veulent communiquer. Il faut se mettre d'accord sur l'ensemble des éléments nécessaires à la communication pour que des échanges puissent s'effectuer. Si l'un des utilisateurs parle en anglais et que le récepteur ne comprenne que le français, aucun dialogue ne sera possible. Les règles à respecter des deux côtés de la communication s'appellent des protocoles. L'ensemble des participants à un échange d'informations doit respecter des protocoles communs. La plupart des constructeurs informatiques se sont forgé leurs propres règles pour que leurs différents matériels communiquent. C'est ce que l'on appelle des architectures de communication constructeurs ou propriétaires.

La normalisation peut s'effectuer de deux façons : soit les constructeurs se mettent tous ensemble d'accord sur des règles communes, soit un constructeur impose aux autres un protocole plus performant ou capable de satisfaire la demande des utilisateurs. Ce protocole ne constitue pas vraiment une norme, puisqu'il n'a pas de valeur internationale, il l'est « de fait ».

De même, des groupements de représentants de divers horizons peuvent imposer des propositions qui sont aussi des normes de fait. Le monde IP, en particulier, appartient à cette catégorie.

Au contraire, le but des organismes de normalisation est d'obtenir des normes *de jure* qui fassent l'unanimité au niveau national ou international. De nombreuses réunions de groupes de travail sont nécessaires pour parvenir à des textes précis. Commençons par les organismes de droit puis nous terminerons par les groupements.

NORMALISATION DE DROIT

Deux organismes de normalisation s'occupent du domaine des réseaux informatiques :

- l'ISO (International Organization for Standardization) ;
- l'UIT-T (Union Internationale des Télécommunications – Secteur de la Standardisation des Télécommunications), qui a remplacé le CCITT au 1er mars 1993 (Comité Consultatif International Télégraphique et Téléphonique).

ANNEXE

A

ISO et CEI

L'ISO est un organisme dépendant de l'ONU qui s'occupe de tous les domaines techniques en dehors de l'électricité et de l'électronique. Le travail est basé sur le volontariat et tout le monde peut y participer. Les représentants nationaux sont des organismes nationaux de normalisation :

- ANSI pour les États-Unis ;
- AFNOR pour la France ;
- DIN pour l'Allemagne ;
- BSI pour le Royaume-Uni ;
- JISC pour le Japon.

Pour arriver à constituer une norme, le document doit franchir de nombreuses étapes qui sont représentées dans la figure A.1.

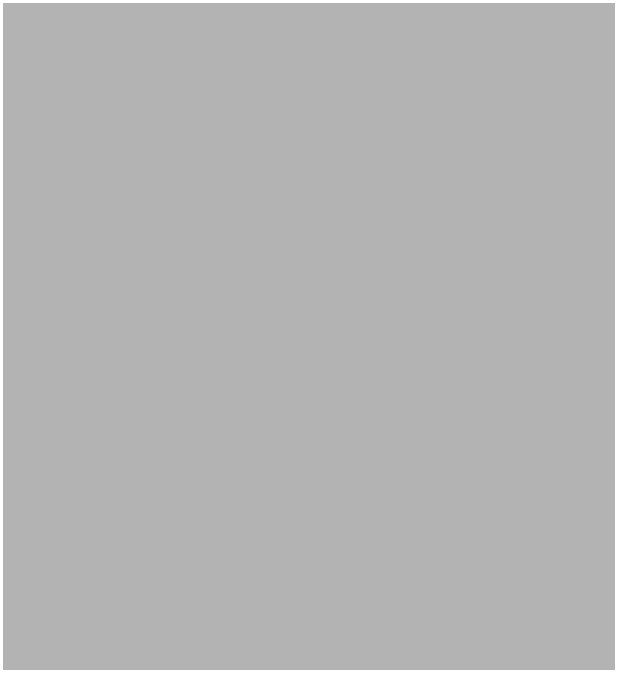

FIGURE A.1 • *Les différentes étapes à franchir pour arriver à une norme*

Les représentants des différents organismes nationaux sont regroupés dans des groupes de travail ou WG (Working Group). Ces derniers sont rassemblés dans des

sous-comités ou SC (Sub Committee) qui, eux-mêmes, forment un comité de travail, le TC (Technical Committee).

Le CEI (Comité Électrotechnique International), qui s'occupe de la normalisation électrique et électronique, a rassemblé ses groupes techniques avec ceux de l'ISO. Les deux organismes ont une compétence complémentaire, nécessaire à l'élaboration de normes dans ce secteur. Le Comité Technique (TC) est commun à ISO et à CEI : c'est le Joint Technical Committee 1 (JTC1). Deux sous-comités (SC) s'occupent plus spécifiquement de réseaux informatiques dans lesquels des groupes de travail produisent des documents. La structure globale est représentée dans la figure A.2.

FIGURE A.2 • *La composition de l'ISO*

UIT-T

L'UIT (Union Internationale des Télécommunications), ou ITU (International Telecommunication Union), est chargé par l'ONU des normes qui portent le nom de « recommandations », dans le domaine des télécommunications. En fait l'UIT est un

organisme plus complexe qui possède plusieurs secteurs : les radiocommunications, le développement, le secteur de la standardisation pour les télécommunications ou UIT-T (Telecommunication standardization sector). Les recommandations qui venaient auparavant du CCITT sont maintenant remplacées par les recommandations UIT-T. L'UIT-T réunit les organismes et les administrations membres de l'UIT. De grands groupes privés, officiellement reconnus, font partie de l'UIT-T. L'ISO et d'autres organismes non gouvernementaux participent aux travaux de l'UIT-T. De ce fait, une relation étroite est nécessaire entre l'ISO et l'UIT-T pour que les normes et recommandations soient identiques ou, au moins, qu'elles constituent un sous-ensemble ou un sur-ensemble l'une de l'autre.

Les recommandations de l'UIT-T sont publiées tous les quatre ans dans un livre d'une couleur chaque fois différente : livre jaune, livre rouge, livre bleu, etc. L'UIT-T est divisé en groupes d'études, les SG (Study Group), qui préparent les documents qui seront adoptés en commission plénière. On trouve :

- SG 1 : définition des services télématiques ;
- SG 2 : services téléphoniques ;
- SG 3 : principes tarifaires ;
- SG 4 : maintenance ;
- SG 7 : réseaux de transmission de données ;
- SG 8 : équipements usagers ;
- SG 11 : signalisation et équipements de commutation ;
- SG 15 : systèmes de transmission ;
- SG 18 : réseaux numériques.

Les recommandations de l'UIT-T commencent par une lettre : G, I, Q, V, X, T, suivant le domaine normalisé. Par exemple, X.25 est une recommandation de l'UIT-T (on peut encore dire CCITT).

Le rôle de l'UIT-T est très important, du fait dela puissance des organismes qui effectuent les travaux : les opérateurs de télécommunication en Europe, plus particulièrement. Une sorte de concurrence entre l'ISO et l'UIT-T a parfois poussé l'un des deux organismes de normalisation à sortir à la hâte un document qui appelle ensuite de nombreux rectificatifs et, parfois, une nouvelle norme ou une nouvelle recommandation.

En Europe, l'organisme le plus influent dans le domaine de la normalisation est l'ETSI (European Telecommunications Standards Institute) qui a été créé en mars 1988. Cet organisme est né de la volonté des opérateurs européens d'harmoniser leurs protocoles. L'ETSI provient de deux organismes, le CFH (Committee For Harmonization) et la CEPT (Conférence Européenne des Postes et Télécommunications). Onze comités techniques produisent des documents qui passent devant l'assemblée technique. Un comité spécifique est chargé d'examiner la prospective : le SRC (Strategic Review Committee).

NORMALISATION DE FAIT

ISOC/IETF

L'ISOC (Internet Society) a été établie en 1992. L'ISOC est l'organisation qui dirige la normalisation du monde IP. L'IAB (Internet Architecture Board) définit les voies à suivre pour normaliser l'architecture Internet et sa gestion. L'IAB, établi en 1989, dépend directement de l'ISOC.

L'IETF, né en 1986, développe les standards IP suivant les directions indiquées par l'IAB. Plus de 2500 RFC (Request For Comments) ont été publiés. Tout le monde peut participer aux réunions de l'IETF et soumettre un document. Quelque 120 groupes de travail font progresser les propositions. Ils sont regroupés en huit domaines :

- application,
- général
- Internet,
- gestion,
- routage,
- sécurité,
- transport,
- service utilisateur.

Le premier pas consiste à introduire un draft Internet provenant de discussions par le courrier électronique. Ces drafts deviennent des RFC dès qu'un consensus quasi général est atteint.

L'Internet Engineering Steering Group (IESG) se compose d'un ensemble d'experts nommés par l'IAB. L'IESG gère le travail des groupes de travail en acceptant ou non le passage vers des RFC. Les drafts avancés de l'IETF sont soumis à l'IESG pour être passés au rang de RFC puis de standard Internet. Les drafts Internet ne demeurent valables que 6 mois après leur proposition.

Pour devenir un standard, un RFC doit passer par les étapes de DS (Draft Standard) puis de PS (Proposed Standard). Un RFC sous la forme d'un PS (Proposed Standard) devient un DS (Draft Standard) après six mois et l'agrément de l'IESG. Des RFC avec l'appellation DS deviennent des standards après quatre mois et de nouveau l'acceptation de l'IESG. Les standards Internet ont un numéro attribué par l'IESG. Un standard doit être implémenté par au moins deux organisations indépendantes avec une gestion et une sécurité parfaitement précisées. Il y a une soixantaine de RFC qui ont le statut de standard Internet.

Des RFC deviennent « historiques » lorsqu'ils ne sont plus appliqués ou remplacés par de nouveaux textes.

ATM Forum

L'ATM Forum a été établi en 1991 pour réaliser des implémentations concertées des protocoles ATM dans un monde privé. Au départ, ce groupement avait pour but une implémentation compatible entre de nombreuses sociétés informatiques. Depuis quelques années, l'ATM Forum s'intéresse au monde IP et à son utilisation au-dessus des protocoles ATM. Les groupes de travail sont les suivants :

- B-ICI (Broadband Intercarrier Interface)
- Control Signaling
- Data Exchange Interface
- LAN Emulation/MPOA
- Network Management
- Physical Layer
- P-NNI (Private Network to Network Interface)
- Residential Broadband
- Service Aspects and Applications
- Security
- Signaling
- Testing
- Traffic Management
- Voice and Telephony over ATM
- User–Network Interface

DAVIC

DAVIC a été établi en 1994, dans le but de développer une architecture pour le transport de la vidéo et plus spécifiquement de MPEG-2. C'est un groupe commun de l'ISO/IEC JTC1 (International Organization for Standardization/International Electrotechnical Commission, Joint Technical Committee 1 TC29) et de l'UIT-T Study Group 15 (SG15). Les spécifications de DAVIC concernent en premier lieu des standards qui ont été développés dans d'autres organismes (UIT-T, ISO/IEC JTC1 et l'IETF). Lorsqu'il n'y a pas de standards disponibles, DAVIC peut en proposer. Trois groupes de travail ont été créés : spécification, architecture et intégration, et enfin API et sécurité.

Tiphon

TIPHON (Telecommunications and Internet Protocol Harmonization Over Networks) est un groupement qui dépend de l'ETSI. Sept groupes de travail développent des spécifications sur la téléphonie sur IP :

- WG1: Requirements,
- WG2: Architecture,

- WG3: Signaling/Call Control,
- WG4: Numbering/Naming/Addressing,
- WG5: QoS,
- WG6: Verification,
- WG7: Wireless and Mobility,
- WG6: Verification tests of ETSI specifications.

L'ETSI publie plusieurs types de livrables : Europe-Norm (EN), ETSI Standard (ETS), ETSI Report (ETR), Technical Specification (TS) et Technical Report (TR).

Tous les livrables de TIPHON sont des TS (Technical Spécification) ou des TR (Technical Report). L'urgence de la normalisation dans ce domaine a conduit l'ETSI à rester à ce niveau de définition en adoptant ces textes sans vote, avec un consensus presque total.

Multimedia Switching Forum

Le MSF (Multimedia Switching Forum) a été fondé en 1988 avec pour objectif l'implémentation des standards pour les commutateurs multiservices MSS (MultiService Switch) fondés sur la technologie ATM. Trois groupes de travail produisent des documents de spécification :

- Architecture (définition des interfaces),
- Switch Control (contrôle et gestion des interfaces),
- Media (modèle de contrôle de la parole et interface de passerelle avec le monde multimédia).

Optical Internetworking Forum

Les récentes avancées dans le monde du multiplexage en longueur d'ondes WDM (Wavelength-Division Multiplexing), du Gigabit Ethernet et des routeurs/commutateurs gigabit/térabit ont contribué à la mise sur pied de l'OIF (Optical Internetworking Forum) qui a été fondé en avril 1988. L'objectif principal de l'OIF est de développer des spécifications sur les réseaux optiques et leur interfonctionnement. La première spécification porte sur IP, sur WDM et IP sur réseau optique. Lorsque ce groupement a démarré ses travaux, aucun autre organisme ne s'occupait des mêmes intérêts. Aujourd'hui, ces aspects sont en partie couverts par l'UIT-T dans son groupe SG15.

LES PRINCIPAUX STANDARDS

UIT-T

Dans les lignes qui suivent, nous donnons les séries de recommandations de l'UIT-T puis à l'intérieur de chaque série, dans les domaines qui nous intéressent dans ce livre, les grands groupes de normes. Nous utilisons les titres officiels en anglais dans la suite.

Series A - Organization of the work of the ITU-T

Series B - Means of expression: definitions, symbols, classification

Series C - General telecommunication statistics

Series D - General tariff principles

Series E - Overall network operation, telephone service, service operation and human factors

Series F - Non-telephone telecommunication services

Series G - Transmission systems and media, digital systems and networks

Series H - Audiovisual and multimedia systems

Series I - Integrated services digital network

Series J - Transmission of television, sound programme and other multimedia signals

Series K - Protection against interference

Series L - Construction, installation and protection of cables and other elements of outside plant

Series M - TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits

Series N - Maintenance: international sound programme and television transmission circuits

Series O - Specifications of measuring equipment

Series P - Telephone transmission quality, telephone installations, local line networks

Series Q - Switching and signalling

Series R - Telegraph transmission

Series S - Telegraph services terminal equipment

Series T - Terminals for telematic services

Series U - Telegraph switching

Series V - Data communication over the telephone network

Series X - Data networks and open system communication

Series Y - Global information infrastructure

Series Z - Languages and general software aspects for telecommunication systems

La série F

- Operating methods for the international public telegram service (F.1 - F.18)
- The gentex network (F.20 - F.24)
- Message switching (F.30 - F.35)
- The international telemessage service (F.40 - F.41)
- The international telex service (F.59 - F.89)
- Scheduled and leased communication services (F.100 - F.104)
- Phototelegraph service (F.105 - F.108)
- Mobile services and multidestination satellite services (F.110 - F.150)
- Public facsimile service (F.160 - F.190)
- Videotex service (F.300 - F.301)
- General provisions for telematic services (F.350 - F.353)
- Message handling services (F.400/X.400 - F.472)
- Directory services (F.500 - F.510)
- Document communication (F.551 - F.551)
- Programming communication interfaces (F.581 - F.581)
- Data transmission services (F.600 - F.600)
- Audiovisual services (F.700 - F.761)
- ISDN services (F.811 - F.813)
- Universal personal telecommunication (F.850 - F.853)
- Human factors (F.901 - F.910)
- Supplements to the Series F Recommendations (F.Sup1 - F.Sup2)

La série G

- General definitions (G.100 - G.107)
- General Recommendations on the transmission quality for an entire international telephone connection (G.111 - G.117)
- General characteristics of national systems forming part of international connections (G.120 - G.126)
- General characteristics of the 4-wire chain formed by the international circuits and national extension circuits (G.131 - G.131)
- General characteristics of the 4-wire chain of international circuits; international transit (G.142 - G.142)
- Apparatus associated with long-distance telephone circuits (G.164 - G.168)
- Transmission plan aspects of special circuits and connections using the international telephone connection network (G.171 - G.176)
- Protection and restoration of transmission systems (G.180 - G.181)
- Software tools for transmission systems (G.191 - G.192)
- Definitions and general considerations (G.211 - G.215)
- General Recommendations (G.221 - G.229)
- Translating equipment used on various carrier-transmission systems (G.230 - G.233)

- Utilization of groups, supergroups, etc. (G.241 - G.243)
- Carrier telephone systems on unloaded symmetric cable pairs, providing groups or supergroups (G.322 - G.325)
- Carrier systems on 2.6/9.5 mm coaxial cable pairs (G.332 - G.334)
- Carrier systems on 1.2/4.4 mm coaxial cable pairs (G.341 - G.346)
- Additional Recommendations on cable systems (G.352 - G.352)
- General Recommendations (G.411 - G.411)
- Interconnection of radio-relay links with carrier systems on metallic lines (G.421 - G.423)
- Hypothetical reference circuits (G.431 - G.431)
- Circuit noise (G.441 - G.442)
- Radiotelephone circuits (G.451 - G.451)
- Testing equipments (G.511 - G.511)
- General (G.601 - G.602)
- Symmetric cable pairs (G.611 - G.614)
- Land coaxial cable pairs (G.621 - G.623)
- Submarine cables (G.631 - G.631)
- Optical fibre cables (G.650 - G.655)
- Characteristics of optical components and sub-systems (G.661 - G.692)
- General (G.701 - G.707)
- Coding of analogue signals by pulse code modulation (G.711 - G.712)
- Coding of analogue signals by methods other than PCM (G.720 - G.729)
- Principal characteristics of primary multiplex equipment (G.731 - G.739)
- Principal characteristics of second order multiplex equipment (G.741 - G.747)
- Principal characteristics of higher order multiplex equipment (G.751 - G.755)
- Principal characteristics of transcoder and digital multiplication equipment (G.761 - G.767)
- Operations, administration and maintenance features of transmission equipment (G.772 - G.776.1)
- Principal characteristics of multiplexing equipment for the synchronous digital hierarchy (G.780 - G.785)
- Other terminal equipment (G.791 - G.797)
- General aspects (G.801 - G.805)
- Design objectives for digital networks (G.810 - G.813)
- Quality and availability targets (G.821 - G.827)
- Network capabilities and functions (G.831 - G.83)
- SDH network characteristics (G.841 - G.842)
- Telecommunications management network (G.851.1 - G.872)
- General (G.901 - G.902)
- Parameters for optical fibre cable systems (G.911 - G.911)
- Digital sections at hierarchical bit rates based on a bit rate of 2048 kbit/s (G.921 - G.921)

- Digital line transmission systems on cable at non-hierarchical bit rates (G.931 - G.931)
- Digital line systems provided by FDM transmission bearers (G.941 - G.941)
- Digital line systems (G.950 - G.958)
- Digital section and digital transmission systems for customer access to ISDN (G.960 - G.966)

La série H

- Characteristics of visual telephone systems (H.100 - H.140)
- General (H.200 - H.200)
- Transmission multiplexing and synchronization (H.221 - H.226)
- Systems aspects (H.230 - H.235)
- Communication procedures (H.242 - H.247)
- Coding of moving video (H.261 - H.263)
- Related systems aspects (H.281 - H.281)
- Systems and terminal equipment for audiovisual services (H.310 - H.332)
- Supplementary services for multimedia (H.450.1 - H.450.3)
- Supplements to the Series H Recommendations (H.Sup16 - H.Sup5)

La série I

- Terminology (I.112 - I.114)
- Description of ISDNs (I.120 - I.122)
- General modelling methods (I.130 - I.130)
- Telecommunication network and service attributes (I.140 - I.141)
- General description of asynchronous transfer mode (I.150 - I.150)
- Scope (I.200 - I.200)
- General aspects of services in ISDN (I.210 - I.211)
- Common aspects of services in the ISDN (I.220 - I.221)
- Bearer services supported by an ISDN (I.230 - I.233.2)
- Teleservices supported by an ISDN (I.240 - I.241.8)
- Supplementary services in ISDN (I.250 - I.259.1)
- Network functional principles (I.310 - I.313)
- Reference models (I.320 - I.329)
- Numbering, addressing and routing (I.330 - I.334)
- Connection types (I.340 - I.340)
- Performance objectives (I.350 - I.359)
- Protocol layer requirements (I.361 - I.366.2)
- General network requirements and functions (I.370 - I.380)
- ISDN user-network interfaces (I.410 - I.414)
- Application of I-series Recommendations to ISDN user-network interfaces (I.420 - I.421)
- Layer 1 Recommendations (I.430 - I.432.5)

- Layer 2 Recommendations (I.440 - I.441)
- Layer 3 Recommendations (I.450 - I.452)
- Multiplexing, rate adaption and support of existing interfaces (I.460 - I.465)
- Aspects of ISDN affecting terminal requirements (I.470 - I.470)
- Internetwork interfaces (I.500 - I.581)
- Maintenance principles (I.601 - I.630)
- ATM equipment (I.731 - I.732)
- Management of ATM equipment (I.751 - I.751)
- Supplements to the Series I Recommendations (I.Sup1 - I.Sup1)

La série J

- General Recommendations (J.1 - J.2)
- General specifications for analogue sound-programme transmission (J.11 - J.19)
- Performance characteristics of analogue sound-programme circuits (J.21 - J.27)
- Digital encoders for analogue sound-programme signals (J.41 - J.42)
- Digital transmission of sound-programme signals (J.51 - J.57)
- Circuits for analogue television transmission (J.61 - J.68)
- Digital transmission of television signals (J.80 - J.87)
- Ancillary digital services for television transmission (J.90 - J.94)
- Operational requirements and methods for television transmission (J.100 - J.101)
- Interactive systems for digital television distribution (J.110 - J.113)
- Transport of MPEG-2 signals on packetised networks (J.131 - J.132)
- Measurement of the quality of service (J.140 - J.140)
- Digital television distribution through local subscriber networks (J.150 - J.150)
- Supplements to the Series J Recommendations (J.Sup1 - J.Sup3)

La série M

- Introduction and general principles of maintenance and maintenance organization (M.10 - M.160)
- International transmission systems (M.320 - M.556)
- International telephone circuits (M.560 - M.734)
- Common channel signalling systems (M.760 - M.762)
- International telegraph systems and phototelegraph transmission (M.800 - M.880)
- International leased group and supergroup links (M.900 - M.910)
- International leased circuits (M.1010 - M.1060)
- Mobile telecommunication systems and services (M.1130 - M.1170)
- International public telephone network (M.1230 - M.1235)
- International data transmission systems (M.1300 - M.1385)
- Designations and information exchange (M.1400 - M.1560)
- International transport network (M.2100 - M.2130)
- Telecommunications management network (M.3000 - M.3400)

- Integrated services digital networks (M.3600 - M.3660)
- Common channel signalling systems (M.4010 - M.4110)
- Technical information (M.Sup1.1 - M.Sup1.6)
- Measuring techniques (M.Sup2.1 - M.Sup2.9)
- Transmission performance of the international network (M.Sup4.1 - M.Sup4.9)
- Miscellaneous (M.Sup6.1 - M.Sup6.2)

La série Q

- Signalling in the international manual service (Q.1 - Q.2)
- Basic Recommendations (Q.4 - Q.9)
- Numbering plan and dialling procedures in the international service (Q.11 ter - Q.11)
- Routing plan for international service (Q.12 - Q.14)
- General Recommendations relative to signalling and switching systems (national or international) (Q.20 - Q.33)
- Tones for use in national signalling systems (Q.35/E.180 - Q.35)
- General characteristics for international telephone connections and circuits (Q.44 - Q.45)
- Signalling for satellite systems (Q.48 - Q.48)
- Signalling for circuit multiplication equipment (Q.50 - Q.50)
- Methodology (Q.65 - Q.65)
- Basic services (Q.68 - Q.76)
- Supplementary services (Q.80 - Q.87.2)
- General clauses (Q.101 - Q.109)
- Transmission clauses for signalling (Q.110 - Q.114)
- Control of echo suppressors (Q.115 - Q.115)
- Abnormal conditions (Q.116 - Q.118)
- Specifications of Signalling System No. 4 (Q.120 - Q.139)
- Specifications of Signalling System No. 5 (Q.140 - Q.164)
- Interworking of Signalling Systems No. 4 and No. 5 (Q.180 - Q.180)
- Functional description of the signalling system (Q.251 - Q.253)
- Definition and function of signals (Q.254 - Q.256)
- Signal unit formats and codes (Q.257 - Q.260)
- Signalling procedures (Q.261 - Q.268)
- Continuity check of the speech path (Q.271 - Q.271)
- Signalling link (Q.272 - Q.279)
- Signal traffic characteristics (Q.285 - Q.287)
- Security arrangements (Q.291 - Q.293)
- Testing and maintenance (Q.295 - Q.296)
- Network management (Q.297 - Q.297)
- Interworking between ITU-T Signalling System No. 6 and national common channel signalling systems (Q.300 - Q.300)
- Definition and function of signals (Q.310 - Q.310)

- Line signalling (Q.311 - Q.319)
- Register signalling (Q.320 - Q.326)
- Testing arrangements (Q.327 - Q.331)
- Interworking of Signalling System R1 with other standardized systems (Q.332 - Q.332)
- Definition and function of signals (Q.400 - Q.400)
- Line signalling, analogue version (Q.411 - Q.416)
- Line signalling, digital version (Q.421 - Q.430)
- Interregister signalling (Q.440 - Q.458)
- Signalling procedures (Q.460 - Q.480)
- Testing and maintenance (Q.490 - Q.490)
- Introduction and field of application (Q.500 - Q.500)
- Exchange interfaces, functions and connections (Q.511 - Q.522)
- Design objectives and measurement (Q.541 - Q.544)
- Transmission characteristics (Q.551 - Q.554)
- General considerations (Q.601 - Q.608)
- Logic procedures (Q.611 - Q.696)
- Interworking of Signalling Systems No. 7 and No. 6 (Q.698 - Q.698)
- Interworking between Digital Subscriber Signalling System No. 1 and Signalling System No. 7 (Q.699 - Q.699)
- General (Q.700 - Q.700)
- Message transfer part (MTP) (Q.701 - Q.709)
- Specifications of Signalling System No. 7 (Q.710 - Q.710)
- Signalling connection control part (SCCP) (Q.711 - Q.716)
- Telephone user part (TUP) (Q.721 - Q.725)
- ISDN supplementary services (Q.730 - Q.737.1)
- Data user part (Q.741 - Q.741)
- Signalling System No. 7 management (Q.750 - Q.756)
- ISDN user part (Q.761 - Q.768)
- Transaction capabilities application part (Q.771 - Q.775)
- Test specification (Q.780 - Q.788)
- Q3 interface (Q.811 - Q.832.2)
- General (Q.850 - Q.850)
- Data link layer (Q.920 - Q.923)
- Network layer (Q.930 - Q.939)
- User-network management(Q.940 - Q.941)
- Stage 3 description for supplementary services using DSS 1 (Q.950 - Q.957.1)
- General (Q.1000 - Q.1005)
- Interworking with ISDN and PSTN (Q.1031 - Q.1032)
- Digital PLMN user-network interfaces (Q.1061 - Q.1063)
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13 - Conformance and Interoperability
14 - Contours: Technology Domain

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+1.650.949.6700 Phone – +1.650.949.6705 Fax
Email : info@atmforum.com – Serveur Web (Internet) : www.atmforum.com
Groupement de constructeurs et d'opérateurs télécom ayant pour but de spécifier et de promouvoir les technologies ATM.

BSI (British Standards Institution)

British Standards Institution
389 Chiswick High Road
London W4 4AL
Royaume-Uni
Tél : (44) 181 996 90 00
Fax : (44) 181 996 74 00
www.bsi.org.uk
Comité membre de l'ISO représentant le Royaume-Uni.

CEI (Commission électrotechnique internationale)

En anglais : IEC (International Technical Commission)
3, rue de Varembé
CH-1211 Genève 20
Suisse
Tél : (41) 22 919 0211
Fax : (41) 22 919 0300
www.iec.ch
Organisme de normalisation international dans le domaine de l'électricité et de l'électronique.

CEN (Comité européen de normalisation)

36, rue Stassart
B-1050 Bruxelles
Belgique
Tél : (32) 2 519 68 11
Fax : (32) 2 519 68 19
www.cenorm.be
Fédération des organismes européens de normalisation.

CENELEC (Comité européen de normalisation électrotechnique)

35, rue Stassart
B-1050 Bruxelles
Belgique
Tél : (32) 2 519 68 71
Fax : (32) 2 519 69 19
www.cenelec.be
Organisme chargé de l'harmonisation des normes européennes dans le domaine de l'électricité et de l'électronique.

DIN (Deutsches Institut für Normung)

Burggrafenstrasse 6

D-10787 Berlin
Allemagne
Tél : (49) 30 26 01 0
Fax : (49) 30 26 01 12 31
Email : postmaster@din.de • www.din.de
Comité membre de l'ISO représentant l'Allemagne.

DS (Dansk Standardiseringsrad)

Kollegievej 6,
2920 Charlottenlund,
Tlf. 39 96 61 01,
fax 39 96 61 02,
http://www.ds.dk
Comité membre de l'ISO représentant le Danemark.

ECMA (European Computer Manufacturers Association)

114, rue de Rhône
CH-1204 Genève
Suisse
Tél : (41) 22 849 60 00
Fax : (41) 22 849 60 01
www.ecma.ch
Organisme regroupant les industriels européens de l'informatique et dont plusieurs spécifications techniques ont été retenues comme normes internationales par l'OSI ou l'UIT-T.

ETSI (European Telecommunications Standards Institute)

650 route des Lucioles
F-06921 Sophia Antipolis
France
Tél : (33) 4 92 94 42 00
Fax : (33) 4 92 65 47 16
http://www.etsi.org/
Organisme regroupant les opérateurs européens dans le but d'harmoniser les protocoles de télécommunication.

Frame Relay Forum

303 Vintage Park Drive
Foster City
California 94404 – 1138
États-Unis
Tél : (1) 510.608.5920
Fax : (1) 510.608.5917
Email : info@frforum.com
Serveur Web :www.frforum.com
Groupement de constructeurs et d'opérateurs télécom ayant pour but de spécifier et de promouvoir les technologies de relais de trames.

Frame Relay Forum Europe

The European Chapter of the Frame Relay Forum
14 place Marie-Jeanne Bassot
92593 Levallois Perret Cedex
France
Tel : (33) 1 46 39 56 78
fax : 1 415 525 0182
Email : frf@frforum.com
www.frame-relay.indiana.edu
Branche européenne du Frame Relay Forum.

IBN (Institut belge de normalisation)

Av. de la Brabançonne 29
B-1040 Bruxelles
Belgique
Tél : (32) 2 738 01 11
Fax : (32) 2 733 42 64
Comité membre de l'ISO représentant la Belgique.

IEEE (Institute of Electrical and Electronics Engineers)

445 Hoes Lane
Picataway
New Jersey 08854 – 1331
États-Unis
Tél : (1) 908 981 0060
Fax : (1) 908 981 9667
Serveur Web : www.ieee.org
Association professionnelle regroupant plus de 300 000 membres, très active dans le domaine de la normalisation. Plusieurs de ses spécifications sur les réseaux locaux ont été reprises par l'ISO.

ISOC (Internet Society)

11150 Sunset Hills Road
Suite 1000
Reston, VA 20190
États-Unis
Tél : (1) 703 326 9881
Fax : (1) 703 326 9880
www.isoc.org
Organisation attachée au développement et à la promotion du réseau Internet et des technologies associées.

ISO (International Organization for Standardization)

1, rue de Varembé
CH-1211 Genève 20
Suisse
Tél : (41) 22 749 0111
Fax : (41) 22 733 3430
Serveur Web : www.iso.ch
Organisation internationale qui fédère une centaine d'organismes nationaux de normalisation dont l'AFNOR pour la France, l'ANSI pour les États-Unis, le DIN pour l'Allemagne, etc.

JISC (Japanese Industrial Standards Committee)

c/o Standards Department
Ministry of International Trade and Industry
1-3-1, Kasumigaseki, Chiyoda-ku
Tokyo 100
Japon
Tél : (81) 3 35 01 92 95
Fax : (81) 3 35 80 14 18
Telex : 02 42 42 45 jsatyo j
Comité membre de l'ISO représentant le Japon.

NNI (Nederlands Normalisatie Instituut)

Kalfjeslaan 2
P.O. Box 5059
NL-2600 GB Delft
Pays-Bas
Tél : (31) 15 69 03 90
Fax : (31) 15 69 01 90
Telex : 3 81 44 nni nl
http://www.nni.nl
Comité membre de l'ISO représentant les Pays-Bas.

SCC (Standards Council of Canada)

45 O'Connor Street, Suite 1200
Ottawa, Ontario K1P 6N7
Canada
Tél : (1) 613 238 32 22
Fax : (1) 613 995 45 64
Telex : 053 44 03 stancan ott
Comité membre de l'ISO représentant le Canada.

SNV (Swiss Association for Standardization)

Mühlebachstrasse 54
CH-8008 Zürich
Suisse
Tél : (41) 1 254 54 54
Fax : (41) 1 254 54 74
Comité membre de l'ISO représentant la Suisse.

UIT-T (Union internationale des télécommunications – secteur de la standardisation des télécommunications)

En anglais : ITU-T (International Telecommunication Union – Telecommunications)
2, rue de Varembé
CH-1211 Genève 20
Suisse
Tél : (41) 22 730 5851
Fax : (41) 22 730 5853
www.itu.ch
Ex-CCITT (Comité Consultatif International pour le Télégraphe et le Téléphone).
Organisation internationale qui regroupe les états membres de l'ONU et propose des avis relatifs aux services de télécommunication et de radiocommunication.

UNI

UNI (Ente Nazionale Italiano di Unificazione)
Via Battistotti Sassi 11/b
I-20133 Milano
Italie
Tél : (39) 2 70 02 41
Fax : (39) 2 70 10 61 06
Telex : 31 24 81 uni i
Comité membre de l'ISO représentant l'Italie.

RÉFÉRENCES

L'encyclopédie suivante présente la plupart des normes du domaine des réseaux.

K. Asatani, Telecommunications Standardization for Global Information Infrastructure, *Encyclopedia of Telecommunications*, Marcel Dekker, 1998.

La normalisation des interfaces et du multimédia dépend de nombreux organisme. L'article suivant en fait le point.

K. Asatani *et al.*, Feature Topic on Standardization for GII and Multimedia Communications, *IEEE Commun. Mag.*, vol. 36, n° 9, septembre 1998.