STUDY GROUP 15

Original: English

Geneva, 13 - 24 November May 1995

(WP 4/15)

Question(s): Q.A

SOURCE   WP 1/15

TITLE: DRAFT NEW QUESTIONS PROPOSED BY WP1/15

This document contains draft texts for the new Questions as agreed by
WP1/15.
Contributions are solicited to the May 1996 SG15 meeting for the finalization..

Q.A   : Multimedia terminals transmitting at very low bitrate
Q.B   : N-ISDN audiovisual communication systems
Q.C   : B-ISDN multimedia terminals
Q.D   : LAN multimedia terminals
Q.X   : Harmonization and interworking of multimedia applications and services
Q.Y   : MCUs, call control and service interworking
Q.Z   : Advanced media coding

QUESTION Q.a PROPOSED FOR STUDY PERIOD 1996-2000

SOURCE: WP 1/15
TITLE: Multimedia Terminals Transmitting at Very Low Bitrate
TYPE OF QUESTION: Task Oriented Leading to Recommendations
MOTIVATION: Continue the work of Q2/15 [Very Low Bitrate]
DRAFT TEXT OF QUESTION:

Work on this question will be divided into four major elements
which are discussed below; [1] continue the work on the H.324/M
multimedia terminal for mobile networks, [2] continue the work on
the H.324 multimedia terminal for the GSTN network, [3] work
jointly with Q.z and MPEG4 to develop H.263L, an advanced video
coder, [4] work jointly with Q.x to insure the efficient
interoperation of H.324, H.324M, and H.320.

1. MOBILE MULTIMEDIA TERMINAL [H.324/M]

At the end of the present study period, it is anticipated that
all H.324/M Draft Recommendations will be determined, but not
approved. In general, the term H.324/M does not refer to new
free standing Recs; rather, it refers to the necessary
modifications to the basic suite of H.324 Recs. Consequently,
the first task will be the editing, and approval, of these
documents.

Following approval, the usual Rec. maintenance and follow-on
enhancements will be addressed; e.g. conformance testing,
multilink, non-conversational services, multipoint, encryption.

Since a wide range of mobile networks exist today, and the range
will clearly increase in the future [satellite, FLMPTS], it is
expected that the number of error protection "tools" which must
be added to the toolbox will increase.

Overall performance of the H.324/M terminal will be improved with
the introduction of advanced coders-H.263L, speech at 4kbps.

2. GSTN MULTIMEDIA TERMINAL [H.324]

Work on maintaining and enhancing the H.324 suite of Recs. will
be initiated in the present Study Period. Examples of this work
activity, which will be continued into the next Study Period,

-System Test: Real time audio-visual tests will be performed to
characterize the H.324 terminal; human factors, preferred
allocation of voice/video resources, lip sync. etc.

-Add multilink, multipoint, loopback, encryption

-H.263 Conformance

-Overall performance of H.324 will be upgraded with the
introduction of new coders- H.263L, speech coder at 4kbps.

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TITLE: Q.B "N-ISDN AUDIOVISUAL COMMUNICATION SYSTEMS"

Title

N-ISDN audiovisual communication systems

Type of Question

Task oriented Question

Reasons motivating the proposed Question

Since the first set of Recommendations for audiovisual communication systems in N-ISDN environments were established in 1990, conforming equipment has been successfully deployed in the market. Following this, several enhancements with respect to multipoint communication, use of new audio coding, security feature and use of telematics data have been worked out during the last study period in form of new Recommendations or revision of existing Recommendations. This effort responding to the market needs should be continued with particular attention to the introduction of advanced audiovisual coding, interworking with other terminals accommodated in different networks and enhancements to cover services other than conversational service.

Study Items

* Specifications necessary for accommodating new services other than conversational services, such as retrieval, messaging, distribution services.

* Enhancement by use of optional advanced audiovisual codings

* Enhancement by use of optional telematics data

* Signal processing for MCU, particularly for continuous presence systems

* Interworking with other terminals accommodated in other networks (H.310, H.323, H.324); function allocation and gateway specifications

* Guidance for design of terminal and its environments, particularly from human factor point of view, which has been accumulated through experience in the field

* Requirements for call control

* Quality of service aspects; audio quality, picture quality, tolerance to delay, hypothetical reference connection and performance objectives

* Revision of existing H-series Recommendations

-New Applications: It is anticipated that basic H.324 terminals will become available in 1995 addressing both consumer videophone and computer-based business applications. During the 1996-2000 study period, the flexible H.324 Recs. will be extended to address a wide range of additional applications such as non-conversational services and new T.120 applications.

3. ADVANCED VIDEO CODING [H.263L]

One of the many objectives of Q.z [Advance Media Coding] is the development a new video coding Rec. having compression significantly better than H.263. This work will be of particular interest to Q.a, due to the low transmission bitrate which is available. Consequently, this item will be given particular attention. The output of this work will feed both H.324 and H.324M.

4. INTERWORKING

Particular attention will be devoted to the issue of interworking between H.324, H.324M, and H.320 terminals. This work will be tightly coordinated with Q.x.

SPECIFIC OBJECTIVES

- H.324M approval   1996
- H.324 non-conversational service   1997
- H.263L   1998
- H.263 conformance test   1997
- H.324 terminal characterization complete   1998
- H.324 multilink, multipoint, loopback   1997

OTHER RELATIONSHIPS

RECOMMENDATIONS: H.320, H.310, DSVD,
QUESTIONS: Q.b, Q.x, Q.y, Q.z, Q.4, Q.8
STUDY GROUPS: 1, 8, 14
OTHER STANDARDS BODIES: ISO/MPEG-4, IMTC

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Specific task objectives with expected time frame of completion

- Revisions of H.320: 1997
- New H.32? for new multimedia services: 1998

Relationship of this study activity with others

<u>Recommendations</u>

- H-series Recommendations regarding video coding, multiplex, communication control, multipoint, security
- G-series Recommendations regarding audio coding and other audio signal processing
- T-series Recommendations regarding telematics facilities

<u>Questions</u>

- Q.x, Q.y, Q.z (WP1/15)
- Q.?? (WP2/15)
- Q.?? (SG8)

<u>Study Groups</u>

- SG1
- SG8

- END -

TITLE: Proposed Question "C" for SG 15 (B-ISDN Multimedia Terminals) for next Study Period

1   Type of Question

Task-oriented Question that should result in the extension and enhancement of work and Recommendations in 1/15 from the current Study Period

2   Motivation

ITU-T Study Group 15, Working Party 1, has studied requirements for audiovisual multimedia terminals in the current study period and Recommended methods and systems to allow provision of conversational audiovisual multimedia services over several types of communication networks, including "broadband ISDN" ("B-ISDN"), in the current Study Period.

Further work is required to improve working of terminals for these services, for non-conversational services such as "video on demand," and to harmonize methods and equipment for common purposes between B-ISDN terminals and terminals on other network types. Recommendation H.321 describes working of audiovisual multimedia terminals on B-ISDN, but some elements of working of a terminal with functionality equivalent to those subject to Recommendation H.320 (working on narrowband ISDN networks) may remain for study.

Further work in this area in the new Study Period would allow continued development of working methods for H.321 terminals and related equipment to complete the set of terminal functions and methods and to ensure correct interworking with other AV/MMS terminals is improved. It is expected that through this work harmonization will be improved, common methods will be found, and terminal complexity might be reduced.

Due to the large and increasing number of network types in use in the world, improved interworking of AV/MMS terminals within and across network types will promote use of AV/MMS methods for both conversational and non-conversational use for both domestic and international use, no matter which network type is dominant at any time in any part of the world. Improved working of these terminals and reduction of terminal complexity will lead to wider availability and acceptance of such terminals, and therefore of AV/MMS services.

3   Questions

3.1 Which features of N-ISDN AV/MMS terminals, such as traffic encryption and encryption key exchange, remain to be specified for B-ISDN and how shall they be specified so as to be harmonized with terminals on other network types?

3.2 What are the elements and methods in common between audiovisual multimedia terminals for different network types, and how can these commonalities be used to reduce the number of distinct AV/MMS terminal types and Recommendations, permitting adaptation of terminals to distinct or novel networks, or to conversational services, non-conversational services, or both with a minimum of network or service-type specific development?

3.3 Which characteristics of the B-ISDN network can be used in AV/MMS terminals for such functions as: multipoint conferences or non-conversational multipoint working without a dedicated

multipoint control unit; variable bit rate working (where B-ISDN terminals might increase bit rate on a single channel while N-ISDN and PSTN terminals might require additional channel set-up and aggregation); and resource budgeting and allocation (e.g. tariff-aware terminals and methods of working)?

3.4 How can terminal and network specific features, such as control and indication protocols and methods for varying available total bit rate, be conveyed from the B-ISDN network environment to other network environments, such as N-ISDN, PSTN, mobile voice networks, mobile packet data networks, and LAN systems?

3.5 Which aspects and results of the advanced media coding question have application to working of B-ISDN terminals, and how can such aspects and results be incorporated in B-ISDN AV/MMS terminals in such a way as to maintain harmonization?

4   Expected results and anticipated target dates

The remaining work for B-ISDN terminals to have equivalent functionality to N-ISDN counterparts might be prepared for Decision in 1997. Extraction of common features with other AV/MMS terminal types will depend on progress in other Questions within 1/15 regarding those terminal types, and on the specification of network equipment by other Working Parties and Questions.

Development of methods for conveying media streams and protocols between terminals on different network types is similarly limited by development of other terminals and of network equipment, as well as by near future and longer term co-operation among Rapporteurs to limit the overlap of Questions, and hence the number of terminal types in use. Application of advanced media coding techniques and error resilience will depend on development of those techniques for use in B-ISDN networks and other networks with similar characteristics error and delivery characteristics.

5   Liaison activity

Studies concerning advanced coding, other terminal types, and harmonization are carried out under other questions of 1/15, and necessary liaison should be established with Rapporteurs' groups for those questions, as well as with ITU-T Study Groups on the subject of B-ISDN and ATM network operation, and with non-ITU groups such as DAVIC, ATM Forum, ISO, etc..

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TITLE: Proposed Question "D" for SG 15 ("LAN" ("Packet Switched") Multimedia Terminals) for next Study Period

1   Type of Question

Task-oriented Question that should result in the extension and enhancement of work and Recommendations in 1/15 from the current Study Period, as well as either adoption of new Recommendations or restructuring of existing Recommendations for terminal working using packet switched network types for which terminals are not currently subject to ITU-T Recommendation.

2   Motivation

ITU-T Study Group 15, Working Party 1, has studied requirements for audiovisual multimedia terminals in the current Study Period and Recommended methods and systems to allow provision of conversational and non-conversational audiovisual multimedia services over both "traditional" circuit switched networks and packet switched and cell relay networks; terminals for these last two network types are subject to Recommendations H.322/H.323 for packet-switched networks and H.310 for Asynchronous Transfer Mode (ATM) cell relay networks.

Additional work is required to improve working of terminals for these network types, and for non-conversational services such as "video on demand," as well as to harmonize methods and equipment for common purposes and interworking across packet and circuit switched networks. Study regarding the further development of new or existing Recommendations for packet-switched networks could enhance operation in networks of the same type but with more complex interconnection and therefore potentially more variable operating characteristics than those studied in the current study period. The usefulness of the H.322 terminal type might also be studied, and perhaps terminals and Recommendations for working on both guaranteed quality of service LANs and LANs without quality of service guarantees might be further harmonized or combined.

As well, both cell and packet network types have potential for novel modes of operation, such as multipoint working without a dedicated multipoint controller or with distributed multipoint control, which may require substantial further study and the development of new operational models and protocols. At the same time, these network types may have characteristics which challenge fundamental assumptions in existing methods of working, which may have been studied in the context of inherent assurance of traffic authentication and privacy; some of these assurances in point to point working may not be available in these cell and packet networks. Study to ensure that these terminal types can work on both private (customer premises) and public versions of their respective networks might also be undertaken under this Question.

Finally, new network types and new methods for network operation may be developed within or outside the ITU during the next Study Period, and where useful to the goals of ITU such new developments should be incorporated in ITU-T Recommendations.

Maintaining interworking between terminals designed for packet switched networks, existing AV/MMS terminals on circuit switched networks, and with new types not yet defined will allow

national information infrastructure initiatives to focus on packet switched networks, if desired, without prejudice to the ability of that nation to use world-wide AV/MMS connections. This could be part of an effort to harmonize the Global Information Infrastructure and to improve return on investment in transport services for less-developed nations.

It should be noted that ITU-T has thus far not developed many Recommendations regarding packet switched network operation of AV/MMS terminal operation, particularly in the case of complex network topologies, and should adopt methods and standards already developed by other organizations where possible. Organizations such as ISO, Frame Relay Consortium, ATM Forum, and ISOC/IETF are already developing standards which may answer to some of the Questions, and where useful their work should be adopted by ITU-T 1/15 through common text, reference, or other methods.

3   Questions

3.1 How can features of circuit switched AV/MMS terminals, such as call control, capability exchange, traffic encryption and encryption key exchange, best be provided for terminals working on packet switched network, keeping in mind the differences in structure of packet switched and circuit switched networks; what further-harmonization efforts are required within the "LAN" AV/MMS Question and between "LAN" and other terminal types; what measures are required to ensure that a single terminal type can work correctly using both a public and a private version of the fundamental network technology for which it is designed?

3.2 Which possible directions for advancing media coding, such as low delay coding, feature based coding, easily edited bit streams of coded media, coding for dynamically variable bit rates, coding for out-of-order packet delivery, coding for non-synchronous media streams, coding for packetization, coding for low-complexity MCU-type signal processing, and coding for resilience against errors common on packet switched networks, may be practically undertaken, and to what extent should common advanced media coding techniques be used in common between different packet and circuit switched terminal types?

3.3 How can correct working be ensured with respect to privacy of media streams and authentication of sources of control messages or media streams in packet switched networks where the lower layers of the network protocol require that all transmitters broadcast all traffic (in the physical sense) and that receivers accept and filter all traffic to determine which packets are destined for their particular terminals? (Note that this is a good example of a question already under consideration by other standardization bodies than ITU-T, but note that the IETF solution, in particular, will only apply to networks using the Internet Protocol (IP) for a network layer, so further work may be required by ITU-T for generalization to use with other network layers.)

3.4 How can the features of packet switched and cell-relay networks such as Ethernet and ATM be exploited to provide potentially desirable ways of working such as multipoint operation without a multipoint control unit and use of dynamically variable bandwidth, and how shall these ways of working be harmonized with the methods of other terminal types?

3.5 Should ITU-T adopt a single set of abstract packet switched network feature descriptions which may be used to improve adaptation of a generic packet switch terminal type to multiple physical network types, and if so, which abstract description should be used? (E.g. TCP/IP ISO-OSI, AppleTalk.)

3.6 How can media streams and control and indication signals be conveyed between terminals on different varieties of packet switched networks, and between packet switched and circuit switched networks so as to allow interworking between such terminals with no gateways or with low complexity gateways, and similarly, how will features such as dynamically variable bandwidth be translated from packet switched terminals and networks to circuit switched terminals using schemes like H.244 or H.324 multi-link to achieve variable bandwidth?

3.7 How should AV/MMS terminals interact with network information services, such as name and address directory services (X.500?), bandwidth reservation, video on demand, public encryption key retrieval (e.g. for privacy and authentication); which services of this nature are already subject to ITU-T Recommendation; which new services should be Recommended to support working of AV/MMS terminals in packet switched network environments?

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3.8 How can AV/MMS terminals on packet switched networks be designed to budget and allocate resources based on network provider tariff structures (e.g. interact with differing tariff rules on various networks to optimize resource use and cost to user)?

4   Expected results and anticipated target dates

The remaining work for H.322 and H.323 terminals to have equivalent functionality to N-ISDN counterparts might be prepared for Decision in late 1996 or early 1997. Extraction of common features with other AV/MMS terminal types will depend on progress in other Questions within 1/15 regarding those terminal types and advances in ITU expertise in packet switched network technology and features.

Development of methods for conveying media streams and protocols between terminals on different network types is similarly limited by development of other terminals and of network equipment, as well as by near future and longer term co-operation among Rapporteurs to limit the overlap of Questions, and hence the number of terminal types in use. Application of advanced media coding techniques and error resilience will depend on development of those techniques for use in packet switched networks or their adoption from Recommendations for terminals working on circuit switched networks.

5   Liaison activity

Studies concerning advanced coding, other terminal types, and harmonization are carried out under other questions of 1/15, and necessary liaison should be established with Rapporteurs' groups for those Questions to ensure that the peculiar needs of packet switched and broadcast-transmission/selective-reception networks are addressed. Close liaison with the Rapporteur for Questions of harmonization should also be established to ensure that developments for new network technology do not lead packet switched terminal experts too far, too quickly, from existing circuit switched terminal methods. Additionally, liaison should be established with non-ITU organizations such as IEEE, ISOC/IETF, ISO, Frame Relay Consortium, ATM Forum, etc., to improve ITU-T knowledge and expertise in non-circuit switched technologies and to convey the needs of the ITU-T terminal experts to those non-ITU experts developing standard methods within networks.

Title: Harmonisation and Interworking of Multimedia Applications and Services

Question type: Management question, possibly involving recommendations on interworking

Motivation: the existing Question 3/15 on harmonisation of audiovisual systems dates back to 1985 when the need for a widely coordinated approach to multimedia (then "multi-facility") was recognised; in recent years the need for this harmony to extend to the diversity of networks has also come to the fore.

Preliminary points for the drafting of the Question text:

1. Framework for MM Standardisation, and other management tools for mapping the whole MM architecture/standards scene, showing standards already achieved, and planning and monitoring the ongoing/future work. [H.200 is a basis for this, but the fact that it is "frozen" at approval time makes it less useful than the "living" version.]. Probably the matrix relating the various multimedia study questions should also be included.

2. Analysis and listing of the requirements for harmonisation, including:

- use of common components for multiple systems (historical examples include G.711, G.722 and H.221/242 in H.320 and audiographic teleconferencing, H.221 also for broadcast-quality audio transmission, H.261 in PSTN as well as N-ISDN systems, H.245 in-band control for PSTN, B-ISDN and LAN systems, T.120 for a wide range of systems...)

- use of similar processes to minimise complexity and/or encourage the manufacture of multi-use equipment

- interworking between different terminals (and MCUs etc) connected to the same network, and same or different terminals connected to different networks; agreement and recording of policy with regard to nature of gateways between networks (eg whether or not transparent at the various levels) - perhaps a Living Document summarising all such interworking requirements and policies with clear configuration diagrams.

3. Continual review of current work to ensure that it is consistent with the requirements

- maximum use of existing standards, and cooperation between parallel activities to maximise re-use

- takes into account in specific detail the interworking aspects listed:

    - call control on one network, including information concerning capabilities which may affect whether the remote terminal answers a call request or not;

    - call control involving two (or more) networks;

    - in-band control, including capability exchange, mode information/control, encryption+key management....;

    - information media - commonality and/or profiling.

4. Drafting of Recommendations (if any) dealing specifically with interworking solutions (even though several different systems may each make the necessary provisions (for example, in terms of codepoints) for interworking, there may not be adequate elaboration of the procedures for establishing interworking. [see below]

Specific task objectives: It already seems likely that the first Interworking Recommendation (notionally "H.mmiw") may best be dealt with under this Question.]

Relationship of this study to others: mention all other Multimedia Questions, as well as ISO/IEC (MPEG) and DAVIC

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TITLE Question Y for the Next Study Period (MCUs, Call Control, & Service Interworking)

MCUs, Call Control, and Service Interworking

1. Type of Question

This is a tasked oriented question directed toward a recommendation. It also has non-task oriented components.

2. Motivation

It has been generally recognized that the MCU is a useful network element. Multimedia systems require both conference and call control, and where current standards are lacking, additional work must be done.

3. Questions

3.1. MCUs:

This part of the question should cover:

a. MCUs for different transport (N-ISDN, B-ISDN, LAN, GSTN, Mobile) and the technical differences that result.

b. Video Mixing services provide by an MCU, or by other means.

c. MCU type services on the LAN/B-ISDN using multicast/broadcast and their relationship to centralized MCUs

d. Control of conferences on MCUs, including admission to and expansion of conferences.

e. The relationship of the MCU to T.120, including T.AVC and T.124.

3.2. Control for Conversational/Non-Conversational services

a. Expansion of H.245 (Does interworking with H.242 go here, or under harmonization?)

b. Relationship of H.245 to DSM-CC, and possible cooperation

c. Encryption issues for H.310, H.324, H.323, and H.320

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d. Conference control, including relationship to T.124/T.AVC

e. H.mmiw for N-ISDN; similar considerations for PSTN, for B-ISDN.... [closely linked to call control and in-band initialisation signaling - how do you get the kind of session (talking to person, storage/retrieval, messaging...) that the caller wants, and how do you change it in mid-call?]

3.3. Call Control

a. Parameters of call request (eg throughput, restricted/not, UDITA, QoS) and how to carry them; response of called endpoint.

b. Mixed network calls; how to carry those parameters across, procedures to make networks do what MM terminals want!

c. Network managed calls: parameters needed to satisfy multimedia requirements (eg reservation, re-routing of some media streams perhaps for translation or other value-add processing...); standards by which an ordinary MM terminal may communicate with an NM front-end (customer-facing end-point).

d. Methods for extending call control into transport domains (e.g. LANs) where interoperable call control does not currently exist. Re-use existing recommendations (e.g. Q.931, Q.2931) to the maximum appropriate extent..

e. Issues related to gateways between transport types

4. Expected Results and Target Dates

The primary goals would be to produce:

a. Possible new recs (H.mmiw, others) for interactions between people and non-conversational devices.

b. Specific MCU related Recs to be produced include revisions of H.231/H.243, and new recs H.23X that apply to GSTN and B-ISDN, and possibly the LAN. A suggestion has been made for a single rec H.23X that applies to MCUs using H.245 on GSTN, B-ISDN, and LAN, but this may not be approrpriate due to the technical differences between the environments.

c. A proposal has been made for H.INTERWORKING that applies to H.323, H.310, and H.324 gateways and interworking units using H.245

5. Relationships and Liaisons

This question will support the other questions of WP1, including Q.A, Q.B, Q.C, and Q.D.

Consideration should be given to the management aspects of Q29.

TITLE: Proposed Question Q.Z for the Next Study Period (Advanced Media Coding)

ADVANCED MEDIA CODING

1. TYPE OF QUESTION

This is a tasked oriented question directed toward a recommendation.

2. MOTIVATION

Without regard to transport type (GSTN, N-ISDN, B-ISDN, LAN, Mobile), multimedia systems share a need for advanced media coding, including:

        a)video or moving image coding
        b)still image coding
        c)audio coding
        d)data compression and representation methods.

SG8 covers still image coding and data methods, and SG15/WP2 audio coding. The association of all of the above into systems falls under Q.X(15/1), harmonization.

3. QUESTIONS

The goal of Q.Z is to produce advanced moving image coding methods appropriate for conversational audio/visual services. However, moving image coding should also consider applications for non-conversational services. In recognition of the efforts that have resulted in H.261, H.262, and H.263, Q.Z should focus on advanced techniques that are likely to result in significant quality improvements. Issues to be considered include:

    a.   methods to lower delay
    b.   higher compression ratios
    c.   a better quality image
    d.   robust operation in error prone environments (e.g. mobile)
    e.   organization of the bit stream to support packetization
    f.   methods to allow sub-rate streams to be easily mixed by MCUs or terminals, including intra only operation.
    g.   Temporal and spatial alignment of streams of varying coding
    h.   complexity
    i.   additional features such as object coding being studied in MPEG4

4. EXPECTED RESULTS AND TARGET DATES

1K

The primary goal would be to produce a rec H.264 offering significant advantage over existing recommendations. This is a long term work item expected to be completed no sooner that 1998.

5. RELATIONSHIPS AND LIAISONS

It is important to collaborate with the ISO/MPEG4 experts group to ensure that their work includes a profile for conversational services.

This question will be a foundation for the other questions of WP1, including Q.A, Q.B, Q.C, and Q.D.

Consideration should be given to the management aspects of Q29.

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