INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
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F.700

Amendment 1
(05/99)

SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES

Audiovisual services

Framework Recommendation for audiovisual/multimedia services

Amendment 1

ITU-T Recommendation F.700 – Amendment 1
Superseded by a more recent version

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION F.700

FRAMEWORK RECOMMENDATION FOR AUDIOVISUAL/MULTIMEDIA SERVICES

AMENDMENT 1

Summary

This amendment is mainly a restructuring of the material of Annex B with the transfer of the control and processing elements to a new Annex C. The generic control and processing element "conference control" provides the control functions for multipoint real-time exchange of information among multiple users. It includes the control functions required for chairing a conference or controlling the use of a facility.

Source

Amendment 1 to ITU-T Recommendation F.700 was prepared by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 27 May 1999.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation the term *recognized operating agency (ROA)* includes any individual, company, corporation or governmental organization that operates a public correspondence service. The terms *Administration*, *ROA* and *public correspondence* are defined in the *Constitution of the ITU (Geneva, 1992)*.

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation F.700

FRAMEWORK RECOMMENDATION FOR AUDIOVISUAL/MULTIMEDIA SERVICES

AMENDMENT 1

(Geneva, 1999)

1) Subclause B.2

Replace subclause B.2 with the following:

B.2 Communication task conferencing

B.2.1 Definition

The generic communication task conferencing provides for multipoint real-time exchange of information among multiple users. The users may be humans or machines. The information may be monomedium as well as multimedia. It includes the control functions required for chairing a conference or controlling the use of a facility.

B.2.2 Description

B.2.2.1 General description

The communication task conferencing provides the basic means for various types of meetings of groups of users distributed in two or more locations. In the case of human users, it will usually use the media component audio, and optionally video and/or other media components, each of them with different possible levels of quality. When video is present, it is synchronized with audio from the same location so that visual and auditory perception of events will appear to the distant user as fitting together naturally and, in particular, so that the movement of the lips will match the sound of the voice.

The use of this communication task for computer conferences is for further study.

B.2.2.2 Operation of the various media components

B.2.2.2.1 Audio

The sounds from the various terminals may be mixed, switched, or a combination of both. In the mixing mode, each terminal receives the sound from all other terminals except its own sound (thus avoiding echo). When many terminals are present, it is advisable for users to mute their microphones (i.e. prevent the sound from being transmitted) when they are not speaking in order to reduce the addition of noises and the risk of unwanted perturbations. For the same purpose, some systems may limit, possibly to one only, the number of audio sources simultaneously received by a terminal. How the sources are selected is described in a subsequent subclause.

B.2.2.2.2 Video

In the basic mode, the video is switched so that only one picture is transmitted to each terminal. In more elaborate modes, several pictures are used. They can be separate pictures, or combined as several windows on the same screen. In the "continuous presence" mode, all locations can be viewed permanently. The number of locations can then be at most equal to the number of available windows

plus one. If the number of locations is larger, this mode of operation is not possible and some switching is necessary for selecting the sources of the pictures displayed in each location.

B.2.2.2.3 Other media components

Data channels may be used to transmit still pictures, text, graphics, or other types of data. Circuit-oriented data channels only allow point-to-point transmission between terminals of the conference or broadcasting from one terminal at a time. Packet-oriented channels are more flexible; they may be shared by several sources at a time and with different types of data simultaneously. Limitations may however also occur from other resources that cannot be shared or from saturation of the transmission channel when the amount of data transferred takes up a large part of the available bit rate. Creation, presentation, representation and processing of these information types may be done using either the same or different functions and devices.

B.2.2.3 Control functions

The control functions required for managing the conference are described in C.1, Control and processing element conference control.

B.2.3 Quality aspects

B.2.3.1 Media components quality

The quality levels for the various service components may be defined separately. The correlation among them results from the requirements of the application and the limitations of the system (for instance, a fixed overall bit rate may impose a choice between audio and video quality, and reduce the quality when transfer of several information types occurs).

B.2.3.2 Synchronization

When video is present, it should be synchronized with the audio from the same source, in particular in order to ensure apparent lip synchronism. The synchronism should be maintained over the various paths that the signals may follow to reach the different terminals in the conference. When the differential delays in various parts of the connections are implementation dependent, they should be aligned separately within each part, or the relevant information should be transferred for final adjustment in the receiving terminals.

B.2.4 Intercommunication

Intercommunication is achieved at the media components level, independently for audio, video and data. Audio is always present, the video and other media components may be dropped if they are not available in all terminals. When audio and video are present, synchronization should be maintained between them with audio.

Alternately, different status may be given to the terminals: a primary status to those terminals supporting the media components and functions selected for the conference with the appropriate quality levels, a secondary status for terminals that do not meet these requirements and will then only be able to participate with some of the components and functions.

B.2.5 Description of the static aspects

The static aspects of communication tasks are described using the following attributes in Table B.1.

Table B.1/F.700 – Table of attributes

Attribute	Value
Configuration	Multipoint-to-multipoint
Symmetry of information flow	Bidirectional
Response time aspect	Real-time or near-real-time
Time continuity	Isochronous for audio and video Non-isochronous for other media components
Mandatory media components	All are possible, and an option is none
Optional media components	All are possible, and an option is none
Media components interrelation	– Synchronization between: • audio and video (lip synchronism, location related synchronism); • audio and text (voice synthesis); • text and video/picture/graphics (subtitles synchronized with images); • synchronization between audio and graphics.

2) New Annex C

Insert the following new Annex C:

ANNEX C

Control and processing elements descriptions

C.1 Control and processing element conference control

C.1.1 Definition

The generic control and processing element conference control provides the control functions for multipoint real-time exchange of information among multiple users. It includes the control functions required for chairing a conference or controlling the use of a facility.

C.1.2 Description

C.1.2.1 General description

The control and processing element conference control provides the basic means for managing various types of meetings of groups of users distributed in two or more locations. It is related to the generic communication task conferencing described in B.2. It controls the operation of the various media components, allowing each terminal to transmit them when appropriate and deciding how they will be combined, multiplexed or switched for transmission to each terminal. To this end it elaborates the control and indication signals exchanged among the terminals and MCUs, and it sends them to the appropriate site.

The use of this CPE for computer conferences is for further study.

C.1.2.2 Operation of the various media components

The operation of the various media components is described in B.2.2.2. It depends upon the type of medium, the available transmission channels and the capabilities of the MCUs for combining the signals. The control functions vary accordingly.

C.1.3 Control functions

C.1.3.1 General aspects

In a multipoint configuration, several terminals are liable to transmit or try to transmit at the same time, and control functions are required to arbitrate between them whenever limitations exist on the number of signals simultaneously handled by various parts of the system. Requests for transmission (explicit or implicit) are received by the control system of the conference, which takes appropriate action in response.

Two modes of control are defined:

1) an unconducted mode in which all actions are automatic responses from the system: All terminals then have equal rights for transmitting on the channels allocated to the various media and for issuing commands to the control system; they may however temporarily acquire exclusive rights for using a given facility (e.g. by requesting an appropriate token from the control system, or by starting to use the facility while it is free, or otherwise);
2) a conducted mode in which some of the requests are forwarded to a specific terminal (the control terminal) and action is taken according to the commands from that terminal: This mode is only optional, but its availability is desirable for the management of conferences with many participants or with elaborate terminals. Control terminals may be conferred three types of privileges, either separately or jointly:
   a) access control, i.e. management of the conference call (call control); this function belongs to the service level and is described in Recommendation F.702;
   b) chair control, i.e. management of the media audio and video components in order to give the floor to the various participants;
   c) facility control, i.e. management of a facility and the related corresponding data channel and resources.

In the simpler systems, these functions may be merged, but it is preferable to keep them separate. They can usually be transferred from one terminal to another through a token or by some other method.

C.1.3.2 Audio and video

The control of audio and video signals uses various schemes depending on the mode for each component. In the continuous presence mode, audio and video from all other locations are permanently available on each site and no control is needed for these two components. In all other cases, selection is necessary for one component or for both. The criteria for this selection are the requests sent by the terminals and the level of the sounds from these terminals, which is monitored when automatic switching is performed.

1) *Unconducted mode*

   In basic systems, each terminal receives the sounds from all other terminals and only one video signal. The video channels are then voice switched, i.e. the image from the terminal with the loudest sound (the speaker) is broadcast to all other terminals. A suitable delay and/or threshold avoid repeated switching which would be uncomfortable for the users, especially if the codec requires some time for building up a new picture. The speaker may

receive the video from the previous speaker, or cyclically the video from the other terminals, or he may be able to select the picture he wants to receive, depending on implementation.

Any participant may optionally make a request to select the video from a specific source, and if the system supports this function, he will receive it when available (limitations may arise from the conference system or from the transmission paths).

Any participant can have his video broadcast to every terminal, provided there is no similar request active. This overrides all previous commands for selecting the video received, but subsequent requests for video selection will be accepted, only subject to availability of the requested signals.

If the system is able to simultaneously convey the video from several terminals, then various schemes are possible. For instance, the latest speakers may be displayed, or only the present speaker with other pictures selected by the user, or any other combination. This is left to the implementor, but the picture of the present speaker should always be included unless the user expressly makes another choice.

If voice is also switched, then it is submitted to the same rules.

2) *Conducted mode: chair control*

The Chairman controls who has the floor: if one or both of the audio and video signals are switched, he decides whose picture and/or voice will be broadcast. When a participant wants to speak, he has to send a request for the floor which the conference control system forwards to the Chairman, who may send back commands to grant it or deny it. Giving the floor to a terminal means that the system broadcasts to all other terminals those of the video and audio signals that are switched. Another terminal may request signals from some specific source to be sent to it instead, and the system will comply whenever possible; reasons for denial might be that this function is not supported by the system, that it has been prohibited (for instance, a buyer in an auction sale may want to be identified only by the auctioneer), or that the requested signal is not available.

If the signals from several sources can be transferred and presented simultaneously, then usually only one of them is controlled by the chairman; the other one(s) may be, for instance, allocated to the previous speaker(s), or to the chairman or selected by the user.

In the continuous presence mode, there is usually no chair control on the audio and video because there is no switching, although the chairman might be able to mute a distant terminal.

C.1.3.3 Other information types

Control of transmission of other information types is dependent on the type of channel that supports it: on a circuit-oriented channel, only one terminal can transmit at a time and control of the channel is required; packet-oriented channels are more flexible and control functions are already embedded in the associated protocol, but control of other resources may still be required. Thus, three modes may be defined: two with allocation of resources and one with shared resources.

1) *Unconducted mode with allocation of resources*

Only one terminal at a time is able to transmit (or possibly a limited number of terminals). To resolve possible conflicts between terminals, the control system allocates resources to one terminal at a time (or to a limited number of terminals). Terminals may send requests for transmission to the control system of the conference, which allocates in response the appropriate resources if they are available (this process may be implicit if the terminal itself detects the availability of resources and takes them up by starting to transmit). If the attempt fails, the terminal may renew its request later on or the control system may set up a queuing mechanism (Note 1).

2) *Conducted mode: facility control*

The facility controller manages a given facility, which can be, for instance, still pictures, or telewriting, or file transfer; requests for its use are forwarded to him by the control system, which waits for his decision before allocating the corresponding resources. He may also interrupt the use of the facility and hand it over to another participant (Note 1).

When several information types are present, a token is allocated for each independent type; if two types of data are mutually exclusive (for instance, if they use the same fixed channel or the same equipment), then they will share the same token.

3) *Shared resources*

Terminals share a common transmission medium and other common resources which they may use simultaneously (Note 2); in this case they may transmit freely at any time. In case of congestion or if the receiving terminals are already engaged, the transmitter will have to try again, or the message may be stored and forwarded later on.

NOTE 1 – Permission to transmit may be represented by a token. In the unconducted mode, it may be acquired on request while it is free, and should be released when no longer needed. When a terminal has the token, other terminals may also be able to issue a request for it to the owner who may reject it, hand out the token or simply release it. In the conducted mode, the token is allocated by commands from the facility controller.

NOTE 2 – A common transmission medium may also be used in the other modes (with allocation of resources) where it adds flexibility for the simultaneous transfer of several information types and for the control functions.

C.1.3.4 Operational aspects

At the beginning of the conference, the default mode is usually non-conducted. Any terminal may then issue a request for taking on a control function and it will be granted.

The chair will often also take on the role of conference controller, but there are cases when he may not be willing or able to do so (for instance, the chairman of a company will probably want to leave this task to a secretary; similarly, in the case of remote teaching or remote lecturing, the teacher or lecturer will chair the conference while the convener will control the conference and screen the participants when they call). Thus the two functions may need to be split, either in the terminal equipment when both are in the same location, or in the conference control system if they are distant. The same considerations apply to the control of the facilities.

When two or more control responsibilities are jointly allocated, it should be possible to leave some of them idle, i.e. let them revert to the unconducted mode. Control over facilities for which the chair terminal has sent no command should remain idle. This will ensure that facilities that the chairman (or controller) is not willing or able to control can still be used by other participants, in particular optional facilities not present in the chair terminal.

C.1.3.5 Private conference/conference splitting

It may be possible to split the conference into two (or more) sub-conferences, if the conference system supports it. It may also be possible to send various information types to one participant or to a group of participants inside the conference. The conditions for this are for further study.

C.1.4 Implementation

The control functions are distributed among the terminals and MCUs. Control signals are exchanged among them for this purpose. The MCU (or one of the MCUs when several are present) usually has the leading role in the management of the conference.

There are two possible levels of complexity for the control functions:

– Level 1 uses only the basic signals in the control channel of the multiplex, with limitations in the capacity of the channel and in the available commands;

– Level 2 uses a packet-oriented data channel with a multilevel protocol defined in the T.120 series of Recommendations on which control data and user data are multiplexed; it is more flexible and offers enhanced control capabilities.

NOTE – For ISDN, the level 1 channel is defined in Recommendations H.221 and H.230, supporting the procedures of Recommendation H.242 and, for multipoint operation, of Recommendation H.243. On other networks equivalent Recommendations are H.222.0 and H.245.

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