Telecommunication Standardization Sector
Study Group 15
Experts Group for ATM Video Coding
(Rapporteur's Group on Part of Q.2/15)

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SOURCE : JAPAN
TITLE : A study on use of multiple VCs
Purpose : Discussion

1. Introduction

There were some discussions about the advantages of multiple VCs for audiovisual communications [1][2]. At the moment, however, how to use multiple VCs is not clear yet. This document also discusses the advantages of multiple VCs and how to use it.

2. Media

Several media can be considered in audio visual communications.
- Video
- Audio
- data; still image, etc.
- control; negotiation

3. Expectations for multiple VCs

There are two expectations for use of multiple VCs.
- Reductions of network resource by disconnecting unnecessary VCs.
- Flexibility for several types of communication.

4. Evaluations based on service aspects

4.1 Reduction of network resource

Table 1 shows the evaluation for the reduction of network resource. The advantages are restricted to some applications such as selective broadcast service in which selective distribution function in the network is necessary, and retrieval service in which layered database is necessary. However these systems may increase total system complexity.

Table 1 Reduction of network resource

application	advan.	separate VC		comments
		data cont.	AV	
all applications	yes/no			Non realtime data can use lower QOS. However multiple VCs may cost more high and bandwidth for non realtime data is usually negligible.
conversation /multipoint conference	no			There is no unnecessary information.
usual broadcast	no			All media are distributed independent from necessity.
selective broadcast	yes/no	A	V	Selective distribution based on command from terminal is available for multi-lingual broadcasting. However this network function is not promised yet.
retrieval	yes/no	A	V	Low profile terminal can retrieve audio only. However layered database may increase total cost.

4.2 Evaluation for flexibility

Table 2 shows the advantages of multiple VCs in flexibility. Except for the synchronization between audio and video, there are many advantages.

Table 2 Evaluation for flexibility

application	advan.	separete VC			comments
all applications	yes	data cont.	A	V	The each medium can use preferable bandwidth easily.
	no/yes	A		V	Synch. between audio and video is difficult. However some application dose not worry about it.
conversation	yes	data cont.	AV		Default audio can be available before negotiation. AV quality is not disturbed by data transmisslon. Data can use the CRC that is provided by AAL 5.
	yes/no	A		V	Default audio is always available. Synch. between audio and video is difficult.
multipoint conference	yes	data cont.	A	V	Mux/demux is easy at MCU or copy node in the network. (Audio recoding is still necessary.)
	no/yes	A		V	Synch. between audio and video is difficult. However differential delay may be acceptable.
broadcast	yes	data cont.	A	V	System demux can work at lower rate. Addition of another language is easy.
retrieval	yes	data cont.	AV		Negotiation and search of database can be done via negotiation VC. Real AV data can be distributed via connection oriented VC.

Except for broadcast application, it is troublesome to control the total bandwidth for all media. Furthermore, AAL 5 is suitable for non realtime data. Table 3 shows how to utilize multiple VCs. An example of communication procedure for point to point communication is shown in annex 1.

Table 3 How to utilize multiple VCs

application	AV	data cont.	comments
conversation/ multipoint conference (High quality)	H.222-TS? AAL1 One VC	T.120? AAL5 One VC	Synch. between audio and video is necessary. Error correction for AV VC.
conversation/ multipoint conference (Low quality)	RTP? AAL5 One VC	T.120? AAL5 One VC	Synch. between audio and video is not necessary. Error detection for AV VC is enough. Simple equipment is preferable.
broadcast	H.222-TS AAL1 One VC		Synch. between audio and video is necessary. Error correction is necessary.
retrieval	H.222-PS? AAL5/AAL1 One VC	DSM-CC? AAL5 One VC	Negotiation and search of database can be done via negotiation VC. Real AV data can be distributed via connection oriented VC.

5. Conclusion

To use multiple VCs for reducing network resource, the advantages are restricted to some applications such as selective broadcast service in which selective distribution function in the network is necessary, and retrieval service in which layered database is necessary. However these systems may increase total system complexity. Then it seems to be doubtful to use multiple VCs for reducing network resource.

There are, however, many applications where the use of multiple VCs has the advantages from flexibility point of view.

References

[1] AVC-640; Sakae OKUBO, "Correspondence between rapportuers for Q.10/8 and Q.2/15," Grimstad, May 1994.

[2] AVC-664; KPN,PTT Reseach, "Multiplex at ATM layer with H.222," Grimstad, May 1994.

Annex 1

An example of communication procedure for point to point communication

Signaling ; A default 64kbps VC-a is setup.

Information ; Voice communication using default G.711 starts via VC-a.
(Merit; quick start of voice communication)

Signaling ; A VC-b for negotiation is setup.
(Merit; AAL type 5 that is suitable for data communication can be used.)

Information ; Negotiation, for example coding algorithm/bandwidth, is done via VC-b.
(Merit; Voice communication continues through negotiation.)

Signaling ; A VC-c for video communication is setup based on negotiation result.
(Another method is to widen VC-a bandwidth and to use VC-a for AV multiplexed stream.)

Information ; Audio and video communication starts via VC-c.
(If synchronization between audio and video is not necessary, audio communication can continue to use VC-a.)