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Title: Considerations on Super CIF
Purpose: Proposal

Introduction

The CCITT SGXV WPXV/1 Experts Group on Video Coding for ATM networks intends to reach a decision at the earliest opportunity in 1992 on the topic of Super CIF (S-CIF).

Discussion

The decision to be made is whether a format along the lines of an enhanced version of CIF from H.261 should be specified in H.26x. There are 3 independent approaches (1 to 3 below) which can be taken individually or in combinations to give 6 options:

1. Single format "xCIF". Specify one format or one family of related formats. The latter would cover the case of including S-CIF and (Q)CIF in H.26x. The essential point of this option is that it is the 'single' format analogue of CIF in H.261.

2. Dual format. Specify two families, one having format(s) directly related to 625/50 and the other having format(s) directly related to 525/60. This splits into two sub-options:

> 2a. To guarantee connectability, equipment would be required to implement both families. (Only decoder or encoder need both and the choice would need to be standardised. Dual family decoder eliminates requirement for a return channel. Dual family encoder does not support 'one to many' as occurs in multipoint and broadcast.)
>
> 2b. If guaranteed connectability is not required, an equipment implements only either the 625 or 525 family.

This approach can be extended to a limited number of families if the 625 and 525 ones are considered too restrictive.

3. 'Generic'. Include no specific formats, but have the H.26x algorithm and syntax capable of working over a wide range. This is essentially the approach taken by MPEG in CD11172 ('MPEG-1') but makes guaranteed connectability very difficult. The coder or decoder (and rest of terminal) must be able to function over the entire available ranges of parameters in the standard. The alternative of negotiating to find an area of overlap implies some mandatory minimum capability. This is inconsistent with the generic approach but see 5 and 6 below.

4. Option 1 plus option 2b. This allows connections to be made between 625 and 525 regions with (S-)CIF while intra regional connections use formats directly related to their local 625 or 525 standard.

5. Option 1 plus option 3. This gives complete freedom to use any format (within range) acceptable to all ends of a connection (including multipoint) but the xCIF format is always available as default. Thus interconnectivity is guaranteed.

6. Option 2a plus option 3. (Option 2b is a subset of 3). Complete freedom to use any format (within range) acceptable to all ends of a connection (including multipoint) but guarantees that communication is possible using either 625 or 525 families.

(Option 1 plus option 2 plus option 3 gives nothing extra. Option 1 does not add interconnectability when 2 is 2a. 1 plus 2b plus 3 is same as 5 because 2b is subset of 3.)

It is almost certain that option 1 is unacceptable to MPEG for their version of MPEG/H.26x. (They rejected CIF as the only MPEG-1 format when the range of interests was smaller and the coding artefacts were more likely to conceal conversion degradations). The MPEG-2/H.26x algorithm will inherently be option 3 from the above list. A coding scheme which allows option 3 is the most general case and can meet any of the above 'usage' options. Thus selection of a S-CIF format NOW will NOT aid the algorithm development in the way that CIF did for H.261. Nevertheless, the algorithm should be tested with candidate S-CIF formats to ensure that S-CIF is a viable format for possible adoption later.

Although MPEG-2 and H.26x will likely be the same algorithm it is possible (or even desirable) that H.26x or H.32x will include as mandatory some specific format(s) to guarantee connectability. This would mirror the H.261/H.320 'application solution' versus the MPEG-1 'toolkit'. There are many factors which influence the number and parameters of such format(s) for H.26x/H.32x, including:

1. Subjective quality of standards conversions.

2. Affect of standards conversion on coding performance.

3. Implementation considerations.

4. Application requirements.

It is suggested that these factors have not yet received enough study to allow a wise decision to be made. Because it is argued above that there is no advantage from the algorithm development viewpoint to make a decision, the Experts Group should defer it. However, study should continue so that an eventual decision on formats can be made at the time when it is necessary to mould the generic algorithm under joint development by ISO and CCITT into the H.26x version.

Proposal

Though a solution which permits world-wide conversational services is needed, the CCITT Experts Group should defer making a firm decision about the incorporation of Super-CIF in H.26x. Study of the topic should continue.