vic and RTPv2

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Status

Work co-sponsored by LBL (Jacobson) and UCB (Ferrari), begun Jan 1992.

vic source code released last week ($2.4\alpha \rightarrow 2.6\beta$)

Ongoing work on congestion avoidance and video coding for multicast (my thesis research)

RTPv2 Issues

Core protocol implementation straightforward.

Preliminary version running.

Next steps:

- verify reception reports; develop diagnostics
- run against independent implementations

Working on video gateway architecture with
Hui Zhang (LBL):

- mixers, translators well-defined; transcoding fuzzy
- spec needs implementation feedback here

RTP Fragmentation

Not all “coding units” can fit in packet.

Profiles define fragmentation if necessary.

Contrast JPEG and H.261.

JPEG easy:

- coding unit = frame
- RTP timestamp identifies unit
- can assume frames in order

RTP Fragmentation (cont'd)

H.261 more difficult:

- coding unit = GOB
- RTP seqno's (implicitly) identify unit
- GOBs *can* arrive out of order

GOBs can't cross frame boundaries
$\Rightarrow$ must schedule GOBs for decode

In effect, have two levels of reassembly for H.261.

Can we make H.261 profile MBLK oriented?

Vic Highlights

Unique features:

- “Robust H.261”
- voice-switched windows

Robust H.261

Combine advantages of nv and ivs codecs:

nv robust to loss (conditional replenishment)

nv fast implementation

ivs interoperability (H.261)

ivs compression gain

Can do this with H.261 syntax:

- send only intra-coded macroblocks
- skip macroblocks that don't change

Very simple implementation (< 500 lines of C++).

Fast H.261 Encoding

Software:

- conditional replenishment sheds most load
- highly optimized DCT/quantizer

Hardware-assist:

- use JPEG hardware as DCT engine
- run conditional replenishment in DCT domain
- decimate color (4:2:2 to 4:2:0) in DCT domain
- requantize & code DCTs w/ H.261 syntax (easy)

Same model works for JPEG/H.261 transcoding.

Voice-switched Windows

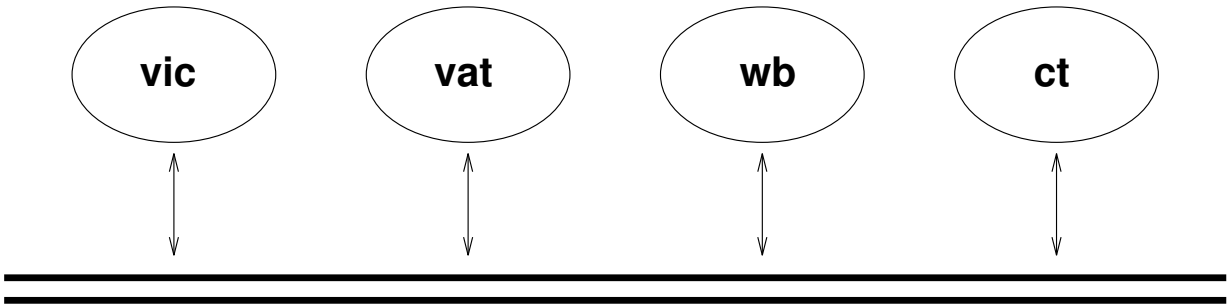
Vic uses cues from vat to “follow the speaker”.

Multicast IPC mechanism: the “Conference Bus”.

Generic coordination architecture:

- device sharing
- floor control
- media synchronization
- encryption key distribution

Conference Bus



Use RTP CNAMEs as media-independent ID.
Ex:

vat	→	focus(“mccanne@126.0.1.1”)
wb	→	focus(“van@126.0.1.7”)
vat	→	release(“audio”)
ct	→	mute(“*”)
		unmute(“mccanne@126.0.1.1”)
		focus(“mccanne@126.0.1.1”)

Summary

- RTPv2 implemented in vic
- revisit H.261 fragmentation
- “Robust H.261”
- voice-switched windows & “conference bus”