An application Protocol for Fast Long Distance Network

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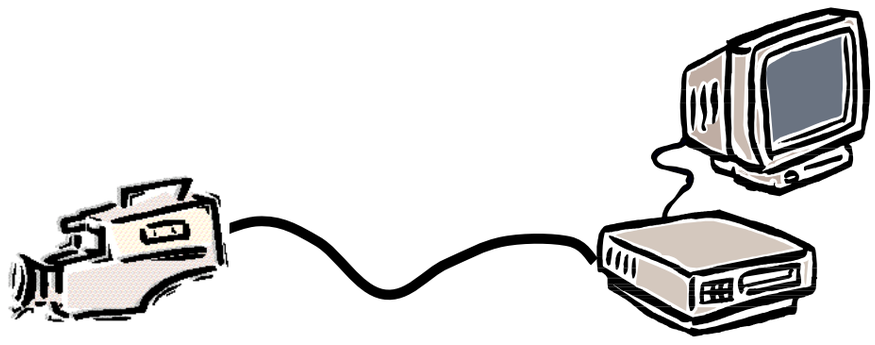
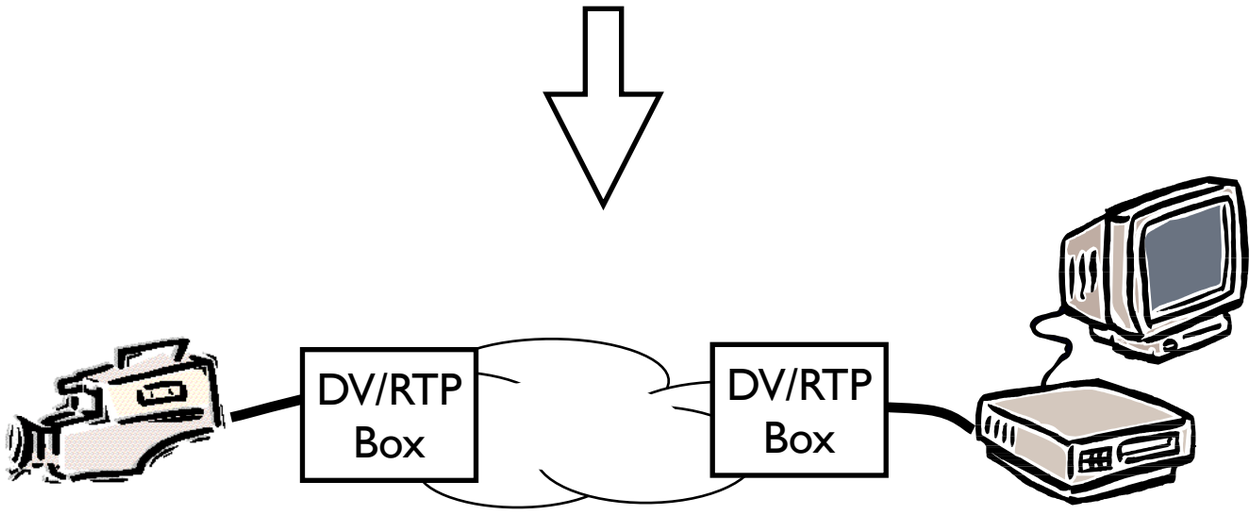
Off topic

- In 1st day panel, Injong Rhee presented high-speed TCP variant issue analogy between just raising sea-level. I felt it as "Global Internet Warming".
- Not sure whether it is "truth" or not.

DV/RTP video system



IEE1394 network



Internet

DV video format

- DV video format is designed for digital video recording format.
  - Both consumer and professional (IEC61834, SMPTE314, SMPTE370)
  - Intra-frame only compression (I-frame in MPEG) using DCT and VLC.
    - no inter-frame (P, B) compression.
  - Fixed and higher data rate: 25Mbps@SDTV, 100Mbps@HDTV.
  - CD-quality audio stream is bundled into video stream.
- Digital i/f is also defined (on IEEE1394, SDI)
- RTP encapsulation for SDTV is specified in RFC3189, HDTV is now in progress.

DV/RTP video system

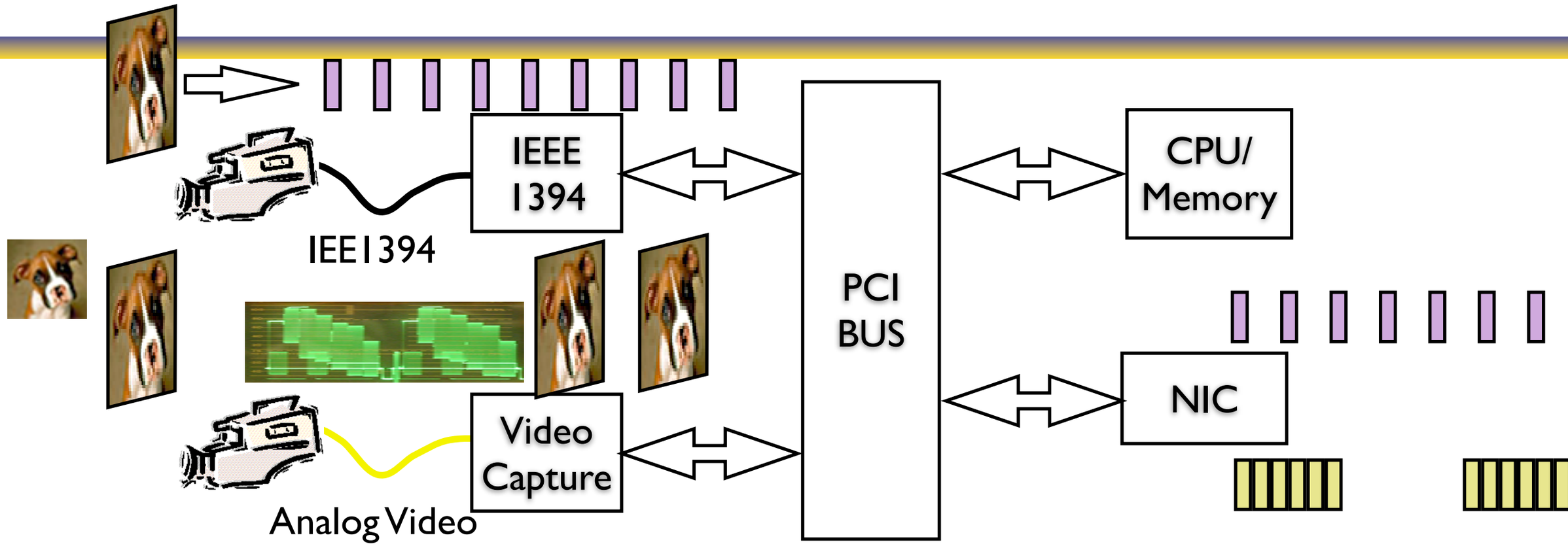
Pros:

- Video packet stream from IEEE1394 is well-shaped CBR.
  - simply forwards incoming packet to network.
  - Easy to predict traffic behavior.
- No inter-frame compression.
  - Small codec delay (< 200 msec.)
  - Resilient to packet loss (shuffling in codec, I-frame only)
- No quality losses on analog video segment.
- Better quality video comm. system in affordable cost.
  - home camcorder + IEEE1394 PC card (< $1,000 USD)

Cons:

- High bandwidth 30Mbps (inc. header overhead).
- Difficult to change codec bandwidth.

How different from other systems.

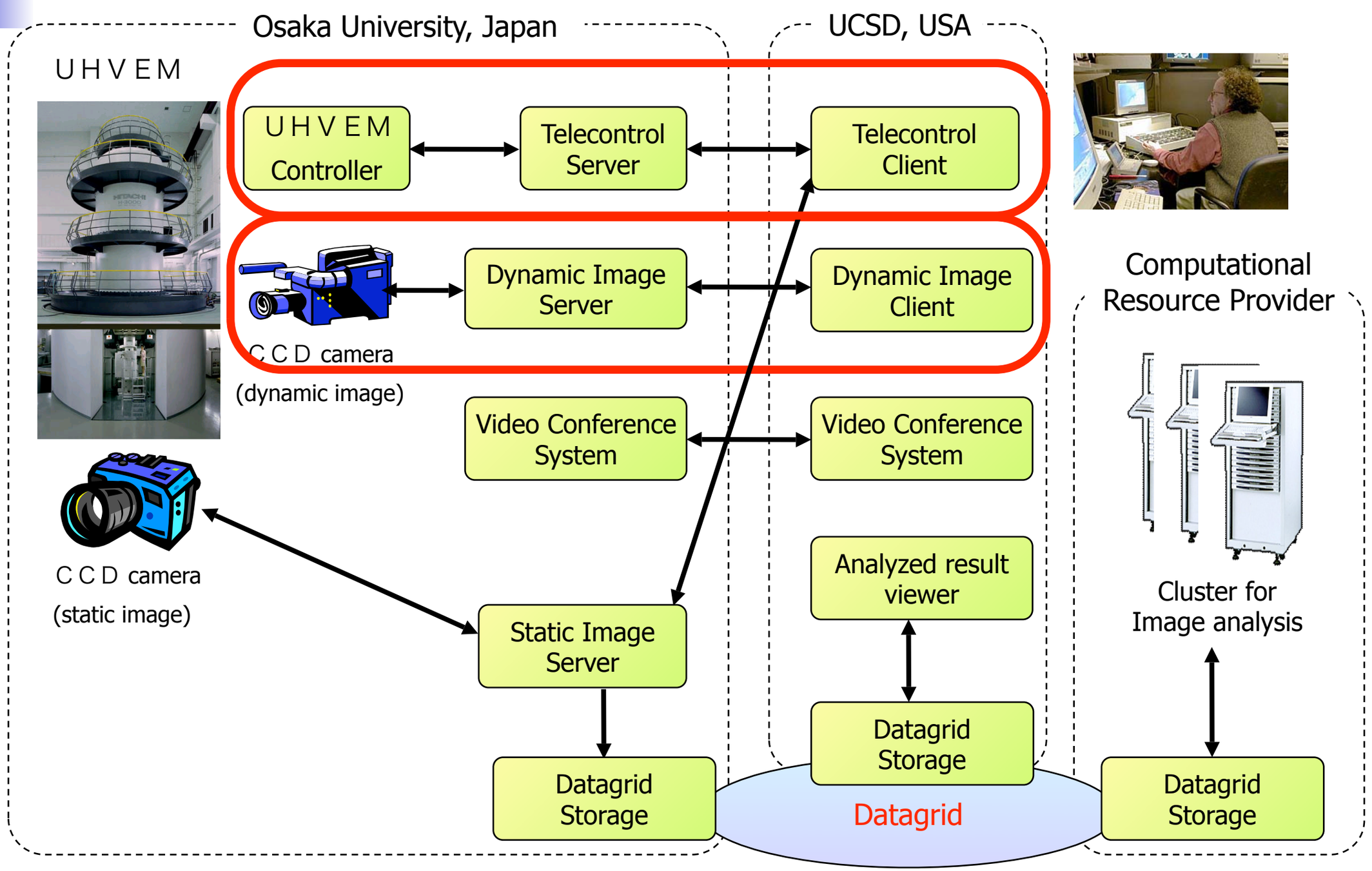


- When using video capture system:
- Rate control is required, even in fixed rate encoding
  - encoding is done at each frame completion (25-30 frame/sec)
- Quality loss in Analog/Digital conversion

Real-time video can support e-Science

- Real-time video is not only for interactive conversation.
  - Enable “expensive” facility remote-operation from own site.

Telemicroscopy



(Earlier SDTV version video system is based on DV video, Latest HDTV system is based on JPEG2000, Courtesy of Y. Akiyama, CMC, Osaka Univ.)

Requirements from TELEMICROSOPE

- Provide comfortable remote operation with real-time dynamic CCD image.
  - Manipulate specimen, change focus, beam intensity.

  ➡ Minimize delay, (e.g., encoding, queuing, , decoding, playout buffering)
- No special circuit / QoS provisioning.
  - To work on usual REN IP service.

  ➡ Resilient to packet loss