IP Networked Studio Infrastructure for Synchronized & Real-Time Multimedia Transmissions

Gaël MACÉ
CR / CP&M Lab. (Rennes / France)

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Functional Overview Diagram

HI-SPEED NETWORK
Combines Essence & Common Control

VIDEO SERVER
ARCHIVE SERVER
ARCHIVES / BROWSE
INTERNET

RECORDING
AUTOGRAPH
VIDEO SERVER

PRODUCTION
VIDEO SERVER

NEWS
VIDEO SERVER

POST PRODUCTION
VIDEO SERVER

CONTROL, MONITORING & INTERACTIVITY

INDEXING

TRANSFER MANAGEMENT

BROWSING

VIDEO SERVER

PLAYOUT

THOMSON
IMAGES & BEYOND
Studio evolution

Yesterday

Homogeneous and fully interconnected

Today

Tomorrow

ANALOGUE

DIGITAL
Studio infrastructure nowadays

- Several and heterogeneous communication infrastructures
  - According to their domain of constraints
    - real-time for production, non real-time for post-production
  - According to the essences they convey
    - Video, audio, synchronization, devices control/command, intercom (voice)
  - According to their technology
    - Analogical, digital, point to point, point to multipoint, synchronous, asynchronous
  - According to their communication mean
    - Signal processing, IP protocol, direct register access
Overall Production Dataflow requirements

- **Bandwidth**
  - High sustained bit rate (from 270Mb/s to 1.5Gb/s for SD & HD SDI compatibility on a single stream)
  - No dropped data

- **Time Predictability**
  - Low to medium latency (less than one frame)
  - Minimal and deterministic jitter (scale of tens of nanosecond)

- **Resource reservation**
  - Virtual dedicated channel
  - Real time guaranteed data delivery
  - Ordered data
  - Non duplicated and lost data (no retries)

- **Scalability**
- **Homogeneity**
- **Responsiveness**
Challenges

• Genlock
  • Synchronization in frequency and phase of all connected devices from the cameras to the video switcher (scale of tens of nanosecond)

• Virtual Audio/Video matrix
  • Keep the availability:
    – to address each of the connected devices (e.g. camera and monitor, camera and switcher input, etc.),
    – to gather set of sources and destinations
    – to switch from one group to another in respect of synchronous event (e.g. frame basis).

• QoS management
  • Different priorities of dataflow: Simultaneous high bit rate streaming, system communication and data exchange sharing the same medium.
  • Dynamic and exhaustive view of the network’s topology including connected devices

• Wired and Wireless continuity
  • Ensure the service’s continuity between wired (Ethernet) and wireless (Ethernet over 802.16) parts.

• Control and monitoring
  • Provide a complete network supervision in accordance with the TV studio usage
  • Support current communication features (intercom, tally, etc.)