IP Without Compromise

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Overview

- What technologies are driving the demand
- What are the challenges of adopting IP at the core today
- And...what solutions are available
- Case study and applications
Why we like baseband

- One signal, one cable
- Simple control system
- Discrete and deterministic switching
- Easy to management and use
New Challenges
More HD/SD services, multi screen
Ultra HD and beyond

8K UHD

4K UHD

1080p HD

SD
Considerations

- Core Router size
  - How large can we go?
  - 1152 x 1152 in 40RU (EQXM)
  - 2304 x 2304 (see picture)
  - If you use Ultra HD divide capacity by 4.
    - 576x576 = 128x128

- Facility cost / space

- Coax vs fiber

- Budget constraints
  - Lower CAPEX/OPEX
10GbE in facility?
10/100GE Infrastructure

Top of Rack

IPX / EXE

mediator
content management

MAGNUM

VistaLINK PRO

IP (MPEG2/H264)

8K/4K/3G/HD

3G/HD/SD

IP (MPEG2/H264)

Remote Top of Rack

3G/HD/SD

Remote Top of Rack

3G/HD/SD

DreamCatcher DC 100 Series

UpDown/Cross Converter

3080PG-NAT-10GE

Network Translator

3000REM-RX9

SDI Gateway (J2K)

3080PG-HD6/12

SDI Gateway

J2K over IP

J2K/H264 over IP

J2K over IP

Remote Top of Rack

8K/4K/3G/HD

3G/HD/SD

0/12

IP

Remote Top of Rack

8K/4K/3G/HD

3G/HD/SD

0/12

IP

Remote Top of Rack

8K/4K/3G/HD

3G/HD/SD

0/12

IP

Remote Top of Rack

8K/4K/3G/HD

3G/HD/SD

0/12

IP

Remote Top of Rack

8K/4K/3G/HD

3G/HD/SD

0/12

IP
Benefits of an 10GbE

- Less cables
  - 6 HD into a single 10GbE
- Bi-directional
- Direct optical interfaces
- Simple WAN interconnects
  - Telcos offer Gigabit / 10GbE interfaces at a lower cost than SONET/SDH
- Direct to disk/storage
- Compressed or uncompressed video
10GbE Realities

- SMPTE 2022-5 and 2022-6
  - High Bit Rate Media Transport over IP Networks
- AVB – Audio/Video Bridging
  - IEEE standard
Benefits of a 10GbE Facility

- Future-proof facility
  - SD to Ultra HD (4K/8K)
  - Uncompressed / compressed

- Scalable
  - Remove physical restrictions of baseband growth

- Efficient Workflows
  - Migrate from linear to non-linear workflow

- Add new services quickly

- Apply for greenfield and non-greenfield
Why not use IP today?

- Not designed for video
  - Latency issues
  - Not frame accurate – NO GENLOCK!
- Not enough bandwidth in the core and cable before
  - Today we can have 10GbE (6 HD or >100 j2k)
- QoS in standard IT is complicated
  - Queuing, prioritization
  - Involves dropping of packets
Why not use IP today?

- Non-deterministic switching
  - Due to internal / automatic path-finding
- Control and management is complex
  - Control is directed in path
- No clear simple bridge to existing broadcast technologies and infrastructure
- No ability to easily automate in broadcast terms
Software Defined Networking

• Separates the network’s control (brains) and forwarding (muscle) planes

• Easier to optimize

• More agile systems

• Rapid deployment
Software Defined Network

Software-defined networking (SDN) is an approach to networking in which control is decoupled from hardware and given to a software application called a controller.

Conventional Network
Each Network Switch Independently manages its own traffic

Software Defined Video Network
All network components are centrally managed to deterministically route traffic
Software Defined Video Network

*trademark pending
SDVN Architecture Overview

Format Translating Services

Gateway Services

Production Services

Storage Services

Transcoding Services

Monitoring Services

Playout Services

10GbE/100GbE Core
Simple SRC to DST philosophy
Leverages 10/100GE Scalable Infrastructure with High Capacity Switching
Format Agnostic

SMPTE 2022-5 and 2022-6

Compressed & Uncompressed
Pooled Resources
Deploy Services Fast and more efficiently

- Storage
- Playback
- Playout
- Multi-Image
“How do I take advantage of SDVN?”
Network Enhanced Production Truck
Transport Workflow

Company Confidential
Production Workflow

Cost/Weight Saver
- Less cables and Easy to wire
- Less operation cost for remote production

Flexible expandability
- Easy to expand I/O ports
- Easy to support future format 4K &8K

SDVN Controller
- Easy control of the production workflow over IP
Playout Workflow

TIE LINES FROM PRODUCTION

LIVE SOURCES 3G / HD / SD

INGEST

MULTIVIEWERS

PLAYOUT

MAIN & MULTISCREEN ENCODING

TIE LINES TO TRANSMISSION
Hybrid SDI/10GE Infrastructure
Thank You