



The Challenge of IP Video: Empower and Educate Staff

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in association with Media180



IP SHOWCASE THEATRE AT IBC - SEPT. 14-18, 2018



Real-Life I.T. vs. Broadcast Misunderstandings

- Live event feed needs firewall port opened
 - But all the I.T. Staff have left for the day
- \$80 WiFi router takes over DHCP for whole network
- Security “penetration test” shuts down live broadcast
- Firmware upgrade takes primary encoder offline
- IT won't approve a \$30,000 color-grading display
- Connecting two switches took entire network down



As an industry, we need to improve communication



Changes in the All-IP Network

- Multiple signals per cable vs. one signal per cable
- Combined core infrastructure for multiple video, audio and data formats
- Maintaining high standards for video and audio quality on a packet-based network
- Creating and managing multiple workflows to accommodate a variety of distribution platforms
 - Linear, OTT, Subscription VOD



Where do We Find the Right People?

- Hire new people with needed skills? Well, maybe not:
 - Median cost of replacing a worker is 21 percent of an employee's salary
 - Typically takes new hires 5 to 9 months to reach full productivity
- or –
- Train current employees in new technology/skill areas
 - As of 2017, more than half of employers are focusing on “upskilling” employees
 - 93 percent of millennials see ongoing skills development as important
 - Current employees are also familiar with company culture and practices
 - AT&T HR Executive: “Satisfied employees...give the company a real and substantial competitive edge”



Source: CNBC “AT&T’s \$1 billion gambit: Retraining nearly half its workforce for jobs of the future” March 13, 2018



Who Needs Training?



In the field



Master Control Room



IP Network

- Broadcasters are accustomed to working with different talent groups
- Crews for video, audio, lighting/staging, engineering, on-screen talent
- IP networking is just another specialty that becomes part of team
- All team members need a common language to allow mutual understanding and to have meaningful technical discussions



Key Learning Objectives, by Group

Media Professionals

Protocol basics: TCP, UDP, RTP, HTTP
 Addressing: MAC, IP, Ports
 IPv4 vs. IPv6
 Jumbo frames, packet overhead
 Unicasting vs. Multicasting
 Subnets and VLANs
 IGMP, PIM, spoofing
 System Security Practices

Networking Professionals

Video signal formats, standards
 Compression, GOPs, profiles/levels
 MPEG2 Transport Streams
 Container/file formats, transcoding
 Metadata, captions, ad insertion
 Unique hardware/software needs





New Material for Everyone

Both Media and Networking Professionals

Streaming formats - HLS, DASH
 Error detection/correction, FEC, SMPTE 2022
 Stream encryption, media key management
 Content delivery networks (CDNs)
 Performance monitoring for time-sensitive streams
 IP Network redundancy schemes for live broadcasts
 IP Media formats: AES 67, SMPTE ST 2022, ST 2110
 IEEE 1588 Precision Time Protocol
 Session Description Protocol (SDP)
 Software Defined Networking (SDN)
 AMWA NMOS IS-04, IS-05, IS-06



Case Study: NEP Group

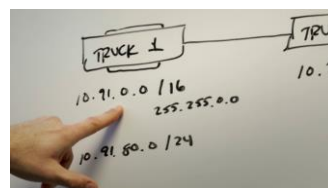
- Worldwide supplier of broadcast services for live events
- EIC's need to become familiar with IP technology
 - Reduce reliance on support from IT staff at headquarters
- On-site training for small groups (6-8 senior-level people per class)
 - 50% PowerPoint lessons, 50% hands-on with actual network equipment
- Topics included
 - IP networks basic concepts
 - Subnets, VLANs, device configuration
 - Multicasting, IGMP, Snooping
 - Layers 1, 2, 3 and 4
 - DNS, DHCP, NAT, Spanning Tree





Case Study Results

- EIC's much more comfortable with IP technology
- Hands on with actual equipment
- Many questions answered and puzzles solved
- Always fair to ask "Why?"
- Ready to learn IP Video and Audio when needed



The Continuous Learning Paradigm



KNOWLEDGE

v.s.



UNDERSTANDING



THEORY

v.s.



CAPABILITIES

20%



LISTENING

v.s.



DOING

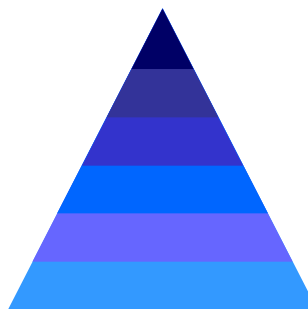
80%





People Generally Remember

- 10%** of what they read
- 20%** of what they hear
- 30%** of what they see
- 50%** of what they see and hear
- 70%** of what they say and write
- 90%** of what they do



...according to Edgar Dale's Cone of Experience



Where to get Training?

- Media Industry Events
 - Many great seminars, sessions
- Vendor-supplied Training
 - Often included in RFPs
- Professional Organizations
 - SMPTE, IEEE, SBE, etc.
- Training Specialists





Media Industry Events

- Multiple seminars/sessions at trade shows during the year
 - NAB, IBC, NAB East, SMPTE ATC, VidTrans
 - Other regional shows (Dubai, Sydney, Singapore, Sao Paulo)
 - IP Showcase (like this one!)
- Good resource for specialized material
 - Case studies, standards progress, technology deep-dives
 - Advanced topics for experts
 - May also offer tutorial sessions



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Vendor-Supplied Training

- Most (all?) vendors will supply basic product operational training
 - “Click button A, enter value B, see result C” etc.
- Some provide enhanced training/certifications
 - Cisco CCENT, CCNA, CCNP, CCIE – general purpose networking
 - Cisco IP Fabric for Media Solutions – specific to Cisco DCNM
- Many cert courses are of limited relevance to media professionals
 - Key topics (e.g. multicasting) only covered in advanced courses
 - Certs require memorization of CLI (command line interface) vocabulary/syntax



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Professional Organizations

- IEEE BTS, ATSC and SBE generating new course material on ATSC 3.0
 - SBE releasing series of webinars starting in September 2018
 - IEEE BTS will offer one-day ATSC 3.0 course at multiple locations in USA
- SMPTE currently offers several Virtual Courses
 - On-line course material with weekly instructor coaching sessions
 - Essentials of IP Media Transport for Broadcasters: Moving Real-Time Video and Audio over Packet Networks
 - Understanding SMPTE ST 2110: Standards for Professional Media Over Managed IP Networks
 - Internetworking, Routing & Switching Programs from Cisco Networking Academy



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Training Specialists

- Independent organizations offer standardized and customized training
 - Syllabus can be tailored for specific student needs
 - May be individual, training firm, or supplied in partnership with vendors
- Some choices to consider
 - www.Q3Media.co.uk – Ed Calverley
 - www.media180.fr – Pascal Souclier
 - www.telecompro.tv – Wes Simpson



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Thank You

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