



EMPOWER YOUR WORKFORCE IN THE DIGITAL MEDIA AGE

TRAININGS PROGRAMS

Convergence
IT/Broadcast
In The Field of Audiovisual Media

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THE MEDIA 180 ADVANTAGE

15 Years of Education Experience:

- A **proven process** with sets of documents tailored to develop, support and measure every project deployment; optimizing the **return of your training investment**
- A **unique methodology** to guarantee acquisition of knowledge

Consulting Support:

- **Experienced Broadcast and IT professional** helping to define or articulate strategic objectives
- **Assistance in managing deployment of projects** across the organization (including HR)
- Report and debriefing sessions will help to **control and measure progress** while optimizing the technical and operational workflows

Customized Training Programs:

- Every training program is **defined according to your business and strategic** objectives
- Assessment of the organization **optimizes the training programs** to the audience
- **Hands on training** optimizes the acquisition and persistence of the knowledge
- Development of **tailored teaching tools** to improve the usage of acquired knowledge

Experienced Team of Trainers and Consultants

- Most of Media180 trainers are **active Media Professionals** with deep understanding of the industry
- Every member of the team is **trained and certified** for their teaching skills
- Continuous research helps to develop new modules for the **newest and emerging technologies**.

TRAINING PROGRAM #1

IT Networking in Broadcast Environment

Organization

2 extended days - 6 to 8 trainees – On site

Audience

Editors / Support team / Audiovisual Technicians / Media Managers / Archive Operators

Pre-requisites

Good understanding of broadcast environment

Training Objectives

Acquire common ground understanding of networking in a broadcast infrastructure context

Academics Goals

The trainees will learn to:

- Understand networking
- Configure a virtual network (VLAN)
- Add devices
- Connect two systems
- Configure Wireless access point

Delivery Method

Hand on workshop using training lab
Workshop pointing to open web sites

Training tools requirements

- The training lab should be set-up and available in August during the preparation of the training with a set of equipment for the preparation and training :
 - Training room with White board and Video Projector
 - 7 to 9 PC workstations (Windows7) networked, with administrative rights
 - Internet connection

Note: network should be separated from the enterprise network

Training Program

Introduction

- Participant introduction
- Reminder Objectives
- Introduction the training program
- Roundtable discussion for inputs and feedback

Basics

- Understand Networking
 - o Network topology
 - Device type
 - Star network topology
 - Network classes
 - Subnets
 - Spanning tree
 - o Internet protocol
 - IP address
 - Subnet
 - Gateway
 - o Routing
 - Dynamic routing
 - Static routing

Management and Trouble shooting

- Configure a VLAN
 - o Principals
 - o Configuration
- Add Device
 - o Machine Network configuration
 - o Introduction Network mapping
- Connect two Systems
 - o Create a Trunk
 - o Venue public network
 - o Point to point connection
- Configure Wireless access point
 - o Client per access point
 - o Wireless channels
 - o Security

TRAINING PROGRAM #2

Video, Files Formats and Encoding / Transcoding

Organization

2 extended days - 6 to 8 trainees – On site

Audience

Editors / Support team / Audiovisual Technicians / Media Managers / Archive Operators

Pre-requisites

Good understanding of broadcast environment

Training Objectives

- **Acquire a strong background in file processing**
- **Manage the video and audio files depending on the production and distribution**
- **Encoding and transcoding video formats for a variety of applications.**

Academics Goals

The trainees will learn to:

- *Recognizing video & audio file formats and common video standards*
- *Families of compression*
- *Define goals for encoding / transcoding*
- *Analyse the quality of a video before and after encoding / transcoding*
- *Adjusting encoding parameters with a specific goal*

Delivery Method

Hand on workshop using training lab
Workshop pointing to open web sites

Training tools requirements

- The training lab should be set-up with a set of equipment for the training :
 - Training room with White board and Video Projector
 - 7 to 9 PC workstations (Windows7) networked, with administrative rights
 - Internet connection
 - Encoding software : like Adobe Media Encode, Telestream...

Note: network should be separated from the enterprise network

Training Program

Introduction

- Participant introduction
- Reminder Objectives
- Introduction the training program
- Roundtable discussion for inputs and feedback

Video and audio files formats

- Wrapper, codec, container, metadata
- Frame size, aspect ratio, frame rate, interlace, progressive, chroma sampling, data rate
- Raw format, uncompressed, mild-compression, high compression
- Footage, intermediate file, master file, distribution file

Common video standard

- Metadata. analog & digital, ITU-R
- Broadcast standards, SD, HD, 4K, DCP, DVD, Blu-ray
- Color space, internet, television, theater

Family of compression

- Metadata. analog & digital, ITU-R. intraframe & interframe compressions, spatial, temporal, DCT, DWT, GOP
- Lossy & lossless compression
- Apple ProRes, AVID DnxHD, Cineform
- MPEG, HEVC, WMV, VC-1, On2, JPEG2000

Goal for encoding/transcoding

- Control of the video quality: motion, fine gradation, image details
- Reference monitor
- Tools to evaluate the loss of information

Adjusting encoding parameters with a specific goal

- Data size vs compression artifacts
- Data size vs cpu load
- Quality vs encoding time
- Amount of compression based on the video content

TRAINING PROGRAM #3

Fundamentals Video Broadcast & Workflow TV For IT Staff

Organization

2 days - 6 to 8 trainees – On site

Audience

IT support technicians, Developers, Network Administrators in broadcast environment

Pre-requisites

Advanced knowledge and professional experience in the areas of IT and networks in audio-visual / broadcast environment

Training Objectives

- **Understand fundamental notions audio and video and the related terminology**
- **Characterize the main components of broadcast environment and linear audiovisual production**
- **Identify the sequences from acquisition to broadcast and implemented workflow**
- **Define the image quality issues and real time in television**
- **Understanding the challenges of the IP production and its impact on infrastructure**

Academics Goals

The trainees will learn to:

- *Overview of a television channel*
- *Understanding the role and operation of key internal systems components to a television station*
- *Basics of audio and video signal and compression*
- *Characterization of various video formats and use cases*
- *Fundamental SDI, method of delivery live video and audio signal in TV*
- *Fundamentals of colorimetry*
- *Setting I/O cards*
- *Using the terminology of the Broadcast environment*
- *Role of different workflow of a TV channel*
- *Identification of audiovisual technology infrastructure elements*
- *Challenges of changing the infrastructure from SDI to IP*

Delivery Method

Interactive and dynamic approach with use case and practical examples
Hand on workshop using training lab
Workshop pointing to open web sites

Training tools requirements

- Training room with White board and Video Projector
- Internet connection
- Video equipment (depending project)
- Metrology equipment (depending project)
- Manufacturers equipment (Upon validation)

Training Program

Basic video signals

Video

- Video Capture in RGB Component
- Representation YUV (why, how)
- Digital Sampling
- TBC: Time Base Corrector

SDI Transport

- Fundamentals
- Flow rates for SD and HD formats

Brief overview of the components of an SDI system

- Sync Generator
- Frame Sync
- Format Converter

Video formats

Pictures and audio Fundamentals

- Design a digital picture or graphic
 - Interlace and Progressive (what, why, advantage / disadvantage)
 - Frame rates (24, 30, 50 and 60) and the origins / use each
 - Aspect Ratio (4:3, 16:9, Cinemascope ...)
 - Pixel Aspect Ratio
- AFD and automatic conversion of 4:3 to 16:9
- Mode full Vs. legal
- SD and HD formats used in broadcast and use cases of each format
 - 576i, 720p, 1080i, 1080p, 4K and 8K UHD-(future)

Codecs and bit rates

- Codecs and rates used in production and by broadcast formats

Audio formats

- Audio fundamentals
- Analog audio and audio Signal digitization
- Audio embedded
- 44.1 kHz Vs. 48 kHz
- The quality of the audio signal
- Main audio standards (R128 ...)

Colorimetry

- Fundamentals
- Standards: 601, Rec 709, Rec 2020, DCI ...
- Measurement: Levels, Gamut
- Card configuration (Blackmagic / AJA)

Digital compression

- Why compression (advantages and disadvantages)
- Compression formats
 - MPEG2
 - MPEG4 / H.264
 - HEVC / H.265
- The main compression setting
 - Subsampling color (4:4:4, 4:2:2, 4:2:0, 4:1:1)
 - Time Compression Inter and Intra Group of Pictures (GOP)
 - Flow rates, Flow mode CBR vs. ABR

Workflows

- Typical Workflows of TV channel (ingest to broadcast)
- People Workflows
- Technical Workflows
- Cases studies in a News channel
- Cases studies in stream tv production
 - In which point of the workflow are used different types of compression
 - The compression settings at different steps in chain:
- Contribution
- Terrestrial Distribution

IP and network in a broadcast environment

- Why IP
- Different IP uses in a broadcast context
- IP System Distribution

Examples and technical tours

- Technical tours subject to availability in a TV Channel, workflows and different steps of production and media processing.

TRAINING PROGRAM #4

IP In Production in Broadcast Environment

Organization

1 day - 8 to 12 trainees – On site

Audience

**Audiovisual staff
Sale and Marketing team**

Pre-requisites

**Understanding of fundamentals of network
Good understanding of Broadcast environment**

Training Objectives

- **Understand the challenges of the arrival of IP**
- **Identify the IP technical principles implemented**
- **Discover the impacts on future infrastructure**
- **Appropriate the terminology and concepts related to the IP live production**
- **Set and optimize IP transmission equipment**

Academics Goals

The trainees will learn to:

- Identify current technology infrastructure elements
- Understand the issues related to the connectors of the video broadcast
- Identify the benefits of IP in production in general and particularly
- Differentiate the IP technologies developed in production and their specificity
- Characterize the key points of development to integrate the technologies of live production IP
- Identify duplex IP issues and file exchange

Delivery Method

Interactive and dynamic approach
Use case and practical examples

Training tools requirements

- Training room with White board and Video Projector
- Internet connection

Training Program

Introduction

- Participant introduction
- Reminder Objectives
- Introduction the training program
- Roundtable discussion for inputs and feedback

Current context: The end of SDI?

SDI, the base of infra

- Advantages
 - Simple technology, open and proven
 - A certain ease of implementation
 - Low latency
 - A constant bandwidth reserved
 - New standards in preparation
- Inconvenient
 - One-way connections
 - The centralization of exchange via a matrix switcher
 - A plurality of cables (video, audio, remote, network)
 - An expensive deployment
 - Limited rates

The arrival of IP

- Reasons of the IP
- IP uses case in a broadcast context
 - The set top box
 - Wired or wireless contributions
 - Streaming
 - Administration systems

IP issues

- An IP technology into broadcast architectures
 - Using real-time or file transfer
 - Originally not for video technology
 - Issues
- Encodings related to IP
 - Mpeg2 and Mpeg4
 - Streaming Technologies
- Knowledge related to IP
 - A certain ignorance on technologies that are changing fast

Introduction of IP Production

What do these new technologies?

- In the deployment of workflow
 - Flexibility in deployment and redeployment
 - Gain provided by the bi-directional connectivity
 - The potential aggregation of several signals
 - Agnostic format
- In the implementation and administration of productions
 - Development of "Remote Production"
 - Redesigning workflow in multi-site environments

SOA

- Simplification of the implementation
 - Less connectivity
 - Centralized configurations
 - Monitoring and remote distribution
- In the field of security
 - Effective management of hardware redundancy
- From an economic perspective
 - Streamlining costs (IP vs SDI)
 - non-proprietary equipment manufacturers and standardized connectors
 - Restructuring of operations workflows
- Transport technology
 - SMPTE 2022: detail
 - AVB (Audio Video Bridging)
- Network Technology
 - SDN and issues around the OpenFlow
 - Restful approach
- Compression technologies
 - Choose to compress or not, Jpeg 2000
 - Compression TICO, LLVC and Dirac Pro
 - Issues related to the FEC
 - Case of encapsulation (HBRMT)
- Synchronization technologies
 - NTP and PTP (Precision Time Protocol)
 - SMPTE 2059 (on the standard IEEE 1588)
 - The challenges of source-timed and destination-timed

- Issues of standardization of technologies related to IP live production
 - SMPTE and IEEE
 - The VSF group
 - Network Media Interface (Sony)
 - Grass Valley (SDN), the hybrid approach
 - Agnostics approaches
 - Issues related to connectivity

Audio and video transmissions over mobile networks

- Technical specifications
 - Network Fundamentals (reminders)
 - File formats Bases (reminders)
 - Workflow Definition and stages of transmission
 - 3G / 4G networks and aggregation
 - The Direct way and File way
- Technical Implementation equipment
 - Equipment configuration
 - Settings receiver LiveU
 - Implementation and settings of AVIWEST client
 - Communication with the video control room (N-1)
 - Monitoring and administration



A team of highly skilled trainers with solid experiences in:

TECHNOLOGIES BROADCAST / IT

- Video and Information Technology
- Networking, Hardware and Software

TV AND VIDEO SYSTEMS

- Design, Deployment, Operations, Support

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