The Transition to All IP

Contribution, Production, Transformation, and Distribution

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Today’s Presenters!

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From Legacy to All Device Platforms

Legacy Television Broadcast

- 24x7 Broadcast Channels to TV
- Dedicated “Media” Infrastructure/Channel
- 1-3 Years Development/Channel
- Limited Broadcast Formats (SD, HD)
- Constrained Distribution (Cable/Satellite)
- Limited TV Viewing Analytics

Emerging All Device Platform

- Streaming/XoD & Digital Platform to All Devices
- Virtualized “Media Cloud” & “IP/Ethernet”
- 0-3 Months Proof of Concept to Distributions
- Format Explosion (US, EU, HD, Mobile, 4K, etc.)
- Disaggregated Distribution (Global OTT/TVE/D2C)
- Robust Audience Engagement & Ad Analytics
“IP, IP, IP is the focus…I don’t want hardware. I want software….We are encouraging all our vendors to help us replace all of these device that require all of us to get back to SDI or baseband video.” --John Honeycutt, chief technology officer at Discovery Communications.

“We are not going to be building any more big iron facilities…The cloud and IP-based infrastructures will allow us to quickly respond to new consumer trends.” --Vince Roberts, executive VP of global operations and CTO at the Disney/ABC Television Group.

“We have been looking at it [virtualization] for the past few years but we are even more serious now about computer and storage mechanism so we can virtualize master control and such. One of the key questions we will be asking our traditional vendors is ‘how are you preparing your products for the cloud future?’” --Richard Friedel, executive VP/GM of Fox Networks Engineering and Operations.
Media @ Cisco

Live and Local All-IP Production Media Cloud
Transition to IP from SDI

- Ready for today’s new formats and data rates
- Increased bandwidth with Ethernet
- Deterministic networking

x86 Workloads

- Move away from specialized, dedicated, expensive HW
- Towards general purpose, low cost compute and storage

Cloud Architectures

- Software Defined Networking (SDN), not manual
- Application Policy Driven Infrastructure
- Treat the platform as reusable pools of resources
IP & Data Center to Cloud Migration

Mixed HW Silos
- Appliances in racks
- Multiple application silos with dedicated infrastructure built to peak

Consolidate Platforms/Apps
- Converged infrastructure
- Initial cloud applications
- Shared resource pools

Fully Virtualized Cloud
- Fully virtualized components
- SDN driven elastic capacity
- Worldwide network of cloud resources

Remote Production  Contribution  Studio & Post Production  Primary Distribution  Secondary Distribution  Consumer Experience
Media @ Cisco: Partner & ISV Ecosystem
Live and Local All-IP Production Media Networks (PMN)
Production Media Networks Industry Transition

Open Standards
SMPTE, VSF, JT-NM, IETF, IEEE

Interoperability
Supporting Rich Eco-System of Vendors

Off the shelf hardware
No purpose-built appliances
Industry Challenges and Requirements

- Unchanged Operator Workflow
- Deterministic Low Latency and Jitter
  Deterministic Quality of Service
- Zero Packet Loss
  Reservation of network resources across redundant paths for zero congestion loss
- Video/Audio End Point Sync and Lock with Micro-sec Accuracy
  Precision Timing and Synchronization
- Fast and Clean Switching
  Switching streams with minimal delay and on frame boundary
- System Availability
  Same or better than SDI-based system
- Network Security
  Protect network operations from any malicious attacks
Live Studio Production with SDI Technology

- Video Router
- Control Systems with Control Panel
- Playout
- Monitoring Systems
- Video Switcher
- Multiviewer
- Audio Mixer
- Graphic Systems
- Video Server Relay and Clips
- Remote Source
- Cameras and Microphones
Live Studio Production with IP Technology

- Control Systems with Control Panel
- Playout
- Monitoring Systems
- Video Switcher
- Multiviewer
- Audio Mixer
- IP Network
- REST
- Network Controller
- Network Interface
- Standard and Open API
- Remote Source
- Graphic Systems
- Video Server Relay and Clips
- Cameras and Microphones
Control System with SDN Network Controller

Applications
- Best understand the networking needs, flows and connectivity requirements

Network Controller
- Abstracts the network and routing complexity while providing control to the higher layers

IP Network
- Provides connectivity using rich industry proven routing technologies

Control System + Network Controller provide the Policy Control System
Use case

Flow Security

- New flow creation requests come from Media Controller
- IGMP requests from end points:
  - Can be blocked and/or forwarded to the media controller for authentication

Flow Metering
Deterministic IP Networks

- Layer 3 standards based
- Admission control and Policing
- Bandwidth Reservation
- Granular priorities
- Traffic shaping
- Deterministic Latency

Cisco Open Daylight Controller with bandwidth manager

REST
Network Controller
NETCONF

Layer 3 - 10G

PTP – Time Synchronization

File WF

Video WFs

Layer 3 Deterministic Network

Source
Destination
Flow
Bandwidth
Delay

Resource Request:

Resource Admission Confirmation

GUI

NETCONF

Network Controller

Video Display

File WF
IBC 2015: Clean Switching with Imagine
IBC 2015: Joint Demonstration with EVS
Media Cloud
Media Cloud & OpenStack
Fulfilling The Promise Of Media Virtualization

Agile
- Spin up new workflows and networks in minutes, not hours or days

Customizable
- Opensource programmability – Large talent pool

Elastic Scale
- Easy to replicate and burst to the public and private cloud infrastructures

Futureproof
- Constantly evolving opensource Code, supported by a huge community
Cisco Media Cloud Converged Infrastructure

Media Cloud
- Media Optimization

Improved Lifecycle Management
- Increased Reliability
- Security

Cisco OpenStack Platform
- Red Hat OpenStack Platform
- Cisco OpenStack Plugins
- CI / CD
- Network
  - Nexus 9000
  - UCS-Fab-Int
  - ASR1000
- Compute
  - UCS-C
  - UCS-B
  - UCSM
- Storage
  - COS
  - C3160 (Swift)
  - C240 (Ceph)

Additional Media Cloud Services
- ISV Certification
- CIS and Cloud Bursting

MediaCloud
- Physical Infrastructure
- Network
- Compute
- Storage
- Cloud OS

Intercloud Fabric

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Cisco Media Cloud

Your Workflow

Deploy Your Applications In A Rich Ecosystem

Transcode  Quality Control  Playout

AnyRes  interra  Versio

Built With Cisco Infrastructure

UCS B Series  UCS C240  UCS C3160  UCS C220  UCS C220

UCS B Series  UCS C240  UCS C3160  UCS C220  UCS C220

UCS C240

Cisco Object Store (COS)

Cisco OSP – Install/Build

OpenStack Controller

Cisco Application Policy Infrastructure Controller (APIC)

Nexus 9000

Networking

Application Centric Infrastructure (ACI) For Application Policy Control
Media Cloud Demonstration

Your Workflow

Media Cloud User

Requesting a Broadcast Channel using a Template

MediaCloud Portal

MediaCloud Portal (Future 3rd Party Tools)

Portal collects template information

Broadcast Chnl. Template

Portal presents Broadcast Channel

MediaCloud Portal

Infrastructure

Status provided through Portal

OpenStack Provisions Compute / Network and Storage infrastructure

Your Workflow
Live Demonstration
TOMORROW starts here.