4 years ago...MAM, What is It?

- **MAM, DAM, CMS, AMS**: several acronyms that mean the same thing, don’t worry about what it’s called, focus on what it needs to do for you...

  - There are several core features in a MAM:
    - IT hardware, collapsible architectures, centralized database, and some level of workflow and physical layer automation
    - Architecture allows for large scale deployments
    - Integrate disparate 3rd Party technology platforms
    - Customizable to created desired workflows
    - Unified user and operational interface

  - It’s all about building the right workflows to meet the requirements.
Today ...

2015 BBS Broadcast Industry Project Index

Measures end-user budgets and plans to **spend money** on over next 12 – 18 months

Source: Devoncroft Big Broadcast Survey 2015 (Preliminary)

- Install or enhance workflow / asset management system
- Upgrade cameras
- Upgrade infrastructure for HD / 3Gbps operations
- Upgrade transmission and distribution capabilities
- Cloud services / cloud technology
- Build new studios / outside broadcast vans
- Archive-related projects
- Move to automated operations
- Launch new channels
- Distribute and monetize content on multiple destination platforms
- Upgrade audio capabilities
- Upgrade newsroom operations
- Migrating from copper to fiber
- Prepare for analog switch-off
- Install or revamp business management systems
- Implement disaster recovery
- Consolidate operations in regional hubs (centralcasting)
- Outsource operations e.g. playout
Big Broadcast Survey 2014 tidbits...

• Content management are more of a priority
• The number of different cloud services cited in 2014 is much more than 2013.
• Amazon Web Services ... wasn’t even in the results in 2013, and in 2014 survey AWS is the prominent way people use and will use the cloud.
  – Cloud awareness is growing...
Cloud Principles = Advantages

- Clustered: active-active, including utilizing other data centers for peaks above internal capacity
- Operate parallel tasks
- Multiple queues of short lived tasks
  - “micro services”
- Purpose Built appliances to maximize throughput AND/OR
- Virtual machines... both under automated control
Content Management Principles

• Biz decisions driven by business systems (i.e., Traffic):
  – Source to destination(s) by a deadline
  – Apply complex rules, profiles, tasks into workflows
  – Prioritize in-to-out based on rules:
    • Deadlines, Priority, etc

• Digital Factory must Scale Out & Automate
  – High Volume “in” to “out” ... “Fan Out”
    • Large Volumes of short lived tasks
  – While in-flight: prioritize queues, meet deadlines!
  – Structured Workflow(s) to sync up at distribution
  – Must be highly automated: Ops only touch trouble assets
Architecture Evolution
Existing Architecture

- Active/Passive: 1:1 High Availability
- Dedicated Blades in Dedicated Chassis
  - “Build for Peak”
- Database running on the Core HW blades
Business Systems

Digital Factory

File → Ingest → Xcode → FTP → Distribution

Task: Ingest
Task: Transcode
Task: Package

Central Storage

Schedule Request
Update
Active/Active Cluster Architecture

- All non-core nodes become part of the cluster
- Static Tasks per hardware server now eliminated
- Componentization and Microservices architecture
- N+M versus N+N redundancy: “self healing”
Elastic Digital Factory

Business Systems

Request

Update

Orchestration Engine

Source

Ingest

Xcode

QC

Destinations

Distribution

11
Elasticity
Analytics: Non-Linear Monitoring
A factor is applied to the queue for 2 factories. Some jobs will miss their deadline.

If a node fails: run the job on another node.

With 3 nodes: the predicted times now fall within the deadlines.
Components and Microservices

Static Task

Micro-Service

Node
Components and Microservices

• Ensures long term (24/7) components are always running once

• Makes use of available resources for jobs

Abstracts CPU, memory, storage, and other compute resources away from machines (physical or virtual), enabling fault-tolerant and elastic distributed systems to easily be built and run effectively.
Mesos
Cluster Monitoring
Using Analytics to make Predictions
• What if our cluster is maxed-out but our predictive analysis shows jobs unable to meet deadlines?
  – Dynamically add more resource into the cluster.
  – And spin-down when no longer required.
Architectural Options
On Premise: Optimized HW

• Purpose Built HW to maximize throughput of CPU availability
  – Pros
    • Purpose built to handle onsite peaks
    • Fastest & most predictable results
    • Security
    • Easier to test, model predictions
  – Cons
    • Once volume reach peak, have to add iron to maintain throughput
    • Ongoing Growth = Ongoing CapEx
On Premise: Generic HW

• Introduces Virtual Machines & Re-Configurable HW
  = any COTS HW
  – Pros
    • Follow Moore’s Law
    • IT simplicity: resiliency, growth, maintenance
    • Could be load sharing with other (IT) departments
    • Maximization of existing investments, manage efficiently
  – Cons
    • Still building for peak volumes
    • Sharing resources (risk?)
    • Some Vendors are tied to “dongles” still
Private Cloud

- In your “4 walls” or hosted in outsourced data center
  - well protected, under your control
- Provides simple(r) connectivity to your other data centers, your premise(s)
- Provides efficient means to share resources with a larger geographic footprint
  - Follow the sun model
    - Shift loads from one data center to another: off peak hours
- If in hosted data center, could offer connectivity to public cloud offerings, CDN’s, IP Distribution
Cloud Services: use cases

• Searching for and ordering content
  – User interface for global search and browse directly via the cloud.

• Global reporting – aggregate site reports in the cloud.
  – Accessible via direct UI.

• Smart use of global compute resource.
  – Offload peak work from one site to another.
Public Cloud

- Complete Virtualization and hosted environment
- Vendor/Service Offerings: SaaS, PaaS, IaaS, etc
  - volume based/transactional
- Pros
  - No CapEx
  - Ease of shifting “peaks” within their datacenter(s)
  - Ease of file sharing: distribution, CDN models
  - Some providers off lower cost for “off hours”
  - “It’s not your problem”
- Cons
  - Perception of lessened security
  - Cost of file transfers from premise to datacenters
Offload Tasks

Other Data Centers

PEAK CAPACITY

CAPACITY

TIME
Hybrid Model

• Mix of On Premise and Public and/or Private Cloud

• Pros
  – Less moving of heavy assets through expensive pipes or public internet
  – Example: Maintain assets within your control, but offload strategic elastic in nature tasks to datacenters: distribution chains, CDN, private offerings
    • i.e., Store Fronts “direct to consumer,” other 3rd party vendors, deep archive, etc.

• Cons
  – Higher upfront costs with on-premise gear
Direct Connect
Summary

• We are at a pivotal point in the industry...
• Shifting business models = new challenges
• Applying best of breed IT practices to media specific use cases
• There are several ways to approach a solution
Q+A
BITS

Tim Murphy

Evertz