“Creating a 21st Century Newsroom”

Karl Paulsen
Chief Technology Officer

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“Creating a 21\textsuperscript{st} Century Newsroom”

The Washington DC Bureau’s design, modernization, move, and its joining to the Al Jazeera’s Global Network
The Challenges

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... and building up a news organization from scratch is another:
... but building up a *global news entity* and transforming it to a *universal operational model* is an altogether different task

...especially when you’re dealing with *multiple languages* and *differing cultures* on *three different continents*
Al Jazeera Networks

... its 19 year history

• Founded in 1996 -- headquartered in Doha, Qatar.
• In Arabic --‘al-jazeera’ means the *island*, referring to the Arabian peninsula
• The Al Jazeera icon – a *gold droplet of water* - is said to spell ‘Al-jazeera’ in Arabic
• January 1999 -- the news outlet triples its workforce to about 500 employees, adding bureaus to Europe and Russia
• January 2003 -- 23 bureaus and 1,300 employees
• November 2006 -- Al Jazeera English is launched
• January 2011 - Qatari government relinquishes its control
• January 2013 - Al Core’s *Current TV* network is bought
Al Jazeera’s Global Perspective

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Main North America Operations

- **Manhattan** – news studios for AJ America channel, broadcasting via Encompass
- **West Coast** – formerly Current TV, now Al Jazeera.net (web & OTT productions)
- **Washington DC** – Al Jazeera International
  - in operations since 2006
  - houses Arabic, English and International bureaus
  - moved to New Hampshire NW in March 2015
Project Scope

• Build out a new facility in Washington DC
• Follow a workflow plan designed for London
  – Adapt it to North American formats
  – Retain consistent interchange amongst all locations
• Design, install, deploy, migrate and document all functions and workflows for the new site
• Move the existing facility ~7-8 blocks
• Support the facility for a full year after acceptance

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Washington DC (before)

- News Bureau Only – no transmission
  - Two Languages (Arabic & English)
  - Secondary location (Newseum) using Avid
- Grass Valley NewsBrowse - NRCS
  - K2 Storage, GXF wrapped, mixed codecs
- SpectraLogic LTO2 & Front Porch DIVA archive
  - No updates since 2007 installation
1200 New Hampshire NW Site
The “1200 New Hampshire NW” Design

• Major operational areas
  – MCR (aka TOC) supporting Media Management
  – Studio Production & Control Room Design
  – Newsroom Systems
    • Avid iNews, PAM, Studio Playout, dual-ISIS storage

• Establish and Refine Workflows to Match London
  – Centralized Media Asset Management (arvato/S4M)
  – Card-based, VTR, File-based & Satellite Ingest
  – Centralized Isilon Storage in two Codec formats
  – IBM/DIVA Archive (dual formats, dual languages)
First Floor

- Production Control Rooms, Studios A & B
- Working Newsroom
Second Floor

- Central Apparatus Room (CAR), ENG
- MCR, Working Newsroom, Editing
- Production Control Room, News Studio
Roof Level Additions

- Satellite
- Walton Hot-air De-Ice
- GPS
- Generator
- Cooling Tower

(5) Fixed Antenna 3,4m & 2,1m
(1) Agile Antenna 3,7m
(2 ea) Dish Network & DirecTV
Format Goals & Concepts

• Establish a globally universal codec scheme
  – XDCAM 50 HD for News Content
  – AVC-Intra Class 100 for Program Content
  – Manage 50 Hz & 59.94 Hz scanning rates

• Automate Ingest & File Management
  – 1920 x 1080i 59.94 master house format
  – No SD, up- or cross-convert, store everything as HD

• Apply specific Wrappers for all Workflow Activities
  – MXF Op-Atom (Avid)
  – MXF Op1a (everything else)

• Master Transcode & QC Farm with Central Storage
  – Ingest, Send to Avid, Send to Archive
    Proxies, Approvals and Transformation
Workflows - Ingest

- Card-based Media Ingest
  - Minimal baseband SDI
- Transcode
  - XDCAM 50 for news content
  - AVC-intra Class 100 for program content
- Transwrap
  - MXF OP1a (ST 377-1:2011) for archive or playout
  - MXF OP-Atom (ST 390:2011) for Avid Editing
- MAM controls pre- & post-production file migration
Media Management/Hub

• Located in the Newsroom
  – 5 staff positions (in addition to those in MCR)
• Handles all media routing and management
  – Conflict resolution for feeds or editing
  – Visually and aurally qualifies content
  – Corrects files (as rejected from QC or MAM)
  – Sets or reschedules – forwards to Master Control
    for refeeds, re-ingest, transcoding, etc.
• Prepares files for other Work Activities
  – Send to other services (e.g., Web, OTT)
  – Send to NY, Doha, London, etc.
  – Send to Archive, Restore from Archive
Central & Editorial Storage Interfaces

• Avid ISIS storage dedicated to Editorial
  – MXF Op-Atom wrapped
• Isilon as Central Storage
  – MXF Op1a wrapped
• Front Porch Digital and IBM Jaguar for archive
• MOG Technologies for file-management
  – F1000 for transcode and wrapping
  – O1000 for transwrapping between Avid and Central Storage systems
Files vs. SDI vs. IP

• >95% of the Content moves as files
  – Ingest from card-based media on P2, SxS, XDCAM
  – Reuters, NBC & ABC (news services) from IRDs, transcoded immediately
  – 32-inbound & 32-outbound fiber services

• SDI Routing
  – Still required for the live studio production
  – Almost zero linear videotape (legacy only)

• IP-video
  – 120 channels Internal Television (Exterity) with video encoding, delivery, desktop video to each user
IT, Servers & Storage

- Graphics = 51 Servers, 2 RAID Stores
- Avid = 71 Servers, 14 ISIS, 1 dbase-Cluster
- Transcoding, QC, MAM, Converters
  = 61 Servers, 7 RAID, 1 dbase-Clusters
- Misc = 23 Workstations or PC-type
- Enterprise = 39 Servers (various)
- All controlled via KVM (270 Tx x 100 Rx)
  – graphics required high-bandwidth KVM
  – monitored by DataMiner
Network Switches

- 2 Core (Cisco Nexus 7010) for Broadcast
- 8 High Level (5585 Firewall, 4500 Aggregation)
- 17 Mid Level (4948, 3850)
- 12 Low Level (2960)
- 12 Remote in IDF/MDF (various)

IP configs, domain control - set, managed and controlled from Doha, Qatar
IPS

CORE BACKBONE

ASA 5585
ACTIVE

ASA 5585
STANDBY

10G

3D8140
IPS

3D8140
IPS

10G

SERVICES ACCESS

10G

20G

10G

20G

BLAN ACCESS

4500

4948

4500

4500

4500

4948

4500

4500

4500

7010

CORE NEXUS

7010

AVID CORE

AVID ACCESS

AVID ACCESS

AVID EXS

AVID ISIS

AVID ISIS

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IT Summary

• 222 COTS servers
• 23 Workstation Class PCs
• ~250 Journalist Workstations
• 14 ISIS 7500 Chassis
• >50 Cisco switches
• 7 SQL/Clustered Database Systems (or equiv)
• ~1PB total media and DB storage (estimated)
• >400 slot Archive (~1.84PB raw storage)
Central/Integrated Graphics

• Editorial Driven Interfaces
  – Apple Mac Tower (Adobe, Cinema 4D, RedGiant, etc)
  – Vizrt integration (51 servers & workstations)

• Live Graphics for Production Control Rooms
  – Vizrt (3 multichannel engines per PCR)
  – Avid Command and iNews Driven
  – Full screen, lower third, video-wall drivers

• Studios
  – Vizrt Engines, Orad Monitor walls (SDI router driven)

• Core Systems
  – Redundant Core Servers & Databases
  – Shared “3N+1M” Media Sequencers
Template-Based Vizrt Graphics

Production Control & Studio A

Control Room Operations

Software

Control Room Engines

Media Sequencer Engine

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Studio Production

- Robotic Camera PTZ & Pedestals
- Viz Social Media
- Integrated video-floors & walls
- LED & quartz lighting
- Viz graphics with Orad wall processors
- Heavy use of Skype
Studio Video Walls

AUGUST 2014

MARCH 2015
Control Rooms

PRODUCTION (3x)

MASTER CONTROL
(aka TOC)
Live & Post-Production Audio
Media Management

- Arvato/S4M ‘VPMS’ as global MAM
- Specific workflows universally and globally deployed for all locations
- VPMS MAM manages all non-production media functions (ingest, transcode, transfer, QC, archive)
- Production Asset Management relegated to Avid Interplay PAM (iNEWS, Media Composer, ISIS)
- Differing wrappers requires continual transwrapping (OP-Atom↔OP1a) between edit systems & storage
Central Apparatus Room

“CAR”

IN ROW COOLING

AVID INTERPLAY & ISIS

INBOUND INTERNET
Central Apparatus Room
52 Broadcast, 38 IT Racks
5 Tape Library Cabinets, 4 PDU, 24 AHU
Diagnostic Monitoring

• Power systems, strips & outlets are IP monitored
• A&B Power, single P/S have local A/B change over
• UPS 600 kVA
• Generator 1.5 MW
• GV iControl for Broadcast and Workflow Mgmt
• Skyline “DataMiner” (SNMP)
  – watches IP networks, servers, facilities,
  – carries through to iControl
  – reports to Doha, including trendings
Issues & Lessons Learned

Every project has its set of ‘issues’ ....

– *most required more time to resolve than was*

a. expected
b. budgeted
c. beyond the knowledge of those employed from the client, vendor or integrator’s side

*(pick any three)*
Every project has its set of ‘issues’ ....

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✔ b. budgeted
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....this project was no different....

➢ Universal Clock Change
➢ Legacy Archive Migration between sites
➢ Address ‘growing files’ - in a consistent discipline across three continents, for archive, restoration and editorial transfer
Shifting Master Clocks to GMT=0

Task
• Switch the clock system to UTC ... and set to GMT=0
  – after all systems were tested, were up and running

Situation
• House GPS master currently were set to local time (GMT+5)
• Wanted the change made “overnight”
• No expectations on interoperability issues or system impacts

Solution
• Consult with vendors (1 full week) re: impacts of the change
• Plan the entire operation (to happen over a weekend)
• Power down each system, change databases (MAM, Enterprise)
  • Sequentially restore each system & test
Legacy Archive Migration

Task

• Move an unsupported, non-indexed legacy archive with >40,000 files to a new site

Situation

• Two language archives, many with common files names
• No MAM employed originally
• Indexing kept (manually) ... in Excel or unsupported NRCS
• Formats varied – including 50/60 Hz, GXF wrappers, mixed codecs

Solution

• XML translations and look ups created from legacy NRCS
• Dual Transportable 42TB arrays as temporary storage
  • Generate MAM needed XML translations
Growing (AVC-intra) Files

Task
• Speed up legacy and original content file processing from the archive (AVC-intra Class 100 & XDCAM 50 HD, MXF Op1a wrapped)

Situation
• Address incompatibility of Growing Files & AVC-Intra Processing
  – Growing Files cannot be ‘advance length predicted’
  – Initial header index information forced waiting for transfer to complete

Solution
• Getting four vendors to synchronize software, deploy and test
• Determine the MXF container format (to customize or not?)
• Make the changes and apply results in real-time
  ... without taking any system(s) offline

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Results

• AJ has been operational since before NAB
• Systems are nearly 100% “file-based”
• Enterprise Global MAM controls all activities
• Staff has nearly doubled from K-Street
• Complexities have quadrupled
• Doha, Qatar coming online now ...
Final Report
Suggestions for Success

• Agreements in Workflows (in advance)
  – Most important!
  – Requires a lot of time, so do it upfront
  – Involve every vendor and every major stakeholder

• Emphasis on standards & practices
  – Establish SLAs, OLAs and UATs (early)

• Training, Training, Training....
  – Cannot be emphasized enough !!!
  – For the technical, operational and managerial staff
    (make sure IT and Broadcast get the same info)
Questions?

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