

High Definition (HD) News Digital Archive, Digital Broadcast Revolution: Promises and Perils of a Dynamic Future Media Management

Ts. Ahmad Shafiq Mirza Bin Mansor

Assistance Director, News and Current Affair, Broadcast Department of Malaysia.

Conceptual

Media archiving was rarely being used in earlier years. However, this has caused a lot of limitations in the news searching process. To overcome this, News and Current Affair Department, RTM has proposed a new HD News Digital Archive System for the whole Malaysia coverage. This article will share the insight of developing this system to manage media coverage either in raw or edited versions. These media materials can further be published on either TV, radio or social media platforms.

Overview

Archive means a collection of historical documents or records of a government, a family, a place or an organization; the place where these records are stored (Oxford Learner's Dictionaries, 2022). Media archives have begun implementing digital preservation processes and strategies (Delaney & Jong, 2015). Preserving digital information is plagued by short media life, obsolete hardware and software, slow read

times of old media, and defunct Web sites (Chen, 2001). There are a lot of methodologies and technology currently on the shelf to be deployed. However, the main challenge to set-up the archiving system is whether or not it is appropriate and suitable for any organisation to invest in the future technology. Furthermore, the technology for media archiving is always advancing every year. Hence, in order to have a better management of the media archive, a long-term planning must be consistent with the product life cycle investment.

Project Proposal

One of the core businesses of RTM is broadcasting information to the public through various media sources such as TV, Radio, and social media. It is contributed through News Content Creation daily either as national or regional information. Therefore, the news team has been deployed to all fourteen (14) states in Malaysia including the island of Langkawi and Labuan.

All of the news teams in the state's regional station alongside with RTM in Wisma Berita, Angkasapuri as Head Quarters (HQ) Central News Operation are required to manage all the Media Content from those regional stations. As for the current workflow, all regional stations are required to ingest and edit their own media source before contributing those final content to various selective news slots that have been scheduled at our news channel base. Once it is published, all raw media from Single Camera Production (SCP), Near Line Editing (NLE) Machine and External Hard Disk need to be purged out to make more room for the new news content.

The main problem that has been recognized was when RTM needed to reproduce the content for other purposes such as Documentary, Analysis or Recap. Media footage is limited to the only edited version of the full content and in most cases, the duration of the footage is less than three (3) minutes. In this situation, the edited footage will

usually be named as Slug or File Name only which makes it harder to be traced out in the future. This issue will result to a repetitive footage usage or even worse, being produced as graphic or voice over only.

Therefore, the knowledge management within media archives and retrieval needs to be improvised based on the current ongoing issues. This includes the enhancement of the Standard Operating Procedures (SOP) by considering the existing manpower required to run this process. The SOP review will hence benefit the past, current and future media management.

Needs Analysis

In order to develop the news archival system, a special taskforce was appointed to counter these issues. Representation from News Production, Technical, Liberian, as well as a representative from each regional station is selected to be part of the committee. Through the User Requirement Survey (URS), the taskforce team identified three (3) core issues in the Media Management especially in Regional Station as follows:

a) Hardware Limitation: Lack of Physical Central Storage

Using External Hard Disk (ExHDD) as a Temporary Storage by multiple users. Hence, the change of possession will expose the exHDD to virus, corrupted file or missing items.

b) Knowledge Management: Information Synchronization between Cameraman, Reporter, Visual Editor and Producer.

Media ingesting was done by cameramen and reporters according to their own preferences filename which can cause difficulty to other users to search the keywords. At the same time, there is also a possibility for duplication to happen

when they are unable to retrieve the ingested media footage, which will cause more storage utilization.

c) Standard Operation Procedure (SOP): Multi-Tasking Media Manager

There are no specific Media Managers being appointed to manage the media ingest and storage which is supposed to be managed by the appointed librarian.

AREA OF IMPROVEMENT

There are several areas of improvement and will be discussed in the following section. The key areas are the holistic feedback and information from multiple perspectives that involve community review, maintenance, administrator, and user operation.

ARCHIVE MEDIA MATERIAL LINE-UP

To encounter these problems, the appointed team have reviewed all the related standards. Since there are various standards can be referred to, only seven (7) standards that have been chosen to be put into consideration to obtain the most effective quality, especially in media conservative toward the future needs.

- a. "ITU-R Rec. BT 709-5", Parameter Values for the HDTV Standards for Production and International Programme Exchange (ITU-R Rec. BT 709-5, 2009);
- b. "SMPTE 379M", Material Exchange Format (MXF) Generic Container, 2009 (SMPTE 379-1-2009, 2009)
- c. "SMPTE 371M", Television (Archived 2007) 6.35-mm Type D-12 Component Format Digital Recording at 100 Mb/s/sec 1080/60i 1080/50i 720/60p, 2002 (SMPTE 371M-2002, 2002)
- d. New H.264/AVC Professional Profiles and Related SMPTE Standards for P2 Applications [(Yu, 2009)];

- e. "RP 2006", Solid State Media (SSM) card Specifications, 2006 (SMPTE RP 2006, 2006)
- f. "RP 2002", Content Specification on Solid State Media Card-For DV/DV-based Essence, 2006 (SMPTE RP 2002-2006, 2006); and
- g. "L-S1", Specification for low Voltage Internal Electrical Installation, CKE.LA.01.01. (04)2017 (JKR, 2017)

Based on those standards, it can be concluded that the media house format for News Archive shall be as follow:

- a. Hi-Res using 1080i50 ProRes 422 Codec at Regional Station (Marsal, 2007);
 - i. Utilization of Panasonic ENG Camera and Apple, Final Cut Pro at regional station (Apple ProRes, 2014)
 - ii. Reduce time taken for transcoding and friendly to media transfer.
- b. Hi-Res using 1080p50 AVC Intra 100 Codec at Angkasapuri; and
 - i. Full Scale Progressive Recording can maximize the video information during postproduction for future demand.
 - ii. Higher bitrate that can store more color depth information in each frame.
- c. Lo-Res using 1080i50 H.264 Codec
 - i. Small storage size of video will make faster respond on preview.
 - ii. Placement at Central Cloud Storage.
 - iii. Compromise as backup footage as alternative workflow.



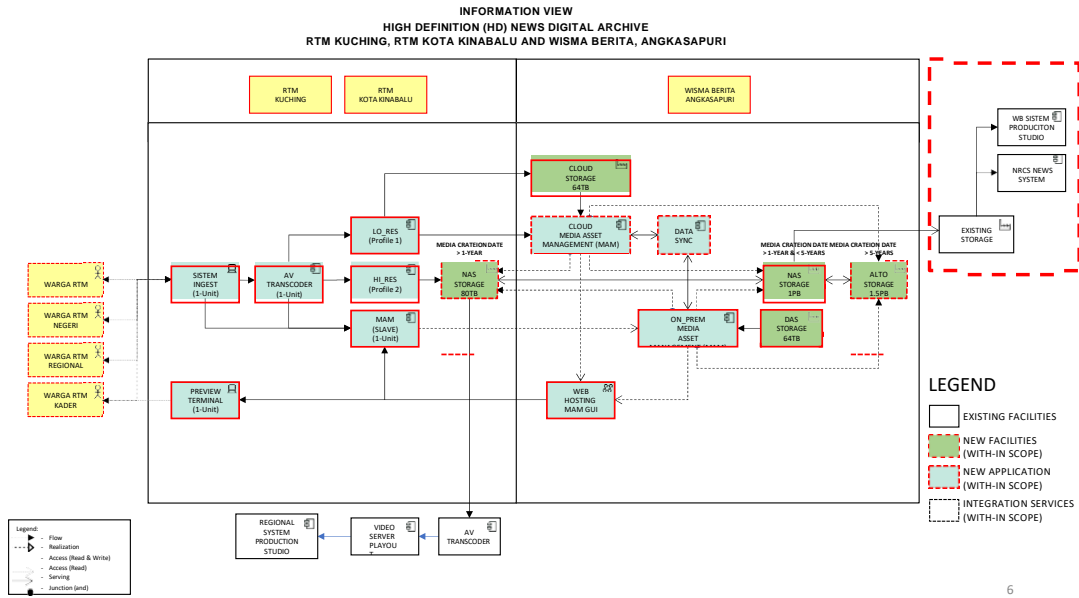


Figure 1B: Information View of High Definition (HD) News Digital Archive for RTM Kuching and Kota Kinabalu (Using Existing HD Playout Server)

Media Workflow Improvement

Currently, to overcome this problem, RTM has been procuring more data storage or compressing the media format which can cause originality data-lost which is unsuitable to be used in re-production. Hence, to overcome this, the new media archive will be focusing more on the media movement and media filtering. At the same time, the media story will be prioritized based on the creation date and time retrieval. During the media movement, the team will decide to re-prioritize the media story based on national's interest to be kept safe in RTM's archive storage possession. At present, the media moment workflow is designed as follows:

a) Day 1 to Days 365 (1-Year)

Media from Regional Station Production Storage to Near Line Archive

b) Day 365 (1-Year) to 5-Year

Media from Near Line Archive Storage to Cold Storage Archive

c) More than 5-Years

Media from Cold Storage Archive to RTM Central Archive.

To implement the workflow, software, and application for Media Asset Management (MAM) and Production Asset Management (PAM) will be used to manage media movement as the central database system. This is to ensure that the media movement is being managed appropriately as a single solution in the File Base Workflow environment. When there are many movements take place, media filtering shall take place with only prioritized media will be preserved and reduced the overall storage usage. By having this workflow, this HD News Digital Archive system will be operated continuously and unable to take any downtime.

Therefore, the hardware and network infrastructure must be designed as active redundancy, especially during maintenance system backup. Besides, we also need to consider the security level with Multi-Layer Workflow execution. Apart from that, there must be an alternative workflow to ensure that the business continuity plan works without any interruption. While operating at an optimum situation, the media mover shall be automated. At the same time, should the system require any over-right, the manual mover shall be implemented as an alternative workflow.

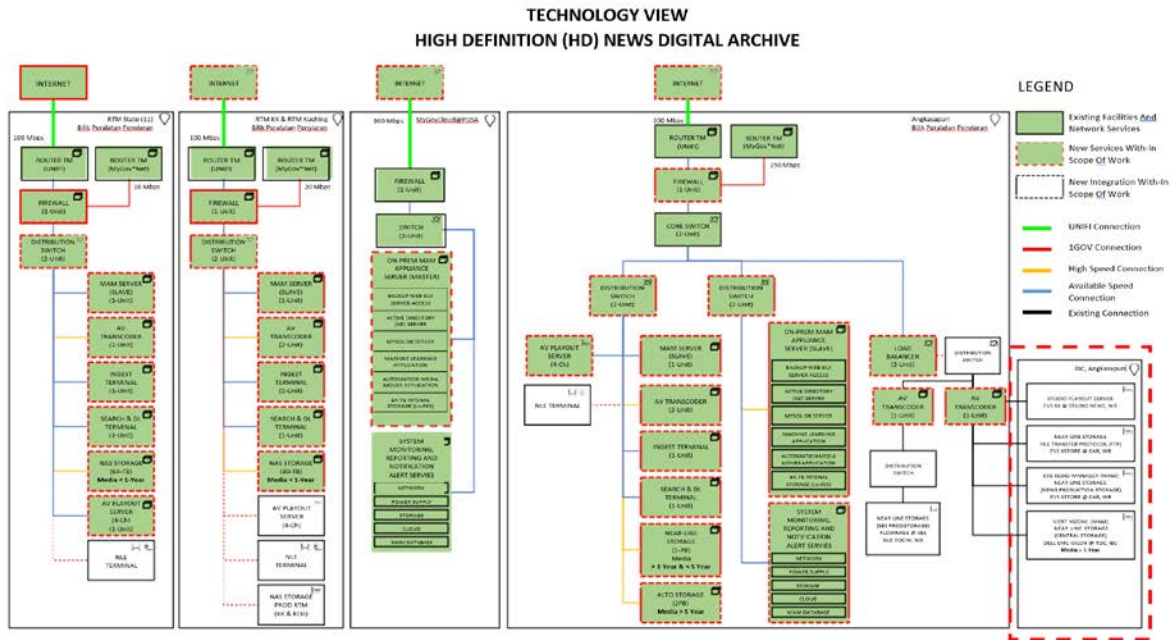


Figure 2: Technology View of Hugh Definition (HD) News Digital Archive

Deployment Of Artificial Intelligent (Ai) And Machine Learning (Mi) Technology

Media management is more effective when the information being extracted out. The information shall be in the form of:

- a. Audio to Text Transcribe;
- b. Face Recognition; and
- c. Object (Tag) Recognition

The above-mentioned form is known as a video analyzer that will be able to assist media mover and be searchable upon the required time. A more accurate process will also provide additional metadata such as face recognition or transcription audio.

Hybrid (On-prem and Cloud) Media Archiving

In media storage management, there are two (2) types of media format, namely high-resolution video and low-resolution video. The development of this system includes low-resolution storage in cloud media archiving, whilst high-resolution storage will remain on the premise. The main purpose of storing the low-resolution video in the cloud media archiving is for a speedier preview as the process will not consume the existing media mover bandwidth. Cloud media archiving can also be considered as an alternative workflow for any connectivity problems on the premise. Unfortunately, the archived media storage in the cloud that can be used to recover the on-premise storage will be in a low-resolution format. But having said that, the low-resolution format media storage is still acceptable for news content.

Inclusiveness Of The System

There are additional tools require for managing huge multiple system. These tools relate to the overall system performance. This system needs to be up at almost 24/7 with a need and functionality of Media Archive System. Therefore, to complete the system, this tools need to be together with the system.

Network Monitoring System (NMS)

Since the news archiving system is considered as a vast system that manages throughout the country with news media being generated daily, some tools need to be deployed together with it. By doing so, the percentage of system failure can be reduced. Thus, NMS may generate consistent monitoring of system health to the best level Quality of Services (QoS). At the same time, it also may notify of any critical issues either from the hardware or network system. On top of that, the NMS also may communicate an early alert to the administrator to either activate backup or alternative workflow.

Media Migration

To make sure the effectiveness of the system, the media migration should be as part of the project. Media migration is crucial for existing media to be at the state of ready-to-use once the system is in place. The execution of media migration will be in the form of “current-to-future” and “current-to-past”. Through this method, the system will be able to retrieve any related media story from the past to the current needs.

Expected Outcome

News media material is a growing daily consumption. Therefore, the management's decision to either archive or not to archive may give a huge impact on the media material collection. The decision-making process is very crucial to determine the remaining material to be archived in the future as the purged material will not be able to retrieve back. By having this system, the media movement workflow will be more seamless by using AI and ML oriented technology.



PICTURE 1: GUI (Desktop and Mobile View) for High Definition (HD) News Digital Archive access through domain adib.rtm.gov.my

References

(2022). Retrieved from Oxford Learner's Dictionaries:

https://www.oxfordlearnersdictionaries.com/definition/english/archive_1?q=archive

(2014). *Apple ProRes*. Apple Inc.

Chen, S.-S. (2001). The Paradox of Digital Preservation. *Computer*, 24-28.

Delaney, B., & Jong, A. d. (2015). Media Archives and Digital Preservation: Overcoming Cultural Barriers. In T. &. (, *New Review of Information Networking* (pp. 73-89). Routledge.

(2009). *ITU-R Rec. BT 709-5*. International Communication Union.

JKR. (2017). *Specification for Low Volatge Internal Electrical Installation*.

Cawangan Kejuruteraan Elektrik, JKR Malaysia.

Marsal, K. (2007, April 18). Retrieved from Apple Insider:

https://appleinsider.com/articles/07/04/18/a_closer_look_at_apples_new_prores_422_video_format

(2002). *SMPTE 371M-2002*. Society of Motion Picture and Television Engineers.

(2009). *SMPTE 379-1-2009*. Society of Motion Picture and Television Engineers . (2006, September 15). *SMPTE RP 2002-2006*. Society of Motion Picture and Television Engineers.

(2006). *SMPTE RP 2006*. Society of Motion Picture and Television Engineers.

Yu, H. (2009). New MPEG-4-AVC/H.264 profiles for professional and high-quality video applications. *SMPTE Motion Imaging Journal*, 118.