



## STREAMLINING WORKFLOWS IN THE DIGITAL NEWSROOM WITH CLOUD NATIVE TOOLS

P. Macklin<sup>1</sup> & A. Rugsveen<sup>2</sup>

### ABSTRACT

TV 2 Norway has a history of using technological innovation to empower creative talent to provide engaging viewing experiences. In early 2020, in collaboration with Vimond Media Solutions, TV 2 created a News service available on Android and iOS mobile devices to deliver breaking news to its viewers, delivering global events in their viewers local language. The service is called TV 2 Nyhetene (TV 2 News), a mobile application designed to be a daily platform for updates on the latest current affairs. Journalists not only create content but also operate the CMS to curate the applications, so the tools need to be easy to use and respond to the time demands of a modern online news service. In this highly competitive space, breaking news stories to their viewers first is vital, with a lean technical and operational footprint.

In addition to the mobile applications and news websites, the solution also distributes content to the Airport shuttle train in Oslo, with daily headline stories rotating in carriages for all passengers to view. Using Vimonds tools, journalists can create and distribute content in different formats to online platforms before their competitors, creating an experience that is part of their viewers daily routine.

### INTRODUCTION

The lifecycle of a story in the media world today is increasingly short. Sparking the interest of your audience, gaining their attention with exciting and important stories as well as being first to publish are key goals for all media organisations. As a broadcaster in a modern mass media consumption space, one has to keep up with the end-user's constant demand for fresh content around the clock and hold a reputation as the first platform that reports breaking news stories.

The Norwegian broadcaster TV 2 has a history of using technological innovation to empower creative talent to provide engaging viewing experiences. In early 2020, in collaboration with Vimond, TV 2 created the TV 2 Nyhetene ("TV 2 News") mobile app available on Android and iOS to deliver breaking news and global events in their viewers

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<sup>1</sup> Vimond Media Solutions AS, Norway

<sup>2</sup> TV 2 Norway AS, Norway



local language. In contrast to other digital services from TV 2, this app features only video content.

Within the news app journalists drive the whole content creation and delivery process, operating the tools for production and the content management system behind the online video platform. As the journalists are hired predominantly for their skill and experience in the discipline of journalism, enabling them to take on the additional responsibilities of editorial curation for a digital OTT platform meant offering a lean and intuitive interface. Whilst the majority of the talent were hired with a background in video journalism and familiar with traditional on-premise non-linear editing systems, they would need to transition to using the Vimond IO browser-based editor, in order to publish at the velocity required by TV to the Content Management System.

According to Camilla Island, one of the first journalists assigned to the News application, this approach to the workflow is essential. Island explains, “allowing us journalists to be part of the whole process enables a faster workflow from production to distribution without any unnecessary bottlenecks. This creates a more efficient workflow than journalists are used to from other platforms. In addition, we value that the system is cloud-based. This gives us more flexibility and possibilities”.

## TV 2 NYHETENE APP

TV 2 news app provides access to Breaking News, Sports, Politics, Crime, International, Business, Lifestyle, Entertainment and Regional News. The app summarizes the most important recent news in its top section, before proceeding to categorized news. Its navigation is inspired by the “stories” format of social media applications that enables the users to easily select the stories relevant to them.

For Breaking News the app supports live video feeds and push notifications to instantly inform the viewer of the latest events. Vimond IO allows TV 2 to create different versions of stories from their live content or content in their Media Asset Management system. All videos are produced with embedded subtitles to support video viewing without sound enabled on the device. Most news stories also have descriptive voice over.



Figure 1 - TV Nyhetene App

TV 2 Nyhetene application is designed to be a platform for getting daily updates about the latest current affairs. Journalists not only create content but also operate the CMS to curate the applications, so the tools need to be easy to use and respond to the time demands of a modern online news service. In this highly competitive space, if you're not



first, you're last and delivering breaking news stories to their viewers first is vital, with a lean technical and operational footprint.

### Viewing habits in Norway

The TV 2 Nyhetene application was just one of many initiatives being investigated internally at TV 2 as a way for the largest private Broadcaster in Norway to expand the engagement with its national population. It is no secret that viewing habits globally have been changing, disrupted by the Internet and coupled with the changing modes that daily news is distributed TV 2 wanted to examine ways to reach a wider audience and draw in younger demographics. In Figure 2, the graph shows the average time spent viewing media, from a cross section of 16 to 79 year olds surveyed by Statistics Norway as part of the 'Norwegian Media Barometer 2020'<sup>3</sup> dating back to 1992 (when TV 2 was launched). Perhaps as one would expect, time spent using traditional platforms for media delivery are declining and the internet has accelerated into the number one position with 'video media' accelerating in recent years. Perhaps not surprising considering the same study reviewed that 98% of the population have access to the internet at home.

04495: Use of different media an average day (minutes), by mass media and year. Minutes used for different media an average day.

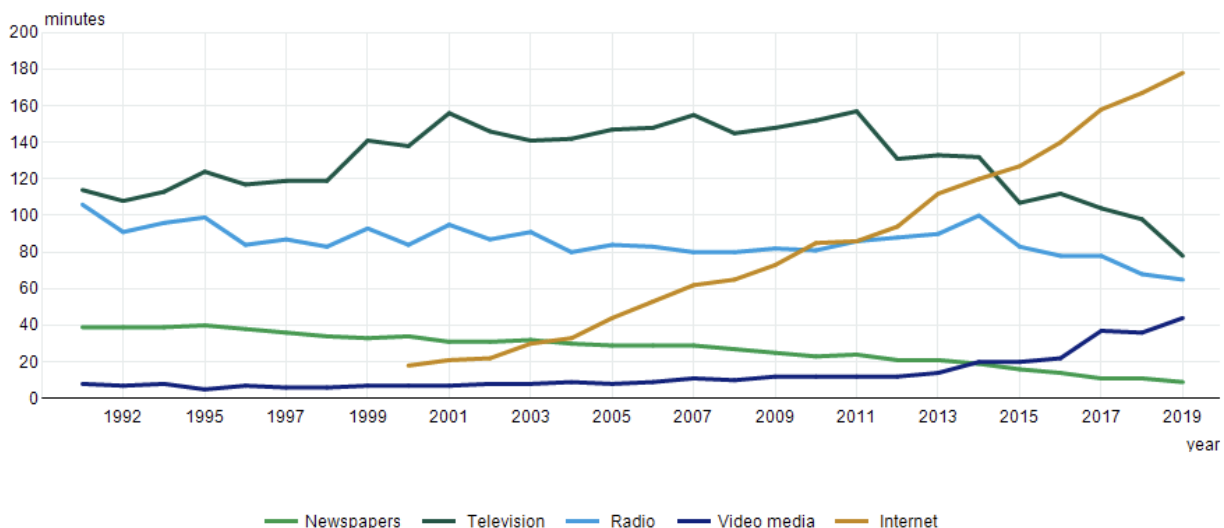


Figure 2 - 04495: Use of different media an average day (minutes), by mass media, contents and year. Minutes used for different media an average day. Source: Statistics Norway

The headline figure in the Norwegian Media Barometer is that 51% of those surveyed use Video Media on an average day; where video media includes DVD/Blu-ray, hard disc recorders and video files, either downloaded from the Internet or streamed via Internet and paid for.

From the same study; the percentage of time spent using radio that has been typically stable until 2015, has started to decline in spite of increases in time spent listening to DAB radio with 39% of the population using DAB radio each day. Perhaps podcast usage, with 20% of the population listening to podcasts, has resulted in less time spent listening to the

<sup>3</sup> <https://www.ssb.no/en/kultur-og-fritid/artikler-og-publikasjoner/norwegian-media-barometer-2020>



radio, although equally it could be music streaming. Regardless, with 80% reportedly streaming music during the day and 90% reportedly using a smartphone to listen to audio files on a daily basis: the takeaway is there is a market for audio only services.

In Table 1 the indicators are that the methods of reaching the widest audience are the Internet and Video Media, this is an average across all age groups from 16 to 79.

Level of education	Newspapers	Television	Video media	Internet
Lower secondary education	14	37	52	90
Upper secondary education	29	55	45	88
First stage of tertiary education, undergraduate level	28	51	53	95
First and second stage of tertiary education, graduate and postgraduate level	40	50	49	95

Table 1 - 12948: Use of different media, by mass media, level of education, contents & year. Source: Statistics Norway

For younger generations the results show a strong bias towards the internet and video media, as anticipated, the sharp decline in time spent using traditional media platforms is perhaps more concerning. Particularly if a viewer's age does not affect consumption preferences seeing a return to linear viewing over a lifetime, these trends show a change that needs to be acted upon now to retain viewers in the long term. In Figure 3, only 7% of those 16 - 24 years and 14% of those 25 - 44 read print Newspapers and with only slightly better numbers for Television. Engaging with this demographic now to secure a long-term customer base requires adapting the media to new platforms and in doing so competing with a global media market. Utilising native language and cultural touch points could be a key differentiator.

12952: Use of different media, by mass media and age. Percentage of the population, 2020.

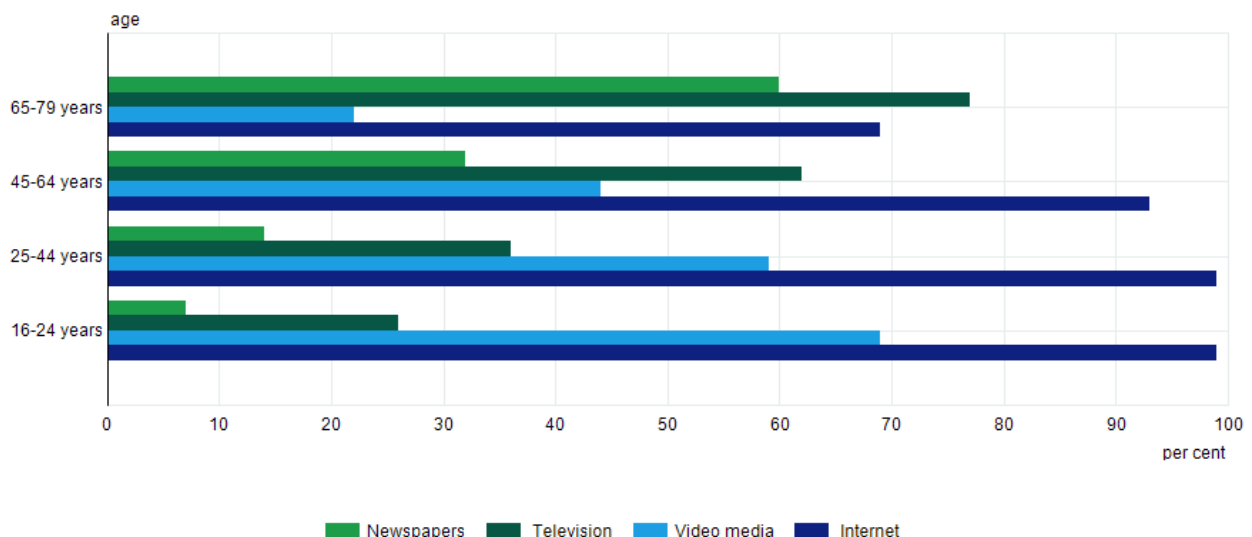


Figure 3 - 12952: Use of different media by mass media and age. Percentage of the population 2020. Source: Statistics Norway

### Application design principles

Engaging with their audience using the internet and providing current affairs using the Broadcasters core competence, video creation, led to the decision to launch a mobile application. For maximum reach applications would launch on both Android and iOS. Given the aim was engagement, and globally over 95% of applications are free, as show in stastica’s research over five years into android platforms<sup>4</sup>, the application is free to download. The content would be video only and provide the viewer with options to receive push notifications to deliver breaking news to the viewer with the latest headlines in a mobile friendly format in the Norwegian language.

Content would be curated in the form of stories, with circular graphic boxes, giving the design a familiar feel in-line with popular social media platforms. Rather than advertise commercial advertiser content the application would include teasers and promos to TV 2 programming, to bring the viewers back to the TV 2 linear channels and OTT service.

Consideration was given to the physical environments that the intended audience would be in when using the application which effected decisions on the video formats with regard to aspect ratio, duration and use of graphics. A key target would be commuters in transit and the time people have between activities during the day and having a few minutes spare, where people often tend to gravitate towards their mobile device. Therefore the 9:16 “profile” format would be used for the videos, with audio used but not required to tell the story, instead captions and graphics used to inform the viewers on the subject matter in the video.

To engage with the audience an element of gamification would be explored, where viewers can opt to watch the headlines, with the daily news bulletins stitched together. In Figure 4, each video can be seen in the top menu which viewers can watch back-to-back to see an overview of the day's headlines and jump forwards or back as they see fit. The concept provides an interactive experience for the viewers, where each video in the daily headlines can be updated throughout the day and automatically stitched together.

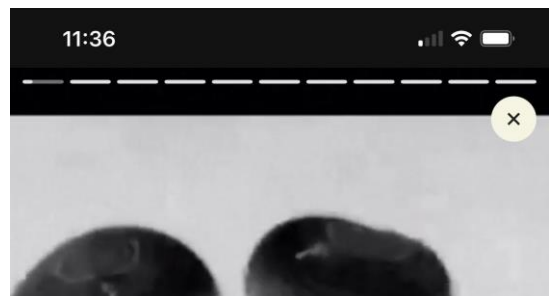


Figure 4 - TV Headline Navigation

From first launch, the application supported up to three video lengths of the same content. A preview that would be used on the top stories of the day to attract more viewing. A short version that was the default for the daily headlines section, giving the user the essence of a story in a matter of seconds. And finally, a longer version, inviting the user to dive deeper into the story, for instance by adding in interviews with subjects of the news story. Based on insights from use of the app in the time since launch, TV 2 has now reduced the use of the long format in favour of creating an even wider range of short videos.

<sup>4</sup> <https://www.statista.com/statistics/266211/distribution-of-free-and-paid-android-apps/>



For viewers wanting to use the application to spend time listening to the news there is a listen direct option to tune in to an audio over IP output of the 24/7 TV 2 Nyhetene linear television channel.

The daily headlines are also presented on the Oslo Airport shuttle service, on screens in each carriage. With the content on the application ideal due to its commuter friendly, short-form, graphics rich non-audio presentation style. The 9:16 aspect ratio is also ideal for the profile video monitors mounted in the carriages. The content would be updated as part of an existing workflow designed to ensure up-to-date news stories are promoted, therefore no additional editorial effort is required for the Shuttle news service, keeping the process streamlined, efficient and cost effective.

## **CLOUD NATIVE WORKFLOW**

To support the TV 2 News app, Vimond provided a browser-based end-to-end cloud solution. Starting with the Vimond IO, a video editor and clipping tool, TV 2 journalists can work from any location at any time to create breaking news stories.

Through IO the teams can source content both from live feeds and files uploaded directly in the UI and mix it with restored content from the TV 2 News archive. Content can be saved in multiple aspect ratios ensuring the right fit for the right distribution point. TV 2 has taken advantage of this by creating 1:1 aspect for Social Media, and 16:9 for desktop viewing in parallel with 9:16 for the news app. Videos are also rendered in various bitrates to support different internet connections from 3G to high speed broadband. When editing one can add custom graphics, images, music, video and audio transitions and voice-overs to create visually striking content suitable for each platform.

Working in a browser-based application allows for remote work that gives flexibility and the ability to scale up teams beyond a physical location. By using one that is also cloud native, TV 2 can replace the heavy on-premise systems, hardware expenses and the need for a fixed physical location to save cost and speed-up the process.

Once the stories are finished edited, they publish to Vimond VIA, Vimonds powerful CMS, where journalists curate the content for the mobile applications keeping the content current and updated. The solution also distributes content to the Airport shuttle train in Oslo, with daily headlines playing in carriages for all passengers to view. Using Vimonds tools, journalists can create and distribute video content in different formats to online platforms before their competitors, creating an experience that is part of their viewers daily routine.

## **Operational Workflow**

The reporter starts by identifying source video content in TV 2s MAM. The selected content is pushed to an AWS storage area and picked up by Vimond IO. The content is made available in IOs library, where it becomes an asset in the video editing process. Clips are trimmed and adjusted to the output aspect ratio, and graphics and voice are added before the video is rendered in a preconfigured selection of bitrates and resolutions.

When the video is rendered, the reporter adds some simple metadata and the content is pushed to the Vimond VIA CMS application. The various versions of a clip are linked so when the reporter assigns the video to a section all versions are available to the mobile app which selects the appropriate version to be applied to the specific display category; preview, short or long.



If Breaking News is occurring, the journalists on duty have predefined modules in the CMS that can be easily adjusted to the current situation. When published, the module will appear on top of the front page with a running livestream, bullet points summarizing the event and related video stories.

Being flexible in the design of the application and the contents of the video that is published is a key tenant to the application's success. It allows a content production pipeline that has been designed with mobile first in mind, to be adapted to a digital first one with the same content being distributed, if TV 2 wishes, in 9:16 to the TV Nyhetene application, 1:1 to social platforms and 16:9 to online websites. This requires no advanced orders for equipment to increase capacity of the processing power or user licenses and workstations, as the platform scales on demand automatically.

## **TECHNICAL CHALLENGES**

With Vimond IO and VIA both being browser based, and access to the Ardome MAM system available over a web browser, the workflow is inherently remote friendly. The mobile application launched at the start of 2020 and although the outbreak and subsequent preventative actions hindered acquisition of content, the daily operations were able to adapt.

Technically the delivery of this flexible service online using some native media services from the IaaS provider did present some challenges and require strategic architectural decisions to be made.

### **Transcoding**

During the early design phase consideration was made on how to produce the adaptive bit rate rendition variant MP4 files. The requirement for the service was speed to air, and capacity could not be a concern or consideration for a non-technical operational team. Producing content in multiple bitrates and non-original aspect ratio formats is done within Vimond IO, which allows the editor to work in multiple aspect ratios in the same project timeline, re-framing 16x9 content for a 9x13 window, previewing all content including any graphic elements in real-time without the need for rendering. The output could be a single high bit rate MP4, delivered to a traditional transcode service. However even a cloud native transcode service takes significantly more time, particularly when providing multiple MP4 that will be later packaged. As shown in Figure 5, using Vimond IO to produce 5 original MP4 files in parallel, delivered to cloud storage would greatly reduce the time-to-air regardless of duration.

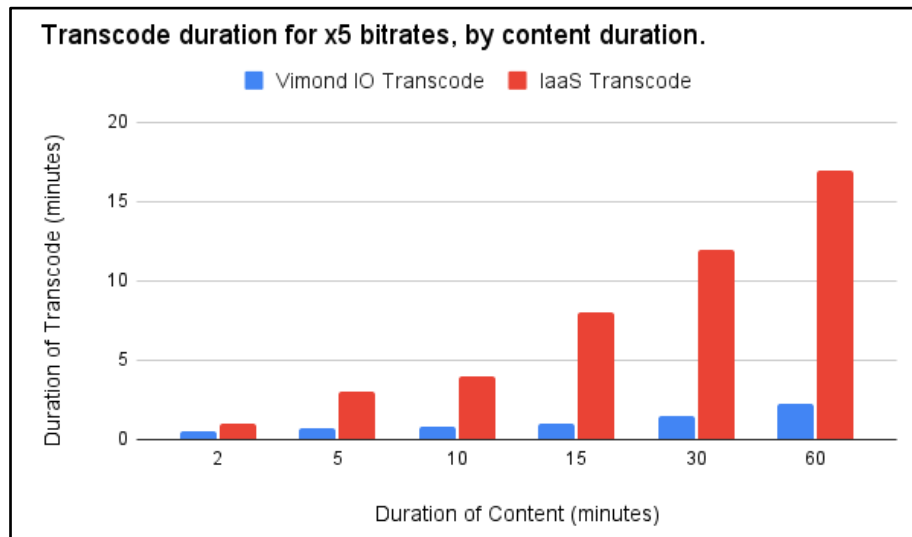


Figure 5 - Transcode duration for x5 bitrates, by content duration.

### Packaging formats and groups

During testing the decision was to present the video content using HTTP Live Streaming (HLS) to devices running iOS and Android mobile operating systems, this meant the cost of packaging could be reduced and the transcode and delivery pipelines supported with minimal complexity. Before launch a noticeable difference in performance was observed with poorer load times on Android devices and a reduction in quality. The packager was modified to produce both HLS and DASH formats, with the change made to the packager it was discovered that the entire content of all packaging groups would need to be re-indexed and during that time playback would not be possible. The re-indexing was anticipated but the inability to playback content was unexpected, due to CDN caching, nevertheless it was a key lesson to use multiple packaging groups and manage modifications in a phased manner in future, in order to ensure playback of key content during peak times. Fortunately, this occurred during testing and only test viewers noticed any difference.

While TV 2 were experimenting with alternative durations of news stories, Vimond IO would occasionally overwrite the files on the cloud storage, causing the packager to reprocess the same asset then fail to playback either old or new version of the asset. Due to time constraints working with the supplier was not an option and the solution to create a new file alleviated that problem. The packager was also not consistent with the delivery of content to the CMS for playback. Although the packager is a market leading product, it is also multi-tenanted and while complete data separation is ensured the total capacity limit is shared across all tenants using the service. Fortunately, the supplier was able to provision some dedicated hardware in the private cloud data centre to ensure a service level required for a leading news service.

Issues with capacity management did not quite stop there, the packaging service has a limit on the number of files processed by a single group. While the transient nature of news stories means it would be unlikely to ever affect the service, the decision was taken early on to build group management within the VIA Orchestrate video engine, to manage the distribution of assets and ensure TV 2 never need be concerned with these limitations.

When the airport shuttle contract was awarded, the playout and distribution system on the shuttle was already installed and designed for file-based playout, meaning it could not pull





HLS or DASH content from the Content Delivery Network. Instead Vimond had to write a small application to enable transfer of the highest bit rate MP4 file, while maintaining platform security. TV 2 had to write an application that would listen to the Vimond API for updates regarding published assets that had a tag “flytoret”, pull the MP4 and localise on the airport shuttles A/V system.

## CONCLUSIONS

For the journalists, operating a digital platform with a skeleton crew in the early stages is challenging. Their primary focus should be and largely is on the creation of content, telling compelling stories and in current affairs getting that content to air as soon as possible. Hosting software the web browser and not requiring any additional login such as VPN or 3rd Party desktop mirroring software removes any complications to the workflow using a tool that most people are familiar with. Additionally ensuring that the software tools have a considered and holistic UX is critical for onboarding more staff quickly. Operationally, one can leverage this toolset best by ensuring that the workflow is well defined, allowing journalists to see a series of simple and repeatable steps around creating their story and publishing it, when in reality they are driving a highly distributed and complex workflow. This kind of operational automation is something that has been well documented as providing value in traditional Broadcasting value chains such as: Studio, MAM and Transmission automation systems. It is refreshing to see the possibility of streamlining to a greater degree with an OTT platform with mobile distribution; a workflow that a few years ago would require an enormous amount of planning and investment in custom tools and expensive consultants. A testament to the confidence and experience developed in TV 2 from years on the cutting edge of digital and online media workflows.

Working with a cloud native toolset allows last minute changes to be made, without major re-engineering and even updates and patches rolled out to a system that is live with no downtime. The software being built using a cloud native architecture allows the system to scale up and down based purely on the demands of the day, with no prior consultation required between customer and supplier. This approach to software also comes with the added benefit of collecting statistics based on engagement, enabling database decision making. This results in an environment that fosters experimentation leading to innovation, something that is critical for all media companies that wish to engage future generations with meaningful content and digital experiences.

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