



Getting with the times

Despite reservations, the Cloud is helping to revolutionise broadcasting. By **Bethan Grylls**

The digital revolution in broadcasting continue apace, but while high definition (HD) and 4K (UHD) dominate the headlines, more profound changes can be found in the way production, storage and distribution are evolving. At the heart of those changes is Cloud computing.

Damon Neale, Chief Technology Officer from BASE Media Cloud, a media Software as a Service (SaaS) Cloud provider, describes the Cloud as centralising processing with users accessing broadcast services and tools via web browser-based user interfaces to access remote Cloud hosted workstations.

The Cloud has caused a shift in the way in which a broadcaster stores, edits and delivers content and how users consume product, leading to the rise of Over the Top (OTT) providers, such as Netflix and Amazon Prime. In fact, OTT has grown to such an extent that UK online streaming services have now overtaken 'pay TV', in terms of revenues.

"OTT has given the media the ability to distribute directly to consumers and not have to rely on old radio frequency technologies," explains Jon Morgan, CEO of software provider Object Matrix, a specialist in storage services for

the media. "We can now watch what we want, where we want, when we want."

With the broadcast infrastructure built around technologies that the industry understood, it has been slow to use and implement Cloud technologies. But it's evident that the Cloud is being adopted as content creators respond to the changing ways in which consumers are now viewing content.

According to a report from Ofcom, the UK communications regulator, the total number of UK subscriptions to the online streaming services – Netflix, Amazon Prime and Now TV – reached 15.4million in Q1 2018.

Traditional broadcast is becoming less popular, especially among younger viewers, with over-54s now accounting for more than half of all broadcast television viewers in the UK.

“Three years ago, broadcasters said they would never use the Cloud, because of worries over security, poor connectivity and cost,” says Neale. However, with the digitalisation of broadcasting, the growing use of distributed production teams, and the rise of on-demand services, the move to the Cloud has started to gather pace.

Production houses have been overwhelmed with archives of tape and vast amounts of footage has been either lost or destroyed, due to the lack of storage space or the unstable chemical properties of traditional reels. The British Film Institute alone has more than 10 acres of archive warehousing.

With the introduction of hard drives, the answer seemed to lie in file-based storage, but, again, the storage capacity to hold such large files has proved very expensive and digitising the video tapes, very time consuming.

The workflow was also a slow process: tapes or hard drives had to be physically transported to various companies involved in content creation, explains Felicity Webster, Marketing Manager at BT Media & Broadcast.

“Companies want to move content around electronically rather than physically,” Webster says, “but the sizes of files are huge – particularly when you’re filming in bandwidth hungry formats like 4K. A 30 second clip can be gigabytes of data.” She explains that having the physical network capacity to transport these files around is an expensive investment and one that requires IT expertise. Cloud providers make financial sense, she says.

For broadcasters, the Cloud offers storage space, better security,

can handle the scale of broadcast projects, makes it easier to have backup copies of the data, and provides access to tools suitable for remote editing. It also makes it easier for teams – wherever they are – to engage and work more efficiently together.

“Offices are designed for people, while datacentres (where the information uploaded to the Cloud is stored) are designed for IT equipment,” says Neale. “In a datacentre, equipment can be properly cooled and powered to maintain service uptime and – if deployed correctly – is more secure because of the physical and digital security options available.”

Along with security and efficiency, the way in which data is organised has also changed.

Traditionally, storage relied upon a file system interface which placed upper limits on file numbers. The introduction of ‘Object Storage’, however, recognises files as ‘objects’, assigning a unique ID and metadata to each one.

Unlike normal data files, it doesn’t rely on a file system to manage content. As a result, it can grow without limits. The metadata and ID means that videos and audio can be stored with relevant information attached that can be used to locate that object.



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Below: Base Media Cloud provides Cloud-based storage and media workflow applications, designed for large capacities on demand

Object storage has also helped with data redundancy. Currently, Neale says that a lot of broadcasters use RAID arrays (for editing) – a system which includes one or more redundant disks to protect against the possibility of disk failures. The problem is that these arrays only give a limited amount of redundancy and only at a single site. They also suffer from performance degradation in the event of a disk failure.

Object storage uses ‘erasure coding’, slicing the files into small chunks which are spread across a greater number of disks (and potentially across multiple datacentres) allowing for increased data protection.

The BBC, for example, is using object storage through its recently built Internet Protocol (IP) Studio – an end-to-end broadcast solution that enables a live studio to operate entirely on IP networks.

According to the BBC, it treats video, audio and data as real-time groups of objects that are sent over the network and assembled as needed. Upon creation, a piece of video, audio or data is given an ID and a timestamp, meaning content can be found and synchronised as required.

The corporation adds that the Cloud has enabled faster transcoding – the process of converting TV



programmes to on-demand content – with a Cloud-based transcoder. What would sometimes take 10 hours, now takes 20 minutes.

BT has also benefitted from the Cloud. To cater to London production houses, it has launched in partnership with BASE Media Cloud, ‘Media Workflow Connect’ – a new high capacity network which provides a flexible, on-demand Cloud service on a private hub and spoke network.

The network is on a ‘pay-as-you-go’ basis, which Webster says is a unique offering: unlike other services, where customers enter into a contract service, paying for a maximum bandwidth for a fixed period of 12-36 months, regardless of use.

The network looks to help production companies upload, assess and edit their data, providing access to Cloud-based tools such as online editing suites provided by BeBop Technologies. It also enables them to share data with other companies involved in the production or team members located off-site. The partnership with BASE Media Cloud provides users with the connectivity they need to access production tools in the Cloud, as well as cross connecting through BASE Media Cloud to other Cloud providers such as AWS, IBM and Azure.

Webster says that the private network allows increased productivity, getting rushes to the Cloud much faster, offering lower latency for remote editing and added security, as it avoids data travelling over the Internet.

The future of storage

It’s evident the industry is seeing a shift to the Cloud and with the likes of the BBC building IP studios and BT offering remote Cloud tools, Morgan’s assumption that “the future is software defined solutions” is starting to appear. “Software has the capability to be built with upgrades. The technology a lot of people are

Different Clouds

There are four types of Cloud services: Public, Private, Hybrid, and Multi-Cloud.

The servers and storage of the **Public Cloud** are offered as ‘Infrastructure as a Service’ (IaaS) and are shared among different organisations and owned by a third-party provider.

Private Cloud delivers an offsite, managed service. These datacentres often use different connectivity carriers, so users can choose the Internet or direct connections to connect their hosted IT kit racks.

Hybrid Cloud is a combination of both on-premise and either a Public or Private Cloud setup. It is intended to offer more flexibility as data can be processed between the two types.

Multi-Cloud provides users with the ability to spread IT infrastructure across multiple Private and Public Clouds. The benefit is being able to achieve specific requirements, such as redundancy, via Private Cloud(s), while accessing services and scalability offered by the several Public Cloud vendors.



buying today will be obsolete in a few years.”

He also points to DNA as a feasible future storage solution in the next 10 years. “A few grams of DNA can store an exabyte of data and keep it intact for up to 2,000 years.”

In fact, CATALOG, a next-generation storage company, has announced it has raised £9million to fund a commercially viable DNA data storage system.

“We are quickly running out of resources needed to store data. By 2025, there will be 160 zettabytes of data, but we will only be able to store about 12.5% of it,” says a CATALOG spokesperson. “Current datacentres consume enormous amounts of energy and the storage media are susceptible to degradation. Furthermore, it is expensive to transfer massive amounts of data



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over the Internet.

“DNA storage is more reliable, sustainable and transportable than existing data storage methods, and could fit the world’s data into a coat closet.”

“It will be that we go away from keeping one archive of data to thousands,” Morgan adds.

But Neale argues that, while promising, the idea of DNA storage is currently just ‘hype’. “It might come in the future, but not anytime soon,” he says. “High capacity SSDs of 100TB+ or LTOs of 330TBs+ are more likely to be the interim solution. While the Cloud is mainstream in other industries, broadcasters have taken years to accept it as a viable solution, so even if DNA is used commercially in other industries in the near future, it will take several years for it to be trusted and trickle into usage in the broadcast sector.”

But, Morgan and Neale both agree that Cloud services – at least for now – are here to stay, and concur that the edge will also be around for some time yet too.

“I see a ‘breath in, breath out trend’ with the Cloud,” Neale says, “we started with centralised mainframes and then moved processing to local PCs. Now we see broadcasters moving 100% to the Cloud for HD and 4K, even for remote editing, but it is possible that if connectivity and performance doesn’t keep up, that 8K could bring finishing services back on-premise.”

Despite broadcast playing catch-up with other industries, it seems it may take production companies a while longer to adjust to the complexities of the Cloud. However, SaaS services provided by companies like BASE Media Cloud are helping more production houses and broadcasters to take advantage of the benefits without having to be Cloud experts. Whether or not production companies keep up with other Cloud developments, it’s certainly an exciting watch.