



Embracing the cloud

The move to all-digital media is pushing all players in the video life cycle to seek the advantages that IT can bring, discovers Philip Hunter

Video creation and distribution have already been transformed by digital technology but now another revolution is underway with the consolidation of the whole lifecycle within single IT infrastructures. This seems a logical sequel to digitisation since video is now just a form of data that can be stored, manipulated and transmitted like any other, but this last stride has taken a long time because the processing and bandwidth involved are on a different scale compared with conventional data.

Of course TV operators have employed IT for many years just like any other business for back office applications, while encoding and compression require intensive processing. But now all players in the video life cycle are seeking the advantages that IT can bring to reduce the costs of global distribution by moving towards shared networks and infrastructures.

There is also a trend towards unifying the different stages of the life cycle, in particular contribution and distribution, again to save money by having a common network, but also to move towards a world where video can be scaled down smoothly to deliver at the appropriate resolution to all end client devices, from mobile phones to home cinemas.

Content owners and operators also believe that recent trends in IT itself, in particular towards virtualisation and cloud computing, promise further improvements in cost effectiveness and performance, so long as they are deployed appropriately. Virtualisation divorces application software from specific hardware, consolidating multiple applications within a single system. Cloud computing takes this further, by creating a whole shared infrastructure capable of running multiple applications, with potentially great economies of scale.

Video players must walk before they can run

At least that is the theory. But players in the video lifecycle must walk before they can run, and there is still some way to go before video can be treated purely as a form of commodity data that can be scaled at will.

One problem is that representation of the moving image as digital data is not an exact science, with different approaches to encoding, compression and editing, and automatic scaling between multiple resolutions is still a long way off. Video is also distinct from other forms of data in the huge size of the files, particularly in the raw compressed form one hour of which at high definition would almost fill an average PC or set top box hard drive. Security requirements are also distinctive, with unauthorised distribution and protection of revenue being the main issues, rather than eavesdropping or tampering.

"The scale of video file sizes means that it is network costs for moving broadcast content around which dominates the cost model," says James Doddington, CTO of content distribution consultancy Three Media Associates. Doddington also notes that content security concerns were persuading many distributors of programming to keep their IT in-house rather than trust an external provider of cloud services.

Trust may be the operative word here, for there is no reason why an external cloud provider should not be able to keep content secure, and indeed there is an argument they may be able to do a better job because they can specialise purely in managing their infrastructure and the risks associated with it. Even so security considerations will not by themselves sell the cloud concept, with the aim just being to take them out of the equation.

Cost will be a factor, although the most compelling argument for operators to embrace cloud computing is speed to market, according to Edgar Villappando, senior VP for marketing at cloud TV platform vendor Active Video. "If you're writing an application and want it delivered to the mass market, you've got to write it for every permutation of set top box at the moment. But with our cloud platform it can be delivered universally to any set top or IP device. An MPEG stream is personalised in the cloud, and then it is delivered to the digital set top box."

Active Video demonstrated its Cloud TV platform in collaboration with Cisco at the recent IBC 2010 trade show in Amsterdam using the latter's Content Delivery System (CDS) to bring an interactive program guide onto an iPad for selection of live, time shifted or VoD content. This content could then be displayed directly on the iPad, or routed to a TV.

Yet while this demonstrated the great potential of the cloud model, it was more relevant for new deployments exploiting the web. Many operators are more burdened by their legacy infrastructures as well as content licensing arrangements that do restrict their ability to employ the cloud model. "Certain obstacles still remain as many media applications are not yet designed for virtualisation and the cloud both from an architectural and licensing standpoint," says Jake Winett, media and entertainment industry manager at Microsoft. "In addition, many home-grown applications may require substantial re-architecting to be made compatible for a cloud environment."

The restructuring required will depend on the situation but some clues can be found by considering what an application designed from scratch for the cloud would



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look like. The advantages of cloud computing derive from flexibility and scalability, so the software would be written in small manageable pieces and be independent of the underlying hardware so that it can be extended and relocated readily. As far as possible these components should be reusable to save money on future software development, and be independent so that they can be scaled separately, keeping down the cost of expansion. So when redesigning existing apps for the cloud, it may be necessary or at least desirable to spend some effort breaking down the software into smaller components and making these independent of specific features in the hardware or OS.

However this re-design will not usually be easy for content owners or operators, according to Julian Wheeler, VP of global media and entertainment solutions at Tata Communications. “Probably more than most industries, video relies on highly specialised, intensive processing, tasks that cannot be easily broken down - so there will be a lead time while new applications tailored to virtualisation emerge,” said Wheeler.

Geo-replication of data

The effort though is worth making and will in many cases be repaid handsomely, according to Microsoft's Winett. For both content creators and distributors, the main benefit of the cloud model will come from spreading the burden of peaks in demand over a large shared infrastructure, reducing costs for everyone.

“This means lifting a significant portion of the capital expenditure burden of scaling their internal data centres to the ‘highest common denominator,’ and balancing out peak periods of content demand by moving distribution services, whether B2B or B2C,

to the cloud,” argues Winett. “Peaks in demand can often be unpredictable - sometimes the death of a rock star, or a viral piece of video. By leveraging the cloud and instant access to geo-replication and CDN resources, video distributors can spend more wisely based on average growth, rather than trying to accommodate for peak scenarios.”

Winett's reference to geo-replication is significant in this era of growing global distribution, which is slowly but surely migrating from satellite to IP-based networks running over fibre optic cable. The key factor here is latency, the delay imposed ultimately by the laws of physics and the speed of light, which means that both streamed and interactive on-demand applications would experience poor performance if the content were served globally from say a single super data centre.

All data of course are equally subject to latency, but for video it is most critical, since latency can lead to unacceptable delays in start up time and in responses during interactive applications. This has implications for the cloud infrastructures used to host CDNs, which must be distributed and reflect the flows of content out to caching points or servers close to the final distribution networks. “I think this is where a true cloud platform can be especially useful, where you have natural geo-replication of data across the entire cloud, conceivably made up of multiple data centres in key geographies,” notes Winett. “Ready access to CDNs will also minimise latency to the edge, or the last mile, to deliver the best possible video experience to consumers regardless of location.”

Co-location for smaller operators

It is worth noting that emerging cloud

platforms will not be suitable for many operators, who may not be ready to trust them yet, or may not have services that benefit from their potential geographical scale. But as content management and distribution become IT intensive, they will still be seeking the economies of scale of shared infrastructures.

An alternative to the full blown cloud, particularly for smaller operators, can be co-location services, where content hosting and distribution are hosted in a third party data centre, with the principal advantages relating to resilience, performance and communications. In the UK, London based co-location centre City Lifeline now has several customers hosting content at its data centre, which until recently was used mostly for traditional IT applications with a focus on business continuity. Apart from being able to provide fully redundant power and cooling which only the largest data centres could afford on their own, a major benefit is access to a wide range of carrier services, according to Roger Keenan, City Lifeline's managing director. “A good co-location operator will have at least 20 carriers available to connect to on site, which means they can offer the particular type and characteristics of communications that you want,” says Keenan.

This, combined with the security and resilience, makes co-location centres particularly appealing to smaller operators who could not afford all the facilities, Keenan adds. “We offer all the advantages bar none of a large data centre, but in a smaller, more friendly, more accessible form. For the smaller operator, locating critical equipment with a co-location operator is much more cost-efficient than operating out of an in-house data centre or adapted comms room. And it creates side benefits like access to unlimited bandwidth for multiple competing carriers which are virtually impossible to do in-house.”

The common trend here is towards use of shared infrastructure and IT facilities of some form, both to unite the different aspects of content management and distribution, and to exploit of economies of scale. **CSI**