

Good afternoon, I'm Chris Steele, managing director of Marquis Broadcast, a UK based software manufacturer focussed on workflow solutions in broadcast and media production.

I've been involved in creating innovative products in this market for 30 years. Getting those products to work with other manufacturers' products has always been an important qualifier for adoption.



As a software engineer I think I was one of the first outside Avid to read and write OMF for NAB 1993?

One of the first outside Kodak to read and write a Cineon files the same year. So, when it comes to standards, well let's just say that I've seen a few come and go. I mention this because where we are today, with cloud workflows, reminds me in some ways of the industry back then. Early digital film workflows were definitely pre-standardisation and it felt a lot like we were on the Wild West frontier doing whatever it took to get the job done.



Marquis is constantly seeking solutions to customer workflow problems and that involves getting other systems to successfully talk to each other. So, working with standards, or more often 'pre-standards' or even 'sub-standards', is a necessary and common task.



We've been listening to customers views on the cloud for several years and this year the increasing interest we have been hearing has turned into real projects and, yes, it feels like the Wild West again.



I was introduced to the work of JT-NM when I worked with Dr. Richard Cartwright at Quantel, and thought it would be of interest to this audience to share some examples of real projects. Because right now it feels like the Wild West needs taming with some standards if we are to deliver open, flexible, scalable, adaptable and efficient workflows to our customers.

Apologies to those of you who know Richard as you might be thinking more of a kilt wearing Steam Punk ace engineer, than a wild west gunslinger, but you'll have to excuse the mixed metaphors.



Concise Oxford English Dictionary

**SHOWCASE** 

"A network of remote servers hosted on the Internet and used to store, manage, and process data in place of local servers or personal computers."

First of all, I'd like to get over an issue about terminology. I know accurate terminology is incredibly valuable in setting standards, but sometimes it is a pain. Take this word 'Cloud' that I had to use in the sub-title of this talk. Its definition has certainly been the cause of many heated discussions at Marquis. The Oxford English Dictionary defines it, in this context, as "A network of remote servers hosted on the Internet and used to store, manage, and process data in place of local servers or personal computers." I'm going to use to describe both private and public data centres, wherever they are.



But perhaps our experience of marketing and hype around the cloud so far is more akin to one of the more general definitions "An indistinct or billowing mass, especially of smoke or dust."



The second point I'd like to make is that despite, as I understand it, the JT-NM being founded to look at live IP based workflows, I'll be talking about post-production workflows, not live ones. This is largely because that is where our customers operate. But I think there is another reason why this is relevant; I believe most of the media movement, manipulation and storage happens post production. The final introductory point I'd like to make is about specifics. You're all engineers, so I know you want me to be specific and give lots of details. I'm going to disappoint you. Why? Well one of the things that these projects have in common, is that the companies involved want to keep quiet about them. So, no names, and not too much technical detail. This is another reason why it reminds me of working in the early 90s, post facilities then had software developers building workflow tools that were part of the IP that made that post house special and so were closely guarded. So, let's talk about some projects in as much detail as I can. These are all real projects I've discussed with customers, some of which Marquis are actively involved in now. What I think is interesting is what they have in common.



Two very different customers have approached us with a nearly identical plan to put their archives into the cloud. The first reaction is disbelief. Why would you do that? Surely you need to keep the archive as close to where the content will be used? Will the upload and download times not be prohibitive?

Yes, these are valid concerns. However, for these organisations they have a need to create and produce content on multiple sites. So, in order to share media it is going to have to be transferred at some point.

So, why not start by putting it in the cloud and then only pull down what you need? It also means that it does not matter where you create it, all your locations will have equal access to it.

If you are involved in sports or news, then you typically only access a fraction of the media you store in your archive – highlights, just a key goal, or that hand hold between Trump and May.



The second reason we've been approached is because of our partial file retrieval technology which allows us to restore only the bytes needed to build the required sub-clip based upon timecode in and out points. That then minimises both the download time, but also the cost of restoring it. We anticipate being able to offer this as a cloud based service in the near future.

We are seeing increasing numbers of customers approach us with Business Continuity or Disaster Recovery needs. Whether the cloud can help here or not depends very much upon attitude to risk.



One customer I talked to said that it was corporate policy that content would never leave the building before broadcast. That might have been a way of securing it from theft, but not such a wonderful way of protecting it from fire, flood or earthquake (and they were in Southern California).

So, getting your content off site might be critical in mitigating against some potential disasters. Whether you do that over dark fibre to a militia guarded secret location in the desert (more gunslingers), or over the public Internet to Amazon, is a different choice.



We now support several types of cloud storage in our Workspace Backup tool. It backs up entire Avid ISIS or NEXIS workspaces, and uses our unique analytics to pull in all the Avid projects and any additional media they need.

Backing up or restoring hundreds of terabytes into the cloud is clearly not going to be something you would want to do every day. But if you need that ten nines level of durability, it really is the only answer. For speed and security people are looking at hybrid solutions which involve on premise and in cloud storage of key assets. Again, to make this solution workable there needs to be some asymmetry about what is uploaded and downloaded. What makes our solution unique in an Avid production environment is that you can restore just your most critical project, or even just a bin, from the cloud, to any Avid workstation anywhere in the world. So even if you are unable to access your entire facility, your editors could be back working on the most important projects very quickly.



Another trend we are seeing in our discussions with customers is around distributed project working.

One customer expressed it very neatly to me, he said "I call it my 'artists anywhere' project" – with creative talent around the world available to work on his projects, he was keen to spread the work around.



Using a similar approach to the Avid storage backup, we can enable the parking of Avid projects into the cloud, along with all their media. The same product can update a cloud archive with changes to that project.

Let's think about the kind of workflows this would enable.

Imagine we have a director filming in Africa and a craft editor working in LA.



The director does a day's shooting, loads up the footage into Media Composer and makes selects and a rough edit so that he can check his footage. He might consolidate and then park the project into the cloud before heading off for dinner. In his morning, the craft editor restores the project from the cloud and does a day's work. At the end of his day he updates the cloud archive and only the new project metadata and any new media are uploaded.

When the director wakes, he can restore the project, and so on.

The benefits of this workflow is that not only do you have project sharing, but you get that cloud durability by default, you also have an entire record of every step of the production process.

When we switched from SD to HD we got a lot of requests to help with proxy workflows, enabling an off-line / on-line post production process. With 4K and hybrid workflows, we've been getting more of these requests again.

One example is a promos department. They already have the finished programmes shipped to them over the Internet, so they were keen to minimise the download time.



Marquis Medway workflow automation tool was already in use on premise. The core engine of Medway, which we call Medway Engine Web Services, or MEWS, was adapted to work within Amazon. This gives us powerful flexibility to operate workflows on-premise, in-cloud, or, as in this case: hybrid.



It was then a relatively simple step to generate proxies for any programmes that arrived in a specific Amazon bucket. These were then passed to high-speed file transfer software for download to premise. There Medway puts the proxies' atoms on the ISIS checks them Interplay.

Once the edit of the promo is complete Medway can automatically request MEWS to transfer the original high res media, trimmed, from the S3 storage, to premise and then relink it.

Ultimately that relink could happen in the cloud and this would make sense as the promos themselves are delivered over the Internet.

We are, of course, always trying to spot trends in the market. Are these projects 'one offs' or are they generic needs that other customers will ask for? This is a critical question for us, getting it wrong will lead to us building the wrong products.



I think there are just three core reasons that link these. Three needs or preconditions that make these workflows not only desirable, but ultimately necessary for the media production organisations involved.

The three reasons I see are

a) they receive or deliver substantial content over the internet,

b) they have a need to utilise resource (people, equipment or time) that demand multi-site workflows, or

c) an attitude to disaster recovery that means an on-site backup is not inadequate. Of course, ultimately it boils down to telling better stories and getting them in front of the viewer, quicker.

A common reason not to use cloud based resources is the amount of time it may take to upload to, or download from the Internet. When you deliver your content over the Internet, or if your content is shipped to you over the Internet the argument flips. Why are you wasting time downloading and uploading it? Why not seek out workflows that minimise what is downloaded (perhaps just partial proxies) and uploads (perhaps just metadata)?

Some facilities are particularly keen to exploit multi-site workflows. Either they have talent they want to use in multiple locations, or perhaps they want to use more

daylight hours by chasing the sun, or perhaps the media is being captured a long way from where it will be produced.

The third reason that crops up frequently is the need to protect assets. Protect from what? Every customer appears to have a different profile of the risks they are most concerned about. Some customers are very focussed on protecting them from unauthorised access.



Another I talked to considered the biggest threat was that they would lose access to their facility because of civil unrest. Some are focussed on machine failure. We have a customer that backs up their edit storage to a NAS that is in a machine room which is below the waterline.



My heartfelt wishes go to all of those affected by recent hurricanes, I guess weather might be impacting risk profiles more now than six weeks ago. It seems to me that if loss of media is a high concern,



only a distributed cloud solution really offers high levels of protection. One final thing that links all these workflows together. They are all file based workflows. And I don't mean that in a good way. These workflows are linked together by a lowest common denominator of standard media and metadata file formats. AAF, XML, MXF, etc.

Wild West? Yes, because right now the only standards holding these workflows together are those of the file formats, the network, the OS and the cloud host. Basically, on-premise workflows transplanted into the Cloud.

This is not going to deliver the open, agile workflows that the industry needs in this time of immense change and uncertainty.



Except in some special circumstances one set of files has to be completely written out by one process before the next one can start. It is like a slinky toy going down the stairs, it has to completely transfer itself to one step before it can start on the next. That's not optimal, and it is not very 'cloud like'. Surely, we should be 'flowing' the content and metadata between processes in the workflow, as we do in Medway.



I would propose that the JT-NM's approach is applicable to, and keenly needed in non-live workflows. In fact, I would contest that it is almost more important as so much more of our media is processed in non-live, but faster than real-time workflows.

When I was thinking about giving this paper in June the JT-NM roadmap looked like this...

<b>CR SHOWCASE</b> REAL TIME MEDIA	JT-NM Road April	lmap 🧃	iabm	
JT-NM Roadmap of Networked Media Open Interoperability*				
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LEGEND: Standard //Specification	IV. Dematerialized fac	Cilities Virtualized functions Cloud-fit Distributed and on-demand workflows		
AMWA 15-0	Auto-Provisioning	Automated resource management for more flexible and sharable infrastructure at scale		
VSF TR-03 SMPTE ST 2059	II. Elementary flows	More flexible and efficient workflows New formats supported like UHD and mezzanine compression		
I. SDI over IP VSFTR-04 SMPTE ST 2022-6 AES07 Action over //	ST 2110-50 ST 2022-6 transport into ST 2110 system	Start implementing IP with current workflows Ease remote production		
0. Current SDI SOMOKOSDI 66/126-SDI	Serial Digital Interface	Current and mature technology Available for many years and evolving		
((x))	" JT-NM assumption as of April 2017 and will evolve over time.	Visit <u>IT-NM org</u> for the latest update. Feedback to <u>item-info@videoservicesfoour</u>	2009	

Phase IV, the dematerialised facility did not appear to get going before 2018/19. That's no good I thought, we need to make faster progress. So I wrote an outline, shot it off, got it accepted, went away on holiday, and when I came back I started to write the paper and checked the JT-NM roadmap again and found that it now looks like this...

<b>REAL TIME MEDIA</b>	JT-NM Roadr August	map	iabm
JT-NM Roadmap of Netwo	orked Media Open Interoperabi	lity*	Sf
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LEGEND: Standard / Specification Published Woley available Study / Activity or other.	IV. Dematerialized faci EBU R146 Cloud Security for Media Companies JT-NM Activity e.g. Identify Best Pro EBU - Investigating models/workflows e.g. reports and best- AMWA Labs Findings e.g. AMWA Specs/Best Practices III. Auto-Provisioning	Lities Cloud-fit Open, secure, public/private cloud solutions practices Non-media-specific IT Self-describing, open APIs suitable for virtualization Automated resource management	
AMWA IS	AMWA IS-05 Connection management O4 Discovery & Registration		
VSF TR-03 SMPTE ST 2059	II. Elementary flows ST2110 Transport of uncompressed essence Timing	More flexible and efficient workflows New formats supported like UHD and mezzanine compression	
I. SDI over IP SMPTE ST 2022-6      O. Current SDI     (*) Inno     **see Dematerialized Facilities FACi at J	FAM.org for more information. * JT-AM assumption as of August 2017 and will evolve over time. Visi	Current and mature technology	

Looks like someone saw me coming!

I believe the principles set out by JT-NM have the capacity to transform many of our multi-manufacturer workflows. To take our media processors, indexers, storage devices, archives, transfer accelerators, etc, etc, to make them all discoverable, scalable, and operate in fileless, flowing workflows.

I think it will be a huge loss of opportunity if we don't work to start making this happen.



You can imagine workflows broken out into a number of components that could be working in a JT-NM orchestrated way achieving the same aim, but with far greater agility and openness. To do this requires many manufacturers to get behind it and make it happen, but more importantly for customers to demand it. Because standards only really become standards when they are used. The Cineon file format turned into DPX and became a facilitator of digital film special effects workflows, less so its namesake software product. OMF, less so. Use it or lose it. Or to misquote Groucho Marx:

"Those are my standards, and if you don't like them... well, I have others." Thank you