POSTMARK

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Analysis and Summary of feasible marketplace business models covering all trails

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Abstract: This report analyses the market for cloud services of the type that POSTMARK is pioneering including type, scale, readiness and barriers to adoption. The POSTMARK trials are reviewed in terms of the business benefits that the services offer, the validation of these by those involved in the trials, and the further work needed to move from trials to a fully commercial and production setting. Business benefits were wide ranging and included lowering costs, better meeting of deadlines, increase in volume of business, and improved customer service. Response from the trials was positive in all cases. This was echoed by the two public demonstration events hosted by the project in 2012 where the attendees (around 100 in total from the film and post communities) were positive about the services that POSTMARK is offering. The main barriers encountered were security, the need for high levels of availability and trust, the need for complete out-of-the box solutions, and of course concerns over cost.   These mirror findings in industry surveys and analyst reports.   These barriers are not insurmountable but do require further investment to address. The key question is whether the market as a whole is sufficiently aware of, and ready to adopt, new services of the type developed by POSTMARK. Indications are good, but large scale adoption would be necessary to give sufficient return on the investment needed to provide fully operational POSTMARK services on a supported and commercial basis.

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OVERVIEW OF THE MARKETPLACE

Film and television form a substantial part of the UK economy, attracting major external investment, sustaining thousands of skilled jobs, and exporting the results of work done in the UK to a worldwide audience where UK film and television is seen as some of the best in the world.

For example, commercial broadcasting by members of the Commercial Broadcasters Association (COBA) is worth an estimated £4.2Bn alone to the UK economy as described in the COBA 2012 Economic Impact Report[1]

> *"Broadcasters in the Commercial Broadcasters Association (COBA) invested £623m on UK TV content last year, an increase of 31% year on year from 2010. The sector is worth £4.2 billion per annum to the UK economy. The sector has increased direct UK employment by more than 8% since 2010, employing 9,000 people directly and 47,000 indirectly. The UK is the biggest European hub for TV investment amongst COBA members. The research findings show that UK investment amongst this group is higher than all the other European markets combined."*

Film has a similarly large part to play and is closely tied to television which remains the main consumption channel for film productions as described in the British Film Institute (BFI) Statistical Yearbook 2012[2].

> *"UK films earned 17% of the $33 billion worldwide gross box office last year while, in 2010 the UK film industry generated a valuable trade surplus for the British economy amounting to over £1.5 billion. Quite justly, UK talent has been feted at all the key festivals such as Sundance, Toronto, and Cannes, and recognised in the awards season, all of which has helped promote British culture, skills and creativity abroad. The UK remains the third largest consumer market for film (by value) in the world, worth £4 billion or 7% of global revenues. Within that market, cinema going remains robust but television is still the dominant platform in terms of watching films, with over three quarters (77%) of all viewings in 2011. The UK film industry exported £2.1 billion worth of services in 2010, made up of £1.57 billion in royalties and £541 million in film production services, resulting in a healthy trade surplus of over £1.5 billion"*

To give this a sense of perspective, the film and television sector is comparable in size to pharmaceuticals, software and aerospace, for example as Sky describes in their 2012 Economic Impact Report[3]:

> *"At end 2011, Sky employed 22,800 people (direct and full-time contract) in the UK. To gauge how significant this is it makes it similar in size to Rolls-Royce's and IBM's UK operations and to Google's global employment at the end of 2010. To give an alternative sense of scale, it means that Sky employs more than twice as many people as the entire software publishing industry in the UK and more than half as many people as the entire pharmaceuticals industry in the UK."*

Within both film and television, a transformation is taking place in the production, post production and distribution process. The move is to fully digital and file-based processes (so called 'tapeless production') with content exchange and delivery increasingly taking place over high-speed networks. The Digital Production Partnership (DPP) is a key in coordinating this change and has issued several reports that summarise the reasons and benefits for this transition.

The 2011 report from the DPP called the "Reluctant Revolution" describes the situation succinctly:

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[1] http://coba.org.uk/coba-latest/coba-latest/2012-economic-impact-report

[2] http://www.bfi.org.uk/statisticalyearbook2012/

[3] http://corporate.sky.com/documents/pdf/publications/2012/the_economic_impact_of_sky_on_the_uk

"While TV production has been digital for some time, it is digital tape that has been used as the means of exchange between different parts of the production workflow. The emergence of file-based cameras, however, is beginning to remove tape from the acquisition stage of the production process, and this in turn is prompting the production community to look at entirely end to end file-based workflows. When the source material is a file, it now seems a backward step to dub material to tape— something that did not seem illogical when the source material was on tape. In the past year alone we have seen a fairly dramatic swing to file-based cameras, in part because they represent a highly cost effective means of delivering HD commissions. At the same time, there are external market factors that will alter the way that consumers access content, notably through "cloud" services, and already many companies are examining how general market innovation can be applied to production.

The move to complete file-based workflows represents a tremendous opportunity for production companies and their clients alike. There is considerable scope for liberating the creative process from the craft technologies that characterised tape-based production. The future will be one of ubiquitous access to content, with an ability to view that content on standard devices (be they laptops, tablets, computers or smartphones), and a seamless movement of content without the need for dubbing to tape and booking couriers. This digital vision has already been embraced by broadcasters, and the BBC, BSkyB, Channel 4, Channel Five and ITV have all invested in file-based technologies for production or distribution in the past three years. All broadcasters are now committed to file-based digital production because they can see the huge benefits in faster and more efficient production processes and in providing creative staff with better tools to allow them to focus on content not process. And, above all, they know that in a fully digital world they will be able to make greater use of content they receive."

A large part of the 2011 report then goes on to analyse the opportunities and barriers for cloud services in the area of file-based production and distribution.

"Vendors in IT and Broadcast Technology have pushed a vision of the future where file-based technologies and cloud services will transform production process, particularly in the area of storage and archive. However, the benefits of these technologies and services need to be made apparent and available to the production sector. In particular, the DPP believes that a credible archive storage and retrieval model, which enables producers to exploit rights more easily would be very attractive. The same model might also enable producers to see benefits currently lost to them in reusing their own 'stock footage'."

This is confirmed in the 2012 Big Broadcast Survey (BBS)[4]. Nearly 10,000 broadcast professionals in 100+ countries took part in the 2012 BBS, making it the largest and most comprehensive market study ever conducted in the broadcast industry.

"Cloud computing is one of the hot topics in the broadcast industry in 2012, but our research shows that it's still early days for deployments of this technology in the broadcast industry."

In the survey, cloud was ranked 7th in the Industry Global Trends Index. Multiplatform content distribution, file-based workflows, transition to HD and IP networking/content delivery came at the top of the list. This is in-line with the transition the industry is going through. It is encouraging for POSTMARK since the focus of the project is essentially cloud services and ones which are closely aligned to the drivers cited in the survey.

"The top commercial drivers cited by broadcast customers for deploying cloud technology in the broadcast industry highlight the fact "cloud technology / cloud services" are principally viewed today as way to enable new workflows and increase efficiencies. While potential cost savings — achieved through increased efficiencies, shifting costs to OpEx, and SaaS services – are arguably the most straightforward rationale for deploying cloud technology, these results imply that customers also see the

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[4] http://blog.devoncroft.com/tag/2012-big-broadcast-survey/

cloud as a potential driver of revenue, particularly if it enables new workflows, drives collaboration, and increases the overall utilization of content."

The BBS survey then looks at the barriers, which are presented in the graphic below taken from the BBS webpage. The main barriers are cost/budget, network bandwidth, security, and the maturity of the technology. This is entirely consistent with the experience of POSTMARK and indeed lowering the cost and network barriers was one of the main objectives of the project.
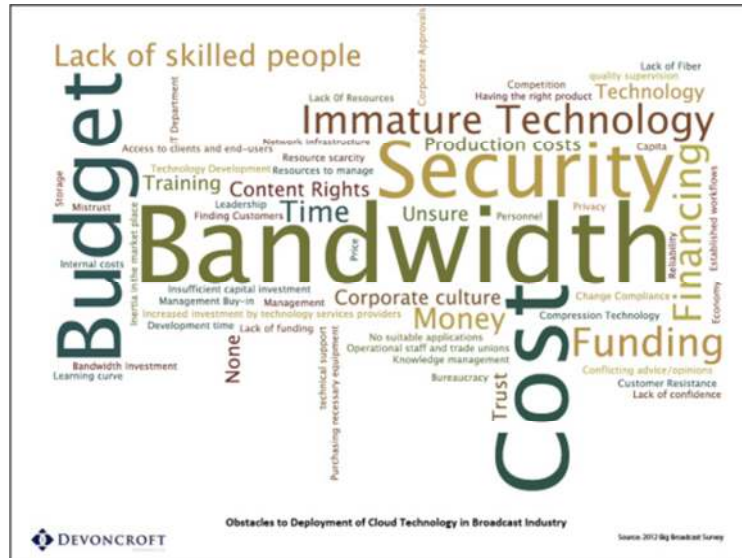

Figure 1 Obstacles to Deploying Cloud Technology in Broadcast Industry. Reproduced from the Big Broadcast Survey. (http://blog.devoncroft.com/tag/2012-big-broadcast-survey/)

The BBS survey reveals barriers that were also cited in the DPP Reluctant Revolution report a year earlier. Here the main obstacles cited were:

"The largest single impediment to the adoption of new services is bandwidth, or rather the lack of good affordable upload capability

The cost of cloud services is coming down and is now at a point where at least superficially it looks quite affordable…A key conclusion is that cloud based storage is only really applicable for 'temporal' storage needs (i.e. short term and timely) and where content needs to be accessed by multiple parties, or it is used as a short term backup

By some way the most significant potential issue that will affect the take up of cloud services is the concern about uninterrupted continuity of service. The production community knows and trusts tapes, and belief in non-tangible offline services will not be the easiest bridge for many to cross."

It is also important to recognise that whilst there is clearly a real and an emerging market for cloud services, there is also a lot of hype and push from vendors and service providers. The readiness and compelling need to use cloud services from a customer perspective is less strong, although it does exist. To cite BBS:

"Given the hype surrounding cloud technology, and the level of investment from vendors, it is perhaps not surprising to find that technology suppliers — represented in the chart below by systems integrators and vendors — see cloud technology as more important to their commercial success than do their customers."

However, whilst the market for cloud services might be nascent, there is a lot of potential for the market to be large with an associated transformative effect on the industry. Many of the scenarios and benefits for cloud services revolve around storage and content exchange. This is also reflected in the POSTMARK trials. This is born out in the annual reports by Tom Coughlin into the role of storage in the media and entertainment industry.

Key extracts from the 2012 report[5] below show that storage in media and entertainment is a major market and like the BBS and DPP reports, cloud storage is beginning to become important, especially for collaborative workflows.

> *"Between 2012 and 2017 we expect about a 5.6 X increase in the required digital storage capacity used in the entertainment industry and about a four-fold increase in storage capacity shipped per year (from 22,425 PB to 87,152 PB). Total media and entertainment storage revenue will grow more than 1.4 X between 2012 and 2017 (from $5.6 B to $7.8 B). The single biggest application (by storage capacity) for digital storage in the next several years as well as one of the most challenging is the digital conversion of film, video tape and other analog formats. Over 84 Exabytes of digital storage will be used for digital archiving and content conversion and preservation by 2017. The greatest storage capacity demand in 2012 was for digital conversion and preservation as well as archiving of new content (about 98%). Content distribution follows in size with acquisition and postproduction using less storage. Storage in remote "clouds" is beginning to play an important role in enabling collaborative workflows."*

The interesting question is whether cloud storage can also address the dominant need for storage in the industry: long-term archiving. The DPP report identifies cloud storage as having potential applications, but not being competitive compared to in-house solutions for long-term storage. Likewise the Coughlin report does not identify cloud storage as the way forward for archive but rather for shorter-term reasons such as supporting collaboration. This is consistent with the findings of POSTMARK.

When considering the business models for cloud services, in particular how they are priced, it is important to note that much of the day to day work on television and film is project based. Business models where costs can be charged directly to a project are likely to be the key to success. This means Pay As You Go (PAYG) for services used for day-to-day activities on these projects, e.g. content exchange and processing in a collaborative project, or fully Paid-Up where the use of a service needs to persist beyond the end of a project (e.g. archiving) or during some form of hiatus in a project (e.g. temporary parking). Or as the DPP Reluctant Revolution report puts it:

> *"This highlights a key challenge for vendors and service providers — production companies want to pay in a way that is aligned to their income; that is, on a project basis. This project-budgeting approach may limit any new service unless the costs are 'pay as you go'."*

It is also important to recognise that whilst the market might look huge and therefore provides a very tempting target for generic IT-based service providers, the market is also specialised with a range of players that have already built up considerable experience of how the industry works in practice and for the need to deliver complete solutions not just technology. The DPP report has the following to say:

> *"For this reason, we see periodic interest from IT companies in the Media and Entertainment industries, as there is a (untested) belief that the market must be huge because of the amount of content produced, stored and distributed. The reality is somewhat different, and while there is most definitely an increased use of IT in media, the nature and scale of opportunity is not simple….The lesson here is 'Marketing 101': know your market and what they buy. While the production community do not understand or really care about 'cloud', they will be concerned about the functionality offered by such services. This would also explain why the take up of "managed storage solutions" by some IT and telco providers has failed to take off: they are selling technology infrastructure in the absence of an explanation of the problem they are supposedly solving."*

This raises the important point that those best placed to address the market are those who already work within the industry, understand the industry, and most importantly are able to assemble and deliver complete solutions to the specific problems faced by customers in the industry. This is, in effect, about the need to deliver capabilities as a service (e.g. a service might be the capability to transcode, QC and deliver content to TV broadcasters in different countries in a way that matches their local standards) as opposed to delivering a specific technologies as an individual service in isolation (e.g. storage). This isn't to say that individual services (e.g. storage, transcode,

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[5] http://www.tomcoughlin.com/Techpapers/M&E%20Storage%20Report%20Brochure,%202012,%20070812.pdf

network) can't be aggregated into an overall solution, just that it is the overall solution that provides the *value* to the customer and is the thing likely to provide the *compelling* reason to buy.

In summary, the market for cloud services of the type that POSTMARK is pioneering is nascent, growing, surrounded by considerable hype and vendor push, but has the potential for major economic impact. It needs to be addressed with attention to providing complete solutions that customers actually want. The main barriers are business models, bandwidth, high levels of availability and trust, and of course cost.

BUSINESS BENEFITS OF POSTMARK SERVICES

When conceived, the anticipated business benefits from the use of POSTMARK services were expected to be wide ranging. The benefits were expected to apply both to existing users of Sohonet and those from outside of Sohonet accessing POSTMARK network services from other high performance networks or over Internet connectivity. The analysis is from the perspective of post houses or other similar organisations, since POSTMARK enables them to be both customers and suppliers or network accessible resources. The benefits to network providers and dedicated service providers then follow. For example, the move from purely in-house working to the use of outsourced or traded capacity was expected to generate more network traffic and more players on the network, both of which benefit the network provider. Likewise, the move away from everything in-house provides major opportunities for dedicated service providers to deliver new storage and processing capacity into the network.

Area of benefit to post production	Type of benefit
Reduction of jobs turned down by a post house because in-house capacity isn't available when the job comes in. This could be lack of people (e.g. permanent or contract staff) or lack of computing or storage resources (i.e. IT systems).	**Increase in business**
Reduction of jobs turned down by a post house because they need to collaborate with other post houses or use subcontractors, but don't currently have a way to do this.	**Increase in business**
Less delay to jobs because a post house doesn't have enough capacity to service the peak load.	**Faster delivery, Customer satisfaction**
Less reduction quality of work in order to meet deadlines because capacity isn't available.	**Increased quality, Customer satisfaction**
Less content is held on high-cost primary storage when it could be shipped off to a lower tier at much lower cost.	**Lower cost**
Render jobs can be outsourced to run on lower-cost remote server farms rather than run in-house on expensive servers	**Lower cost, faster delivery**
Ability to account and charging for content stored or processed held on behalf of a client during or after a job is complete	**Lower cost**
Cost saving through workers (e.g. freelancers) who work on a job without needing to be physically present at a Soho office. This allows extra work to be taken at lower cost.	**Increase in business, Lower cost**
Cost saving by selling spare capacity (e.g. other post houses) when in-house systems are not fully loaded.	**Lower cost**
Using a remote service compared with having to invest in extending in-house capacity (e.g. procurement, installation, maintenance etc.) on temporary and long-term basis.	**Lower cost, faster delivery,**

All these benefits depend on the availability of a combined high performance network, storage and processing infrastructure delivered with guaranteed QoS. This is essential since these applications have stringent requirements for data rates, data volumes and completion to strict deadlines. Sohonet delivers the network part of this capability and POSTMARK extended this to include storage and processing. On top of this, specific POSTMARK applications were built, for example Project Parking, 3D alignment and multiplexing, automated QC and transcoding.

The trials done in POSTMARK investigated many of the benefits above and included trialists that were both on and outside of the Sohonet network.

The trials investigated or executed included:

- Collaborative working for remote grading and VFX with a company exchanging content with its clients through shared storage.

- Content safety for fast backup of digital dailies to offsite storage at a third-party site.
- Content resale where a portal and database provides access to both proxy and hi-res content deliverables created using storage and transcoding services.
- Remote grading where colour grading is done at one site with the customer at another and is mediated using shared storage and transcoding services.
- Approval for TV commercial versioning where the customer can access remote transcoding services to create specific versions directly and quickly without the need to engage staff at the post-production house providing the versioning services.
- Integrated parking of digital film assets to remote storage during the film production process (which can last months or years) to save costs, free up in house assets and increase content safety.
- Storage and transcoding on demand to reduce need for in-house resources where space and budget is limited.
- Centralised storage and transcoding services to support multiple users and remove need for multiple data transfers between disperate in-house systems.

It should be immediately clear from the above that many of the services being offered are very much complete solutions to a customer need rather than specific technological or infrastructural services.

The benefits investigated for users of the services fall into several classes:

- Lowering cost, e.g. by a company avoiding capital expenditure in upgrading infrastructure at times of peak load.
- Meeting deadlines, e.g. by buying in extra capacity to satisfy the needs of a large project with a tight delivery schedule.
- Increase in business, e.g. by a company being able to take on work that it might otherwise have to decline due to lack of resources at that specific time.
- Improved customer service, e.g. by avoiding staff bottlenecks when servicing customers.

Response from the trials was positive in all cases.   This was echoed by the two public demonstration events hosted by the project in 2012 where the attendees (around 100 in total from the film and post communities) were positive about the services that POSTMARK was offering and additional services also identified (e.g. rendering).

Some example comments from the trials illustrate this well:

> *"VFX Consulting was very commending of the concept of the project. They were initially very keen to trial the services as they are a fairly small outfit with limited budget for their own equipment, especially data storage. The solution that was offered to them was very appealing as it would potentially reduce a fairly large amount of manual processes and time."*

> *"The use of the service was welcomed by the production team. The deployment of the service in this scenario looked to solve a genuine time consuming problem.   The producers involved used the service on 5 campaigns, each of these requiring around 50 client approval transcodes. They were able to upload multiple files which was considered to be a major plus point. The output files were all of good quality and suitable for the requirement."*

> *"This client based in Scandinavia is attempting to make use of the network to provide a Grading service to his client. He does a large portion of his work for UK based clients but it is not always practical to consult the client in person... Both Service provider and client were able to access files on the centralised storage at Pinewood studios... The benefits of the billing based on metrics was of great importance and interest to this potential client"*

> *"The move from film to a digital file based workflow allows the daily rushes to be processed almost immediately. The plan was to use the POSTMARK system to facilitate file transfers between the two sites, making use of the checksum service to verify consistency, and then to provide a number of transcodes.   Under normal circumstances this process is extremely time consuming, requiring highly skilled human input and*

therefore making it costly and prone to human error. The commercial viability of this process through the POSTMARK system could save the facility costs in labour. The system's ability to bill based on the metrics of use would have also created a new commercial model upon which to create billing."

"There is currently has no centralised storage area for their work and they rely on moving files around shared folder areas on their workstations. This has to be managed continually by all users and has been proved to be inefficient and risky. None of these areas are backed up. There have been issues before where their data management processes have failed and someone has worked on an incorrect version of a file, or deleted a master file that had been incorrectly named. Deploying the Postmark storage service aims to not only serve the benefits of using remote storage, but introduce the concept of working off central storage to the trial user"

"Like many smaller post facilities they can lack the capital to purchase equipment required for many of the functions they are expected to carry out as part of their overall service. Also, their central London location means that they are unable to facilitate a lot of larger pieces of equipment. A good example of this is data storage as it tends to be high in capacity, rack space, power consumption and expense. A client can often suddenly request services that might not have been within the original brief. e.g. transcoding to a specific format"

BARRIERS AND KEY FACTORS FOR ADOPTION

Whilst the business benefits of POSTMARK services were validated by the trials, and also confirmed at the demonstration events, there were several barriers that prevented some of the trials from going further and some of the trials from taking place at all. These barriers were about the readiness, robustness and the long-term availability of the POSTMARK services for use in a production setting. For example, comments from the trials included:

Overall, the concept of the process was considered to be sound, but the interface and, in this case, lack of feedback from the system held back the more widespread use of it.

The user found the interface fairly un-user-friendly and was not confident that it was doing what it was supposed to. Also the ability to book bundles was fairly complex in their opinion. There was a fair amount of support required to train and re-train on the interface use.

Although POSTMARK supports multiple levels of security the client unfortunately was not comfortable leaving his files on the POSTMARK storage for any length of time. This is an extremely difficult obstacle for POSTMARK to overcome, as it would take multiple clients utilising the system successfully without compromising security to convince others of its integrity.

We were however not able to meet the client's further requests to provide an interface by which they could skin the portal page to portray their company logo, design and colour scheme. If the POSTMARK product was to be commercialised this personalisation feature would need to be incorporated.

Unfortunately again the client was not confident with the security of the system and was not prepared to risk uploading their highly sensitive digital assets onto the POSTMARK system. In this instance it would only be through successful trial use that clients might become satisfied with the security levels.

Finding potential clients to trial the system proved to be more difficult than first anticipated. The clients that have shown interest are not prepared to become involved in the trials phase due to the limited time available to deliver their own projects.

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Our clients wish to offer the service on to their clients, but are not confident in being able to offer quality of service.

There was also comment on the lack of feedback from the system and complex look to the interface.

They used the storage service for a number of standalone jobs (i.e. jobs that are not continuous and likely to come back) as they were not willing to move current project data over to a new server, or risk moving it back again post-trial.

During the testing/consultation period described above, there was a reluctance to take part in the trial as they were entering a very busy period of work. The main user was not willing to disrupt any of their current projects so we agreed that they would initially use the storage to test-archive old VFX work.

Being able to access shared, central storage between three VFX artists was a success in terms of re-assessing their working methods. They reported that they would be keen to adopt such a method of data operation and would be willing to use this remotely if it was more stable and they didn't have to adopt workarounds for day to day use.

The barriers are largely in the areas of security, user interface/customisation, and the need for production grade services. Many of these concerns stem from the fact that the only opportunity many had in using POSTMARK was in a 'live' setting as part of daily work where there is no tolerance for errors or delay and where the content being handled is highly confidential. These issues reinforce that in this industry there is the need for complete and robust solutions that are ready to use out of the box.

Similar questions and concerns were raised at the demonstration events, for example attendees asking:

- o *Network bandwidth has been the limiting factor, especially for small post houses, and still is for them.*

- o *Can service providers competitively bid for work? If so is bidding open or not?*

- o *Is data encrypted?*

- o *Support – would/could I call if something goes wrong?*

- o *Studios want Stone Age solutions that they know are safe, security a key issue for them.*
- o *Film projects often have the money to build their own closed infrastructure, which is inherently secure. So maybe the target market is more likely to be lower budget TV series?*

- o *Disaster Recovery (DR), what happens if Sohonet goes down?*

- o *What does it cost?*

- o *Security? This is important to protect IP*

- o *Is billing mechanism standardised?*

- o *Can you predict price/cost?*

- o *Guaranteed delivery?*

- o *Who certifies service providers, i.e. allows them into the POSTMARK club?*

- o *Who pays for support?*

- o *What's the security? (And security of data?)*

o *Any support for service brokering?*

o *What SLAs and service guarantees exist between providers and customers?*

Other than security, these are largely non-technical issues and revolve around the commercial aspects of the services – for example the need for support, SLAs, guarantees, certification and other factors that would be expected in a production setting rather than a trial setting.

The issue of network bandwidth came up in feedback on the demo events, but only in the context of small organisations who only have internet connectivity and would struggle to afford Sohonet. This is largely an issue of cost. This was also seen in the trials where organisations not on the Sohonet network were exposed to the variability and lack of guaranteed QoS that comes with Internet connectivity and had some difficulties as a result.

Overall, the issues and questions that arose from the trials and demo events all align closely with those identified with cloud services in the DPP and BBS reports, namely: security, network bandwidth, cost, business models and high availability/reliability.

The experience of the partners on the supply side of the services was also interesting. Significant support effort was required to get users up and running with trials and address any problems they encountered. This is partly because of the immaturity of the testbed services and partly because of the nature of people always needing support when learning how to use new products or services. Estimates are that supporting the POSTMARK portal for access to all the services would be a full time job in a fully commercial environment. This is a significant cost and needs to be factored into the business plan for commercialisation.

SUMMARY

The market for cloud services of the type pioneered by POSTMARK is nascent, growing, surrounded by considerable hype and vendor push, has the potential for major economic impact, but also needs to be addressed with attention to providing complete solutions that customers actually want.

The trials investigated or done in POSTMARK included: collaborative working for remote grading and VFX, content safety for fast backup of digital dailies to offsite storage, content resale where a portal and database provides access to both proxy and hi-res content deliverables, approval for TV commercial versioning, and integrated parking of digital film assets to remote storage during film production. Business benefits were wide ranging and included lowering costs, better meeting of deadlines, increase in volume of business, and improved customer service.

Response from the trials was positive in all cases. This was echoed by the two public demonstration events hosted by the project in 2012 where the attendees (around 100 in total from the film and post communities) were positive about the services that POSTMARK was offering and additional services also identified (e.g. rendering).

The main barriers encountered were security, the need for high levels of availability and trust, the need for complete out-of-the box solutions, and of course cost. These echo findings in industry surveys and analyst reports. These barriers are not insurmountable but do require further investment to address.

Given the apparent interest in POSTMARK services, the validated business benefits, the fit of business models with customer needs the key question now is whether the market as a whole is sufficiently aware of, and ready to adopt, new services of the type that have been developed by POSTMARK. Indications are good that there is a need for these services, but without clear potential for large scale adoption it will be hard to justify that there will be sufficient return on the investment needed to move POSTMARK to a set of fully operational services that are delivered and supported on a commercial basis.