You won't Get SAN in the Cloud

Introduction

Post production, creative agencies and facilities that work with raw camera footage and compressed video often fall into the trap of purchasing a SAN when one wasn't needed in the first place. Because of its low latency and high bandwidth, SAN has provided a degree of reassurance for facilities looking to handle increasingly higher file sizes and data-rates.

However, for facilities investing into SAN to remain competitive, efficient and scalable, the infrastructure comes with prohibitively high manpower and infrastructure costs to manage and maintain.

This whitepaper explores the many moving parts within the modern production environment for creative agencies and how NAS technology, combined with DIT tools, will be the next step to scaling users and processes into operating on a facility-wide shared storage.

"provide a shared storage environment that guaranteed video content could be played back without disruption"

Why did SAN fit?

Whether for content capture, post-production editing, visual effects, or coloring and finishing, Fiber Channel and Storage Area Networks met the needs of the modern media production environment for one key reason; they provided a shared storage environment that guaranteed video content could be played back without disruption.

But this capability comes at a cost, both in monetary terms, and the fact that a SAN is an 'island' of data and limiting collaboration, productivity and efficiency.

How does SAN do it?

At its simplest, a Storage Area Network or SAN is a storage solution that provides deterministic connectivity between Hosts (servers and workstations) and Storage (disk or RAID devices), via a Fabric. Each workstation, or host, within the fabric could address shared storage as if it were a local drive directly connected to the Operating system.

Because of its low latency and high bandwidth, it provided some degree of reassurance that the shared storage would not be a limiting factor in achieving video playback. However, the cost of SAN is often prohibitively high, requiring budgets and engineers to be dedicated to specific parts of the workflow.

pixitmedia
beyond expectations

Where commodity IT fell down

Thanks to advances in the performance of commodity IT hardware and Ethernet networks there was the potential to meet the performance requirements for Media & Entertainment with reduced complexity and vastly improved value for money per port or per client.

However, Scale-Out NAS Appliances and Software-Defined Data Platforms are not capable of servicing true 4K frame-based playback requirements. Even with the most careful tuning and the use of local SSD or NVMe cache on their nodes, they just cannot guarantee performance to real-time applications.

This is because the low-level data-flows between NAS and SAN are dramatically different. The host Operating System must address a network storage target as opposed to a direct attached volume. This affects the application performance, and adds additional CPU overhead on both host and server side.

pixstor

The pixstor solution from pixitmedia is a holistic storage solution specifically designed for Media & Entertainment.

Utilising commodity IT and Ethernet technology, pixstor takes a top down, application-first approach to offer the flexibility of a shared NAS environment with the option of utilising technologies, such as NVMe-oF. NVMe-oF is desirable as it can provide performance and latency that exceeds that of a SAN and gives that 'SAN-like' experience.

At all times the pixstor solution respects the golden rule in Media & Entertainment; guarantee bandwidth to real-time video playback applications.

"the overall cost overall cost and complexity of SAN is often prohibitively high"

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"respect the golden rule in Media & Entertainment; guarantee bandwidth to real-time video playback applications"

Creative Post Production

High end, frame-based playback is indeed necessary for many parts of the Media & Entertainment supply chain, but what about the majority of facilities who operate at a smaller scale, in terms of bandwidth and data-rate? A huge amount of content is created using compressed camera formats, edited as standard compressed media codecs, and delivered directly to transmission or online platforms as compressed video.

Compressed video codecs are designed to compress high resolution, often high dynamic range video and be as efficient as possible in storage capacity terms. But the trade-off here is that the computation required to decompress this video is the task of the application and its host workstation.

Tools, like ATTO 360, enable technology teams take a holistic view of their entire environment. With pre-set tuning profiles that are customized for specific workflows, it will ensure that even outside of a SAN environment it is possible to ensure that the entire solution stack is optimised for demanding workloads.

> **"the trade off with Compressed video codecs is that computation becomes the task of the application and its host workstation"**
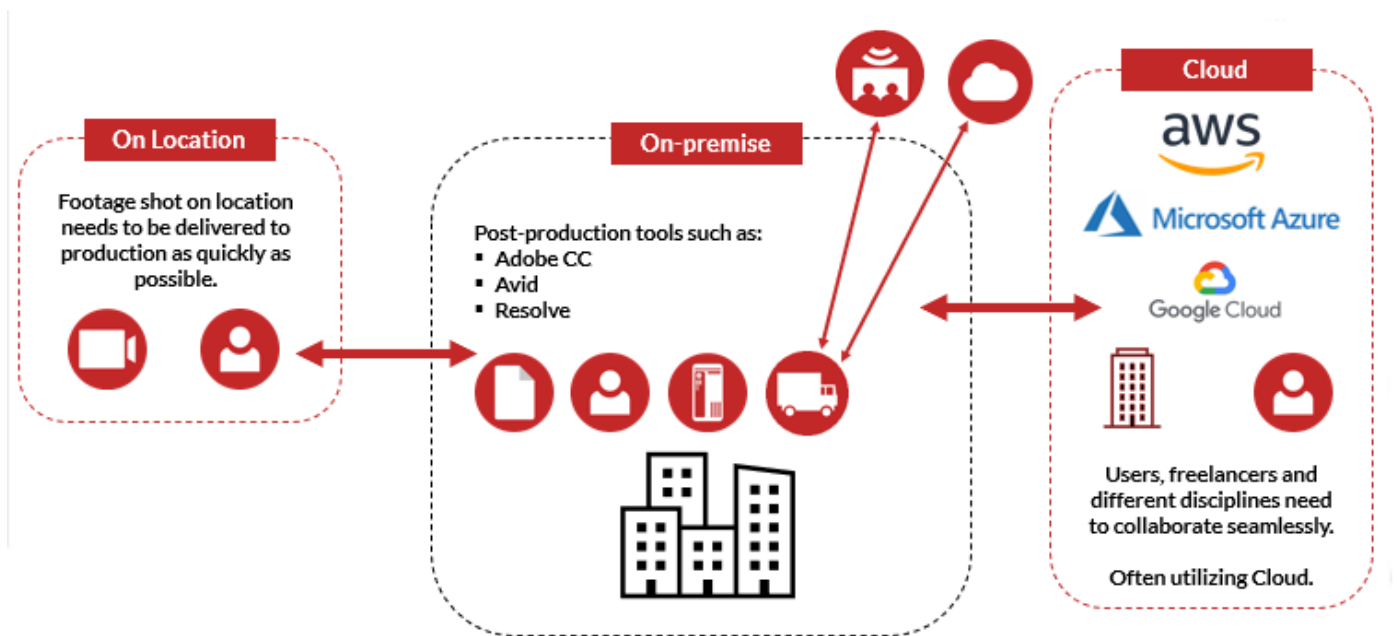

Real World Performance

Using our pixitmedia lab, we carried out tests with two workstations (1x Mac and 1x PC) and a single underlying storage solution. We compared the difference between a synthetic test application, which is designed to measure 'raw' storage performance, and the actual maximum number of playback streams that an application was capable of delivering without frame drops.

When CPU Idle time becomes low, there is not enough available compute power to decode additional video for playback.

## Codec: ProRes 4444XQ UHD 24p, single track playback, target data rate 199MBps

Application Bandwidth and Synthetic Test
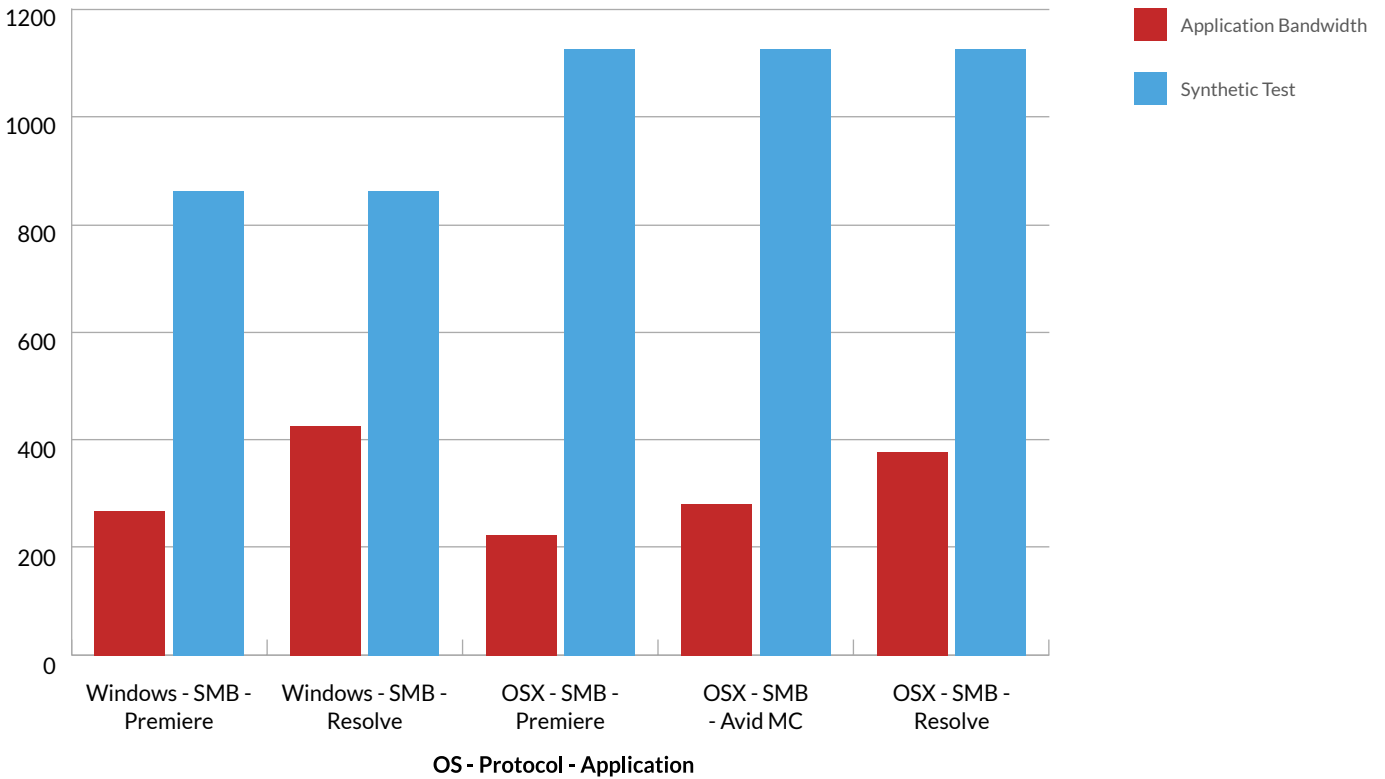
OS - Protocol - Application	Maximum Simultaneous Tracks	CPU Idle Time (free CPU)	Application Bandwidth	Synthetic Test
Windows - SMB - Premiere	2	10%	268	861
Windows - SMB - Resolve	4	51%	425	861
OSX - SMB - Premiere	1	3%	223	1124
OSX - SMB - Avid MC	1	8%	280	1124
OSX - SMB - Resolve	2	39%	378	1124
OSX - SMB - Resolve 16	23.54	28	1,361	1,146

Codec: DNxHR HQX UHD 24p, single track playback, target data rate 83.26MBps

Application Bandwidth and Synthetic Test
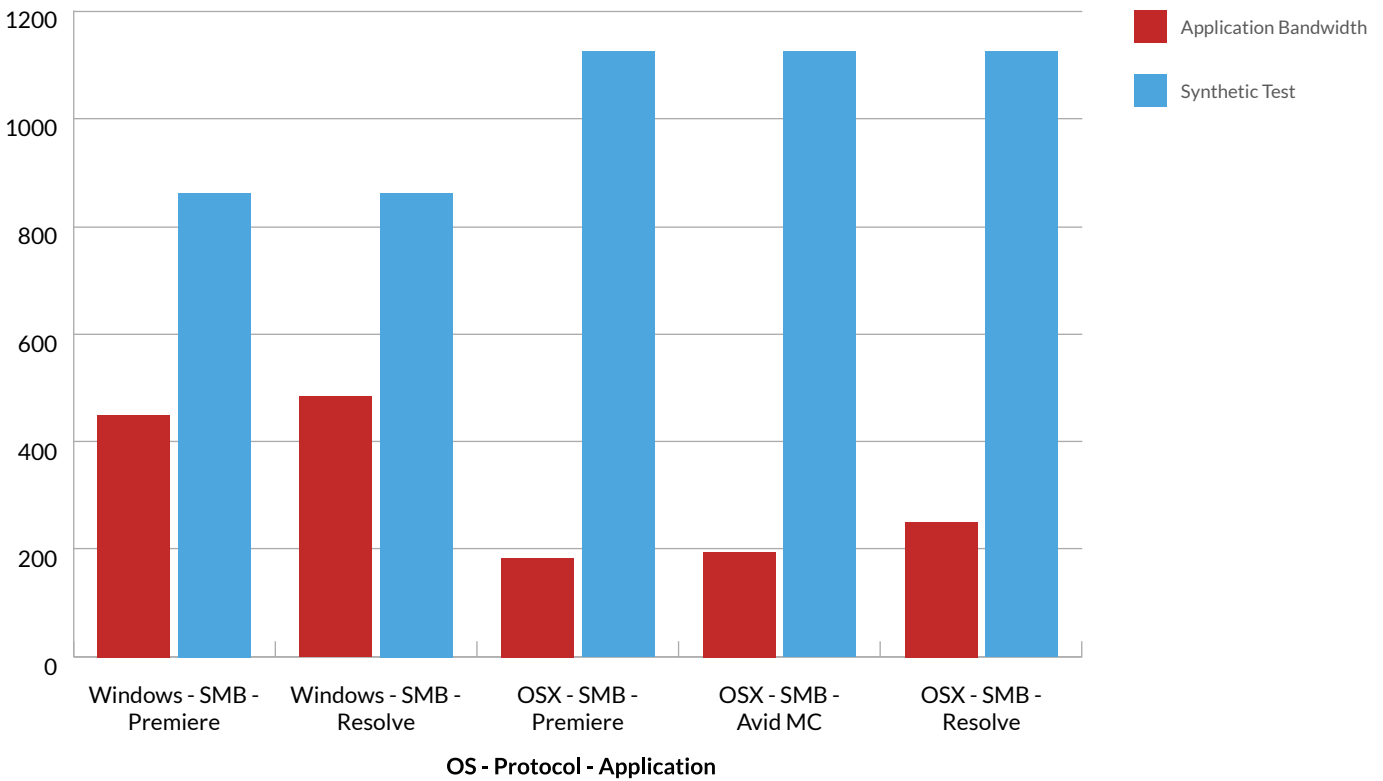
OS - Protocol - Application	Maximum Simultaneous Tracks	CPU Idle Time (free CPU)	Application Bandwidth	Synthetic Test
Windows - SMB - Premiere	6	49%	450	861
Windows - SMB - Resolve	6	18%	484	861
OSX - SMB - Premiere	1	18%	185	1124
OSX - SMB - Avid MC	1	17%	195	1124
OSX - SMB - Resolve	4	4%	252	1124
OSX - SMB - Resolve 16	23.54	28	1,361	1,146

As you can see from the above results, our pixstor solution with ATTO technology is easily capable of providing the performance you need with your application.

* Windows tests were performed a HP Z8 workstation, 2x Intel Xeon E5-2637 CPU @ 3.5GHz (HT Enabled, 24 cores/48 logical) with 32GB Memory. Mac tests were performed using a Retina 5K iMac, with 3.2GHz Intel i5 CPU and 24GB Memory. The iMac network interface was a 25Gb ATTO Thunderlink via Tunderbolt connectivity. The pixstor solution utilised SSD drives configured as part of a global namespace.

** Application bandwidth was measured by monitoring the outbound network utilisation of the pixstor gateway node.

Cloud Compatible

Unlike SAN, the pixstor and ATTO 360 solution is 100% cloud compatible. Many customers are already operating in the cloud, using standard workstations, industry standard codecs and workflows, and appropriate VDI technologies.

Of course cost needs to be factored into any cloud transition but unlike SAN and Fiber Channel technology there is no technical barrier to utilising a pixstor solution on-premise, with remote workstations or in a 100% cloud studio configuration.

"the pixstor and ATTO 360 solution is 100% cloud compatible"

Summary

The majority of post production facilities will handle compressed video at some point during the creative process. And to remain competitive, efficient and scalable, all of their other users and processes will benefit from operating facility-wide shared storage.

When assessing application performance and ultimately end-user experience, the best benchmark is a real-world, workflow relevant benchmark.

"focus on the job in hand; creativity and excellence"

The many moving parts within the modern production environment means we can no longer be lulled into the false sense of security that SAN technology used to provide.

It is with the pixstor solution, combined with ATTO technology, and our top down approach that we achieve the most effective way to ensure that the solution will be fit for purpose and we can focus on the job in hand; creativity and excellence.

About **pixit**media ®

pixitmedia delivers seamless collaboration to enable the power of ideas.

Our purpose-built, software-defined storage and data solutions simplify the flow of data to connect an increasingly complex world.

Our aim is to deliver beyond expectations throughout all areas of our operation. We devise solutions that give customers both choice and freedom, our restless innovation constantly pushes boundaries and the unrivalled care and knowledge of our team ensure optimum performance and value. Customer success is at the heart of our business.

We have a dedicated in-house lab facility to guarantee the effectiveness of our solutions.

pixitmedia is privately-owned and headquartered in the UK, with offices in the USA and Germany.

For more information on pixitmedia solutions:

UK Sales: +44 (0) 345 052 3721   e: info@pixitmedia.com

US Sales: +1 (424) 537-4948   w: pixitmedia.com

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