



# Origin Storage: The Next Level of Delivery Optimization

An insightful exploration into the impact of storage on the performance of delivering your digital experiences.

WHITE PAPER

# Origin Storage: The Next Level of Delivery Optimization

## In this whitepaper you will learn:

- The role of storage in improving digital experience performance
- The pros and cons of different kinds of storage
- The next generation of cloud storage

## The impact of distance

Let's do some math. You are adding 3,000 new objects a month to your digital content library. Let's say that based on headers you set and other factors, you have about a 10% cache miss. That's 300 times each month that the CDN has to return to origin. But wait! That's only 1 POP. Your content is global. Multiply that by, say, 45 (which is the number of POPs in our network) and suddenly that is 13,500 origin requests each month! When that origin is in a centralized location and outside the network, it can cause a significant amount of latency for a lot of your audience.

## Introduction

You've got a website. Or a mobile app. Or maybe a few of both. You understand what it means to deliver a digital experience. You've got web servers and database servers and application servers and lots of places that you store the digital content your users crave—videos, images, text, downloads, and more.

But you are plagued by the specter of performance. Everything has to be delivered as quickly as possible or you risk your audience finding another digital experience (like your competitors'). And you've implemented solutions to help combat some of that latency—you are using a CDN, you have added acceleration technologies for your dynamic content, you've even improved how your website renders for each browser with front-end optimization. Only it's still there. That latency. Haunting you.

That's because the last little bit of latency isn't something that you can install a piece of software to combat. No, it's much more fundamental. It's latency at the core of your digital experience architecture...at your origin. Of course, you've tried to improve how fast you can deliver the first byte or the responsiveness of your drives. You've turned on memcache and optimized the TCP/IP stack. Only it's still not moving fast enough. Your users still have to wait, especially when they are accessing content that's not popular and has fallen out of the CDN cache.

This whitepaper looks into the role that storage placement plays in the overall performance of your digital experiences and answers the ultimate question, "What origin storage type is the best for my digital experience and where should I put my content?"

## The Pillars of Performance

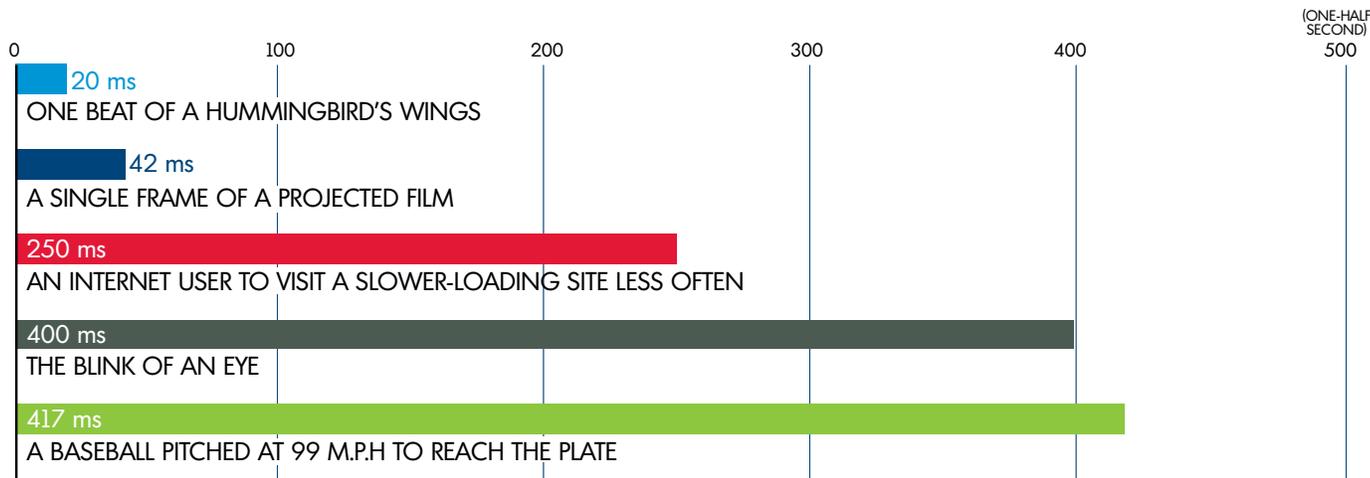
At the root of selecting where to put your origin is improving the delivery performance of your digital experiences. Because users don't like to wait. They want things to happen immediately. In fact, if Google® researchers are correct in their analysis of wait times, a difference of 250ms between your site and a competitor's is enough to chase them away. That's faster than the blink of an eye!

With this instant gratification driving behavior, your digital content must be delivered with broadcast quality—your website must load instantaneously; your video must start playing back immediately (and with no stuttering or buffering); every part of your digital experience must work flawlessly.

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## Time Required For<sup>1</sup>:

MILLISECONDS



It may be unrealistic, but it's reality. And how your audience responds to your digital experience—interacting with it or abandoning it—really depends upon how you address the pillars of performance:

- **Content acceleration**—Part of your digital experience may be a website. When that's the case, you need to accelerate static content (like images and javascripts), dynamic content (that's generated on-the-fly), and the front-end interface in order to ensure that you are delivering your digital experience as quickly as possible.
- **Scale and availability**—Perhaps you are delivering files like software and games as part of your digital experience. When that's the case, you need to make sure that you can meet user demand by having the capability (and capacity) to deliver to anywhere in the world.
- **Proximity**—From where are you delivering your content? Are your web servers half-way around the world from your users or right next door?
- **Origin storage**—What happens when a request comes in and the object is not available? The request has to go back to origin to get the file. But what if that origin is 3000 miles away from the user requesting that webpage? Or 10,000? Not only does the object have to travel that distance, but it also has to do so over the public Internet, which can be congested depending upon the time of day and other factors.

Solving the first three are obvious for many organizations—dynamic content acceleration, frontend optimization, and a CDN. It's the last one that everyone seems to forget about.

<sup>1</sup> <http://www.nytimes.com/2012/03/01/technology/impatient-web-users-flee-slow-loading-sites.html>

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## The Impact of Origin Placement on Performance

Where you put your origin storage can have a significant impact on the overall performance of your digital experience for a variety of reasons:

- **Distance**—There is no getting around the speed of light...or the public Internet. When your origin is 3000 miles away, traversing dozens of network hops to retrieve and return a requested object is going to add latency to the performance of your digital experiences.
- **Scale**—There may be a time when cache fails or when someone specifies the wrong time-to-live in the file headers or when you have a ton of new content. Whatever the reason, your origin is going to get hit hard. An inability to scale to meet demand can have serious repercussions on performance.
- **Geography**—Related to the distance, your origin shouldn't just be in one place because chances are your audience isn't either. By having origin that is geographically distributed and available across different regions of the world, you can significantly minimize the distance to origin issues.

But placement isn't the only consideration. You also need to think about which origin storage type is best for your digital experience.

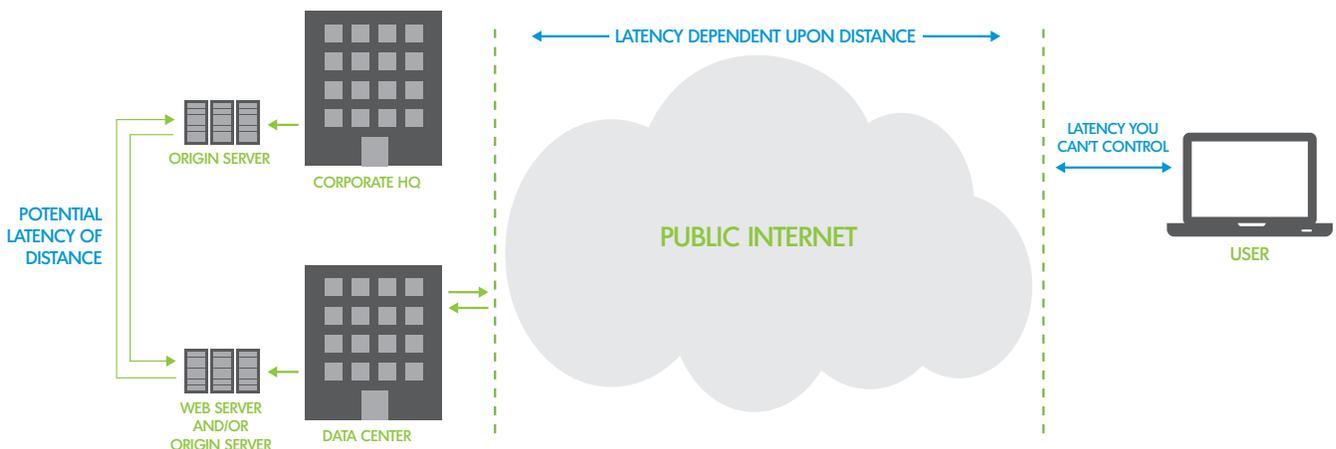
## Storage Options

There are two basic ways that you can store your digital content:

- **On-premise/Datacenter**
- **Cloud**

## On-premise/Datacenter Storage

In this kind of storage, your gear is located in one of your office buildings, or at some datacenter. You own the hard drives, the bandwidth, and everything in between. When this kind of storage overheats because your website was just mentioned by Oprah, you are down and out. It might take Joe a while to peel himself away from the donuts in the break room to go and fix it.



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## Case Study: AnyClip Media

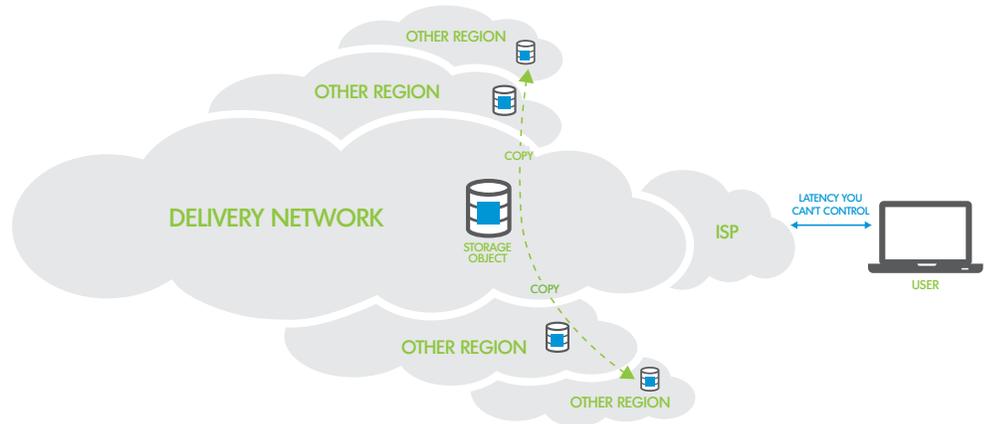
AnyClip Media is one of the top traffic networks globally. The company is responsible for almost 2% of the world's video ad inventory and streams up to two billion minutes of video a month, globally. Along with Google, Facebook and Yahoo, AnyClip has been ranked in comScore's prestigious top 10 Video Content Properties.

Whenever a major new film is released and the need to stream promotional material spikes, AnyClip needs assurance that anyone, anywhere, can access the content at the highest quality.

AnyClip relies on Limelight's high performance cloud storage solution to place video files as close to their audiences as possible. By automatically uploading, transforming, and replicating files across the Orchestrate Storage platform, Anyclip can ensure an excellent experience for viewers and monetize content on a global scale.

## The Next Generation of Cloud Storage—Combining Delivery and Storage in the Same Network

If selecting cloud storage can squeeze some latency out, then in order to remove the last bit the storage cloud needs to be combined with the delivery network.



In this next generation of cloud storage, the public Internet has been removed from the equation completely. Requests come into the delivery network and never have to leave. This kind of storage takes the best of a distributed, scalable cloud storage infrastructure and puts it where it's most needed—at the edge—so that when users request digital content, it's not even a hop, skip, and a jump to fetch it.

## Limelight Orchestrate Cloud Storage—Purpose-Built Cloud Origin for Digital Content

Limelight Orchestrate Cloud Storage is the next generation of storage for your origin content. By combining intelligent and flexible cloud storage with the delivery network, you gain significant performance improvements (by storing objects closer to the end user) as well as realize the inherent benefits of cloud storage (no more hardware to manage).

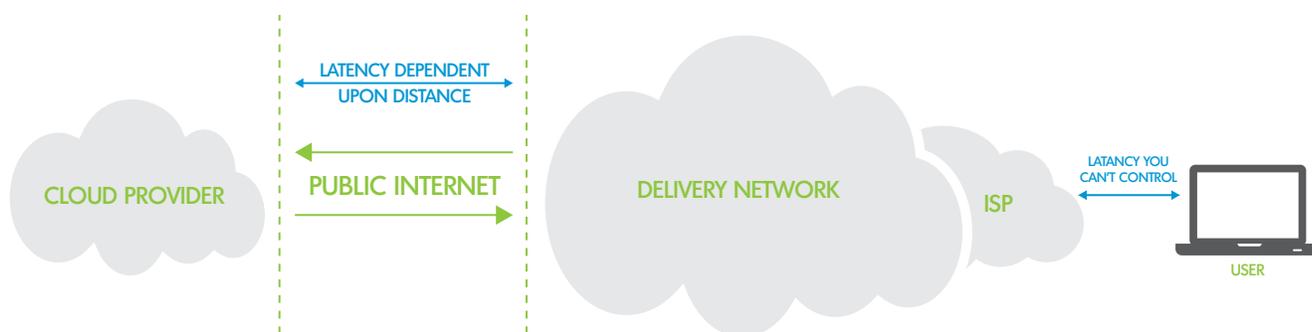
Our edge-based cloud storage provides the robust, scalable flexibility of cloud storage with the proven delivery capabilities of a world class CDN. But Orchestrate Cloud Storage is more than just your run-of-the-mill storage. It includes powerful features and capabilities that you won't get from other cloud storage providers.

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Traditional on-premise or data center storage has the most potential latency. First, each request has to traverse the public Internet. Second, the origin content is stored on a physical machine that may or may not be optimized for first byte retrieval. Third, there are some ongoing, recurring costs associated with physical hardware—new servers, firmware upgrades, OS upgrades, etc. that have to be carried out over time as the technology changes and storage grows.

## Cloud Storage

No more boxes (no more Joe). All of your assets are now distributed in a scalable, highly distributed infrastructure spread out across multiple physical locations. There's little chance that you'll ever "go down" except when a meteor strike starts worldwide Armageddon. And then, no one is probably looking at your website anyway.



But even the cloud suffers. In this type of storage, requests are still traversing the public Internet.

## The Benefits of the Cloud

Is the cloud a better storage solution? In many ways, it offers clear and distinct benefits to on-premise or datacenter-based storage:

- **No more hardware to manage**—Let's face it, one of the hardest tasks to do in optimizing storage is tuning the hardware. There are simply too many variables. And not only that, you need specialized resources that understand how to make operating system and hardware adjustments to maximize first byte delivery.
- **Higher availability**—Cloud storage providers usually stretch their offering over broad geographic regions, replicating your content within multiple "nodes" within the region. This can help mitigate the distance-to-origin latency.
- **Accessibility**—Unlike dedicated storage that must be physically connected to a network in order to gain access, the cloud is available from anywhere.

The cloud, by nature of removing dedicated hardware from the picture, should reduce latency. But does it, really? The issue that normal, run-of-the-mill cloud storage faces is exactly the same as its fixed-storage brethren—the public Internet. Regardless of whether the storage is located in a single location, multiple datacenters, or put into the cloud, a user request must still traverse the public Internet to fetch needed content. So although cloud storage can help mitigate some of the latency, there doesn't seem to be a way around the latency associated with the public Internet. Or is there?

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## The Hidden Costs of Cloud Storage

Of course, a delivery network like the Limelight CDN can work with any cloud storage provider. But there are some critical differences between Limelight Orchestrate Cloud Storage and other cloud storage providers:

- **Usage fees**—unlike other providers, Limelight does not charge for GETs, PUTs, DELETES, and data transfer. When you have a significantly large library on another cloud provider that you are using for origin (so a lot of data transactions each month), those extra fees can really add up.
- **Integrated delivery network**—When you are using Limelight Orchestrate Cloud Storage, there's no need to get a thirdparty CDN. Delivery is built right into the product as Orchestrate Cloud Storage is combined with the same software and hardware used for content delivery in the Limelight CDN.
- **Replication**—with many cloud storage providers, replication only happens within region. But what if you need another region? Well then you are doubling, tripling, or quadrupling your storage costs including paying incremental "replication" fees to copy the data from one region to another.

Limelight Orchestrate Cloud Storage is purpose-built for your digital content. That's why it doesn't include many of the fees that other providers charge.

## Intelligent Cloud Storage

At the heart of the Orchestrate Cloud storage is a powerful policy engine. This engine enables you to create business rules for how your content is treated. For example, how content is automatically replicated upon ingest. You can specify files to be replicated only in specific geographic regions or around the world; or, you can have certain files stored in certain directories based upon their file extension.

## Global Distribution

Orchestrate Cloud Storage is integrated right into the edge of the network, which means that each delivery location has the potential to store your content library. With Limelight, that is over 80 delivery locations in 35+ metro areas around the globe. Based on your traffic patterns (i.e., you are getting a lot of traffic from specific regions), you can modify your policies to replicate your content accordingly and ensure that it's as close to your audience as possible.

## Faster Storage is Better Storage

Remember that choosing the right kind of storage is all about improving the performance of delivering your digital experiences. In today's high-paced digital world, having the content stored under your desk (or even in your own hardware within a datacenter) is not going to provide you the best possible performance... or mitigate that latency! Because Orchestrate Cloud Storage is baked into the edge of the network, when there is a cache-miss, the content can be retrieved locally rather than traversing long distances back to origin (or even deeper within the network). This can greatly improve the overall performance of delivering your digital experiences...all by changing where you store your content.

## Scale on Demand

Like other cloud storage solutions, Orchestrate Cloud Storage is intended to scale when needed. With over 38 Petabytes of storage capacity, you can rest assured that when your library grows, Orchestrate Cloud Storage can accommodate it.

## Multiple Ingestion Methods

Orchestrate Cloud Storage is designed to facilitate a wide-variety of workflows. To accommodate the many ways that organizations may want to engage with this specialized cloud storage infrastructure, we have implemented a variety of ingestion methods including:

- MRSS (Media RSS)
- Aspera
- FTP
- Browser-based UI with drag-and-drop functionality
- Restful API

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## Migrating from Amazon S3 or Other Cloud Storage Providers

Need to migrate your files from an existing cloud storage provider? Simple! Just provide public URLs to the files you want to move to the Orchestrate Cloud Storage API and...voila! Orchestrate Cloud Storage does all the rest. You can even build a simple program to carry this out and automate the entire task of migration.

## Case Study—Leading Global Game Developer

Founded in 2009, our customer—a global developer of digital games—is dedicated to creating the best mobile and social experience for hardcore gamers worldwide. With over 90 million registered users, it is consistently ranked among Facebook's top 10 hardcore game developers. Its hardcore social games are available on all major social networks as well as web browsers and iOS. The company's hardcore gamers constantly challenge the company to make its games better in ways that it never envisioned—the users have built global communities, forged new friendships, and done more than just "play" its games... they've brought them to life.

The company's growth is centered on expanding its gamer population globally. In addition, while most of its current players are hardcore gamers on social platforms, a key dimension to its strategy is to offer its games on any platform its gamers want to play, whether it is the web, social or mobile.

This gaming company wanted to address the issue of having their content in the right location for global access, and they didn't want to worry about uploading content and then manually ensuring it was in the right location. The criteria for choosing the right solution focused on finding the fastest and most reliable technology from a vendor with the best technical service. In addition, planning for expansion for support of multiple platforms was in their long-term plans.

"Limelight makes my world much easier," says the Head of IT. "That's been true from the very beginning, as migrating to Limelight was a no-brainer. We fed our URL's and files into the Orchestrate platform, performed some testing and we were done. Overall, I don't want to worry about uploading content and making sure it gets delivered to all regions of the world. I just upload our content into one place in the cloud and that's it. It's there and our gamers get it with the performance that they expect."

The result? Orchestrate Cloud Storage helped to decrease load time by over 200 percent!

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## Conclusion

Where you store your digital content does matter. The choice you make on the kind of storage and where it can place your content has a direct impact on the performance of your digital experiences. With the next generation of cloud storage—combined with a delivery network—you can squeeze that last bit of latency from the equation.

Don't let your digital experiences be undermined by poorly-performing storage. Get your digital assets into a high-performing, flexible, intelligent edge-storage solution like Limelight Orchestrate Cloud Storage!

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