As businesses continue to expand their global online reach, user experience is one of the most important factors for building audience satisfaction and driving revenue. Whether you are delivering video, web content, music, software, music, games or APIs, ensuring engaging online experiences on an increasing variety of devices around the world is a huge challenge.

Organizations may use a variety of methods for improving online user experiences, one of which is leveraging a content delivery network (CDN). But not all CDNs deliver the same level of service. This guide will provide some tips on how to determine what is most important to your organization and how to choose a CDN that meets your needs.
DO CONSIDER KEY ASPECTS OF CONTENT DELIVERY

Depending on the use case, there are a variety of aspects of content delivery that can affect the user experience. Across multiple use cases, here are some common factors to consider:

- Latency
- Throughput
- Availability
- Global scale
- Security
- Actionable analytics

Any organization evaluating CDN providers should look at the key aspects that are meaningful for their business. For this general paper, let’s look at some common factors.

LATENCY
User expectations for fast online experiences are higher than ever. When visitors request an online asset, they expect instant response and have no patience for delays. Slow performance disappoints visitors and can lead to high abandon rates, customer churn and lost business. Nearly half of people are not willing to wait more than 5 seconds for a web page to load before leaving the site, and more than 43 percent of people will leave a website and purchase a product elsewhere if they feel the site is too slow. To reduce latency, CDNs cache popular content in multiple Points of Presence (PoPs) close to site visitors so the user’s request can be retrieved from local cache and served rapidly. However, content that is not found in local cache must be found in other cache sites or in origin storage and then retrieved across the network. There are many variables that determine response time for any given request, including whether the requested object is found in cache, connectivity between PoPs and origin storage if the object is not in cache, and last-mile peering. Many CDNs have insufficient cache capacity, rely on the congested internet for retrieval, and have too many hops for handoff to the last-mile provider. All these components can contribute to high latency. Ask CDN providers how they minimize end-to-end latency.

THROUGHPUT
For applications like large file downloads, the effective throughput — the rate of successful delivery in Mbps — has a major impact on user experience. The theoretical maximum throughput is dictated by the slowest link in the path. But in practice, effective throughput is impacted by network conditions, hardware design and traffic management systems. Different CDNs may approach these issues differently, and a private network has more flexibility than a network that relies on the public internet. Ask CDN providers how they ensure high throughput.

AVAILABILITY
You can have the fastest site in your industry, but if it’s not consistently fast and available to your global users, your business will be negatively impacted. You need assurances that your content will always be available to customers everywhere. Ask the CDN providers you are considering about content redundancy, connection redundancy, proactive monitoring and other features that will protect you against unexpected—and costly—downtime.
GLOBAL SCALE
Users located across the globe want their online experiences to feel local, even when dealing with international brands. Most CDNs rely on the public internet to move content between locations and are at the mercy of internet congestion. Look for a CDN with a global QoS-enabled private backbone, modern high-capacity PoPs in population centers around the world, and peering agreements with all the major ISPs. Such an architecture provides high performance to a large global audience by combining fast transit between PoPs, caching of your content close to users around the world, and fast handoff for last-mile delivery.

SECURITY
You can’t afford to have your website go down because of a Distributed Denial of Service (DDoS) attack. And you can’t afford to have your digital content stolen or sensitive customer data accessed by unauthorized users. Security issues like these can impact the availability of your website and cost you money. To address today’s security challenges, you need cloud security services that provide a layered defense against malicious website attacks and unauthorized content access without impacting the performance of your web applications and content delivery. To quickly mitigate large volumetric DDoS attacks, you need fast detection and high-capacity on-network scrubbing that ensures uptime without impacting site performance.

In addition, Web Application Firewall (WAF) and Bot Management capabilities integrated into the CDN help protect data from malicious hacking. The right global full-service CDN helps you keep abreast of the latest threats and preventive mitigation measures without adding latency to the delivery experience.

ACTIONABLE ANALYTICS
If you have a system for improving performance but can’t measure the impact, it is not very useful. Detailed and actionable analytics should include traffic patterns to reveal trends, insight into user behavior as well as service delivery and systems, geo-reporting to drill into granular data, storage reporting, and content utilization data so you know what is being viewed, how often and where. Real-time analytics can be invaluable when time is of the essence. The ability to create custom queries can help you manage your unique environment. And analytics should be accessible the way you need them, whether by logging into a web portal or accessing them via an API.

DON’T JUDGE PERFORMANCE ON SPEED ALONE
Complaints related to online user experience are often a primary driver for evaluating content delivery solutions. Speed of delivery is an important factor—maybe the most important and visible one. Depending on the type of content, speed can manifest as video start time, web page load time, file download time, and responsiveness to interaction. But speed is just one factor of the performance puzzle, especially when you’re delivering different kinds of content (dynamic and static) across different geolocations.

To improve online user experience, organizations should be looking at additional contributing elements. In the case of video, rebuffering is the primary frustration with viewing online video — 66% of viewers will abandon a video that rebuffers twice. In terms of website performance, page load speed is the primary factor that users notice. Even when the web team optimizes the site for speed, other factors can disrupt performance and leave users frustrated that they must wait for content to appear or to add items to a shopping cart. And when downloading files, metrics like start time are less important than throughput.

Content delivery providers understand that speed will always remain paramount. But top-performing CDNs also optimize for other key performance metrics that affect how users interact with content when it is delivered, no matter where those users are located or what devices they are using.
DON’T BASE SPEED STATISTICS ON AVERAGES ALONE

Many organizations judge CDN performance based on average speed statistics. But averages don’t really give a complete picture of performance and could miss potential business losses that could occur in specific geographic regions. For instance, an organization could see that a page has an average load time of three seconds and be satisfied. However, the web team may be missing the fact that in the U.S. the load time is two seconds, while outside the U.S. it is five seconds.

Limelight recommends diving deeper into CDN provider statistics to fully understand capabilities for measuring content delivery performance. Furthermore, real user measurement (RUM) techniques should be used in conjunction with standard measurements to get more specific user metrics. This not only helps with improving performance, but also makes sure the overall performance of the site is positive for every visitor.

DON’T FORGET TO DO A CONTENT AUDIT

Potential CDN customers should do an audit of their websites to understand the mix of dynamic or personalized content and static content that drives the user experience. Dynamically generated content is tailored to specific users, while static content does not change across users and can be cached.

Most websites are a mix of static and dynamic content and of small objects and large objects such as video files. A content audit can provide you with insight into what bottlenecks may be standing in the way of meeting your performance objectives. For instance, an audit of your mobile site could reveal multiple dynamic thumbnails that are being refreshed on every request. The resulting round trips back to origin could cause server overload and delayed delivery. This problem would require a very different solution than on-demand video files would require, for example.

DO LOOK FOR INTELLIGENT CONTENT CACHING AND RETRIEVAL

Quickly locating and retrieving content is one of the most important operations for CDNs. Basic CDN practices involve caching popular content in multiple locations at the edges of the network to serve it more quickly. However, less-popular assets that are not found in cache must be retrieved from cache hierarchy or origin.

There are multiple factors that affect performance when retrieving content that is not cached in the PoP closest to the users. Intelligent caching software and hierarchical caching techniques like origin shield can be used to access content from other cache locations in the network without having to go back to origin storage. This improves performance while reducing calls to origin and the associated storage egress costs.
DO CONSIDER YOUR ORIGIN STORAGE

Although often overlooked in the user experience conversation, choices about origin storage have a direct impact on your workflow, total cost, and access speed. Poorly-integrated storage can make it more difficult to manage a large content library. Access costs can potentially exceed storage costs. And access speed can suffer from inefficient storage placement and slow transfer.

Origin storage designed for content delivery can simplify the management of your content library and improve user experience. Storage automation and intelligent services can save you time while increasing control over your content, including where and how it is ingested, stored, replicated, and delivered. For faster retrieval, look for storage that offers automatic multi-region replication with the ability to automatically serve content from the fastest site. Make sure to ask the CDN providers under consideration about their end-to-end storage management and retrieval capabilities.

DO CONSIDER A CDN WITH A PRIVATE NETWORK

Most CDNs today depend on public internet connections to transfer content, which can affect performance when inevitable congestion occurs. Caching popular content at the edges is a partial solution, but any content that isn’t cached is at risk. Unpredictable performance, latency and packet loss are inherent in the best-effort service provided by the public internet.

For superior reliability, look for a CDN with a QoS-enabled private backbone to ensure secure, high-performance transfer of your content on cache miss.

DO LOOK BEHIND THE NETWORK

Technology factors in content delivery are important, but they’re only part of an integrated solution. The company behind the network can be just as important in ensuring positive end-user experiences. Does the company have the expertise to help you solve integration challenges? If there are delivery issues, can you call the experts at no cost 24/7/365? Can they help you improve your end-to-end workflow? Can they help you augment your current staff with professional services?

The right CDN provider should also be a solution partner. Their team should be dedicated to helping you achieve your goals. Ask about their integration expertise and how they can help you solve problems and craft a solution as well as augment your team if needed. A full-service CDN can help you identify ways to improve end-user experience and streamline your operations. Finally, it’s critical to avoid the high costs of downtime with support that’s there when you need it. Free unlimited 24/7/365 expert phone support can significantly reduce your downtime compared to email-only support with slow response time.
WHY CONSIDER LIMELIGHT CONTENT DELIVERY SERVICES

Limelight is a solution partner that goes far beyond the basic CDN approach of positioning content in edge caches. Limelight owns and operates one of the world’s largest private networks featuring a global private fiber backbone, more than 80 advanced PoPs in 40+ metropolitan locations around the world, and connections to more than 900 ISPs and last-mile providers. With our own application stack, private network and global peering connections, Limelight can optimize the first, middle and last mile and bypass the congested public internet, resulting in faster, more reliable, and more secure content delivery.

Limelight delivers one of the highest cache hit ratios in the industry, ensuring fast delivery of your content and lower egress costs from storage. Unlike traditional CDN vendors that rely on third-party technologies for key components of their content delivery infrastructure, Limelight’s ongoing investment in the development and optimization of every component of its CDN provides industry-leading performance, even over congested or changing network conditions. Limelight also ensures the lowest possible video rebuffer rates by constantly monitoring viewers’ available bandwidth and network conditions to optimize video delivery based on real-time analysis.

Limelight Origin Storage is tightly integrated with the CDN and offers multi-region replication with the ability to automatically serve content from the fastest site. Limelight delivers up to 200% faster storage performance than traditional cloud storage.

Limelight’s cloud security services offer a layered defense against malicious website attacks and unauthorized content access without impacting the performance of your web applications and content delivery. DDoS attack protection guards your website against denial of service attacks, while Web Application Firewall (WAF) protection stops attacks intended to compromise your web site and steal data.

Finally, Limelight provides the services to help you succeed. Whether you are responding to changing business requirements, implementing new services, or training and augmenting your staff, Limelight has the experts dedicated to helping you succeed. Limelight provides free unrestricted access to 24/7/365 live technical support, and our award-winning Professional Services team has extensive expertise solving complex integration challenges. Our experts can analyze your existing workflow, help you optimize your configuration and train your team—reducing costs to you and accelerating your time to market. And our Network Operations Center is always there to help ensure efficient operation.

Contact Limelight to learn more about how we can help you solve your content delivery challenges.

ABOUT LIMELIGHT NETWORKS

Limelight Networks Inc., (NASDAQ: LLNW), a leading provider of digital content delivery, video, cloud security, and edge computing services, empowers customers to provide exceptional digital experiences. Limelight’s edge services platform includes a unique combination of global private infrastructure, intelligent software, and expert support services that enable current and future workflows. For more information, visit www.limelight.com, follow us on Twitter, Facebook, and LinkedIn.

2 The State of Online Video 2018, Limelight Networks (https://www.limelight.com/resources/white-paper/state-of-online-video-2018/)