

FROST & SULLIVAN

CLOUDFLARE

2022
TECHNOLOGY
INNOVATION
LEADER

GLOBAL CONTENT DELIVERY
NETWORK INDUSTRY

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Cloudflare excels in many of the criteria in the content delivery network space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Business Impact</i>
Commitment to Innovation	Financial Performance
Commitment to Creativity	Customer Acquisition
Stage Gate Efficiency	Operational Efficiency
Commercialization Success	Growth Potential
Application Diversity	Human Capital

An Evolving Market Demands Innovation

A CDN minimizes the distance between the content and the end user, storing a version of the content closer to the end user in a cache, rather than sending a request to the origin server for each click, page load, or stream. CDN vendors balance capacity (in the network) and cost (of transit, storage, and egress) for an array of customers across use cases (websites, video, or apps). CDN vendors develop their own unique strategies for caching and load balancing dimensions.

Across the board, the CDN market is experiencing downward pressure on prices. Many customers now perceive traditional CDN caching as a simple commodity and expect price declines year over year. Moreover, as many organizations look to tighten their spending, many enterprise customers are approaching CDN providers to extract additional value and renegotiate terms to lower the total cost of ownership. At this point, static content caching has become a commoditized offering, and now vendors must differentiate by innovation to deliver more value.

While the CDN environment began as a way to accelerate the delivery of static content, in the last 10 years vendors have expanded their portfolios with complementary and parallel offerings. More and more, the functional use cases that customers are seeking demand resources and features beyond traditional CDN caching. Vendors are broadening their offerings across dynamic delivery and optimization, edge computing, and security services. For example, the CDN serving as an intermediary between users and the origin server makes it a natural security shield against malicious actors searching for vulnerabilities to

penetrate or degrade enterprise networks, insert malicious code, and divert traffic to their own sites and purposes. Additionally, CDN providers recognized that their distributed networks can serve as computing resources, providing network functions such as data processing “at the edge” to deliver low latency benefits. Integrating the services running on the existing network can enable the CDN vendor to optimize the integration of products and produce additional value for the customer.

The content delivery network market is energetic with vigorous competition amongst top-tier providers and specialized vendors. CDN providers must prepare to cope with the increasing number of devices and users propelling data volumes upward; scalability will be key for coping with the demand for content and performance. Globally, sanctions and self-imposed national firewalls built around some nations’ internets are elements of a long-building trend where the global internet is becoming fragmented. Sanctions on some nations and internal firewalls to prevent access to external content (and to a lesser extent other localized regulations) are making the era of open borders on the internet less viable and accelerating the trend toward data localization. Competition and cooperation are common amongst content delivery network operators, cloud service providers, and network operators in multi-CDN deployments. However, differentiation is key in earning business in meritocratic multi-CDN deployments, and a comprehensive portfolio will enable service providers to meet the rising needs and expectations of customers.

In this intense landscape, Cloudflare is a leader investing in innovation to create products and services that constantly improve network capacity, website, and application performance. The company has dedicated itself to serving as a network for digital transformation. With CDN as one of its foundations, Cloudflare has advanced as a leading developer of innovative products features and value-adding features that support customers of all sizes and industries to serve up exceptional experiences.

A Network Designed for Scale and Ease of Use Delivers Speed and Performance

Cloudflare’s network delivers massive scale and ensures customers find it easy to use, where any user (single blogger or massive company) can make employ of each product. Cloudflare designed its network architecture to ensure that customers can access all the available capacity and experience exemplary resilience. Some providers operate with specific data centers doing different tasks, some as scrubbing centers and some running separate networks for CDN, with the result that any one customer will not actually be able to utilize all of that capacity. By contrast, each Cloudflare data center is architected in the same way and all of them undertake services from border gateway protocol (BGP) Anycast. This means that each data center carries the same IP addresses with routing that resists becoming overwhelmed with traffic, and traffic finds the best path through the best data center. Additionally, each Cloudflare data center runs the exact same servers running the exact same software stack, so that each machine can accomplish all of the functions offered in the company’s portfolio. This structure furnishes customers with full network capacity, and each new machine immediately adds capacity for the entire user set.

Further, Cloudflare owns and operates each rack in every data center, removing dependence on third-party vendors and speeding the pace of innovation. The company offers first access to new products and features to its large population of free users, leveraging this base to work out the kinks before deploying

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out to enterprise customers. The free tier of users (individuals and small-businesses) serves as a crowd-sourced quality assurance team at a massive scale.

The company has become a leading network for supporting digital transformation, with outstanding reach, speed, and performance. The network offers consistent performance for every user, as it is only 50 milliseconds from 95% of the internet and carries 155 terabits of capacity. Further, the network includes more

than 275 cities in more than 100 countries (expanding all the time), and peering connections to more than 11,000 networks globally (such as major internet service

providers, cloud providers, and large enterprises). Expanding the geography and getting as close to customers as possible makes for a fast and reliable network, and mitigates threats closer to the source. Cloudflare demonstrated its resilience in coping with the massive spike in requests at the onset of the pandemic and sustaining service as that growth became the new normal.

A Massive Global Network



Source: Cloudflare

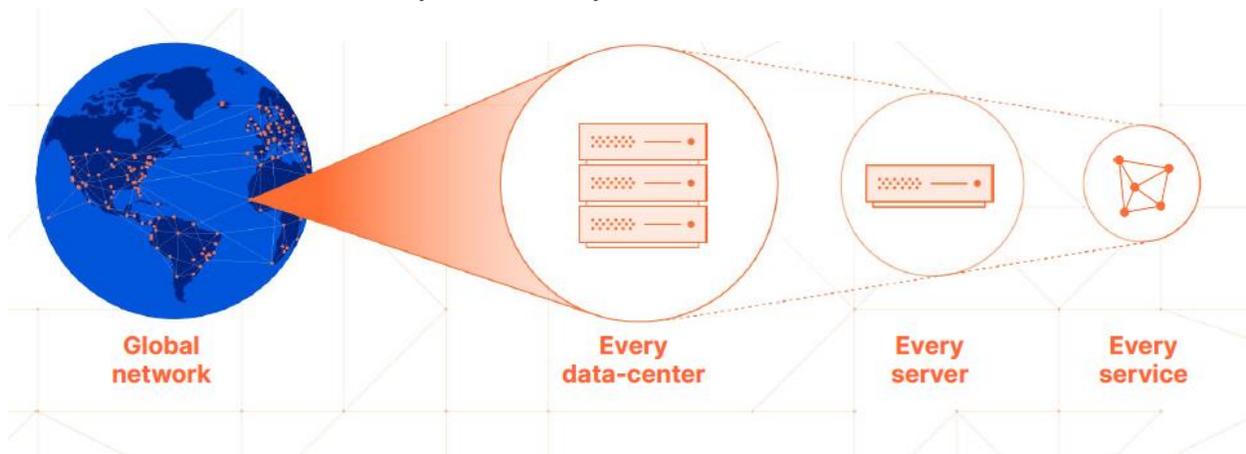
Dynamic Delivery Differentiates

While static content delivery is effectively commoditized, the more complex and increasingly important function for CDN providers is dynamic content delivery. Cloudflare demonstrates its position as an innovator in the space with its collection of dynamic content delivery and application services. First, *Argo Smart Routing* addresses the needs of dynamic traffic, approximately 50% of the traffic on the network. This kind of traffic (such as application program interface traffic), cannot be cached and represents a massive amount of requests and can result in significant congestion. Leveraging the visibility across the network to see real-time internet traffic, Cloudflare developed the *Argo Smart Routing* tool, which reduces average dynamic traffic latency (as measured by time to first byte) by a reported 30%. *Argo Smart Routing* detects where the congestion is building and directs traffic to the most reliable network paths, ensuring greater speed and reliability and including the integrated security of Cloudflare.

Further, 2021 saw the release of the *Early Hints* service which allows a web server to propose hints to the browser to begin pre-loading a page while the server is compiling the response. With the aim to intelligently improve page loads, *Early Hints* preloads a likely resource and speeds up website performance on time to first paint (a metric of when the first pixel is painted onto the screen), achieving a reported 30% increase in page load time. *Early Hints* exemplifies Cloudflare’s dedication to innovation and partnership, a major ecommerce company approached Cloudflare to help improve their platform’s performance. Cloudflare worked with the company and a major browser provider to create and launch the solution in only a few months, and now it benefits the entire landscape. Building on this innovation, Cloudflare will launch *Smart Early Hints* in 2022, facilitating faster page loads without the need for any configuration on the origin server. Working on the edge, *Smart Early Hints* grants all the benefits of *Early Hints* with only a single click on the Cloudflare dashboard.

Moreover, 2021 also witnessed the release of Cloudflare’s *Crawler Hints*—a feature targeted to search engine crawlers to ensure they receive high-quality and up-to-date data. *Crawler Hints* help the crawler to intelligently time its crawl to surface new results when content has changed on a site using Cloudflare.

Every Service, Everywhere is a Powerful Tool



Source: Cloudflare

The feature minimizes wasteful crawls and resource consumption on the origin server, the crawler infrastructure, and the Cloudflare infrastructure. Rather than waiting for a search engine to update its summary of a page, Crawler Hints speeds the process to serve the most up-to-date information benefiting providers by minimizing resource consumption and driving search engine optimization and furnishing users with the best, freshest experience.

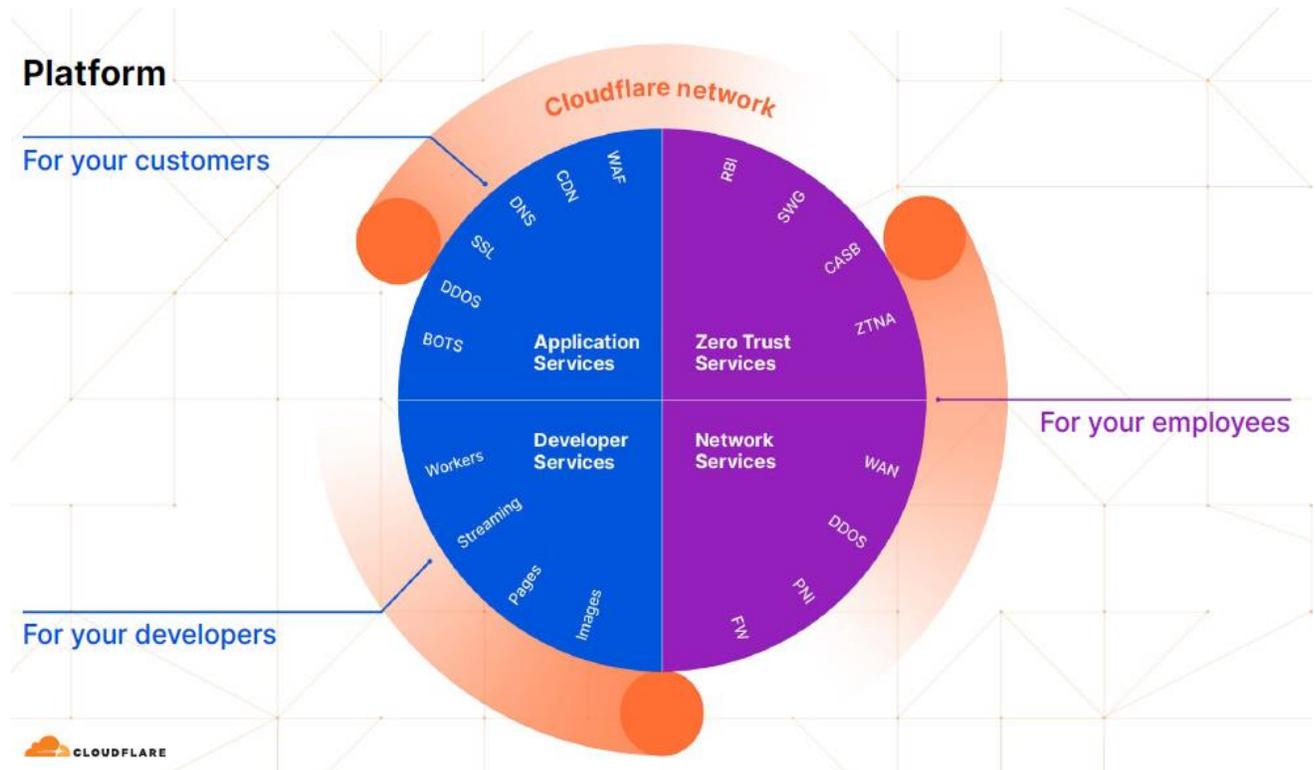
Integrated Platform and Range of Products

While most service providers in the CDN space have grown by acquisitions and by bolting on the other company's services, Cloudflare's platform is fully integrated, with each product built to function alongside every other product in the portfolio. For one of the largest CDN use cases, video, Cloudflare maintains a range of security and performance solutions that support an excellent end-user experience. The *Stream* product is an all-in-one package for media streaming. Stream is a video on-demand and live streaming platform that helps users build video applications, taking care of the encoding, storage, and delivery to a variety of device formats and network connections. The *Stream Delivery* product is geared toward users looking to cache and deliver video through the Cloudflare global network at a flat-rate price. Cloudflare's broader portfolio of performance and security services is designed to work optimally with the video service to safeguard uptime and delivery reliability. Moreover, as traffic on the internet is growing by leaps and bounds with massive increases in the number of devices and bandwidth-intensive applications, Cloudflare is positioned to cope with the future. The company's teams handling video delivery are especially focused on building out the features and products that will enable metaverse applications, to support on-demand and live video streaming over the network that provides for real-time interactivity and immersive experiences.

More broadly, Cloudflare's integrated platform means that a single vendor can serve a variety of needs, adding value for customers looking to simplify their deployments and tighten spending. In the current atmosphere rife with recession worries, many companies are slashing budgets or shrinking their footprints. In this environment, Cloudflare serves as a consolidated service provider, furnishing a range of services for customers beyond CDN but including security services such as web application firewall and distributed denial of service mitigation, zero trust services to continuously authenticate and verify users and devices, as well as email routing, Web3.0 decentralized applications, and serverless computing functions.

This broad-based perspective allows Cloudflare to grant cost and performance benefits to customers. By flowing all their traffic through the same Cloudflare datacenter architecture, customers can optimize application performance by avoiding the added steps of hopping from one cloud provider to another. Moreover, as a single provider, Cloudflare can help drive digital transformation and reduce the total cost of ownership across the entire portfolio. The company is seeing steady growth in its core segment of small users as well as significant increases in the larger enterprise segment (reportedly even outpacing the size of the pay-as-you-go business used by individuals and small enterprises). Indeed, with high retention rates, the Cloudflare enterprise business is serving approximately 29% of the Fortune 1000 and 13 of the Top 20 (across a range of industries from telecommunications to pharmaceuticals, consumer products, financial services, and crypto exchanges).

Fully Integrated Platform Built as a Cohesive Whole



Source: Cloudflare

Forward-looking at Every Level

Cloudflare’s strategic priority is to improve network performance as well as add value across the technology stack. For example, as regulations increasingly require restrictions on data flow, Cloudflare is supporting the need for data localization. The *Data Localization Suite* allows the customer to pick exactly where traffic is serviced and decrypted, and where the logs and data actually go, to satisfy compliance or privacy requirements. With the performance and security features of the Cloudflare network built in, the *Data Localization Suite* helps organizations to set rules and to control, at the edge, where data is stored and protected. Organizations can catalog data for their customers, leveraging the global network or utilizing the specific data localization potential. Moreover, Cloudflare has become a major CDN provider in mainland China. Partnering with local powerhouse JD Cloud, Cloudflare is providing service through 36 points of presence inside mainland China.

Further, Cloudflare is also staking out a strong position to help hold down costs for customer organizations. Looking to support development at the edge, Cloudflare *Workers* offers a serverless platform to build or improve applications without the need for the customer to configure or maintain infrastructure. *Workers* offers developers a production-ready platform to write and deploy apps quickly. The *Workers* platform is built on an efficient architecture and does not include hidden fees to keep containers warm and ready to run functions. The recently released R2 solution for object storage carries

“Cloudflare’s engineering teams are constantly challenging themselves at each level, to speed network performance as well as to create future-facing developments that add value across the technology stack and network performance.”

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zero egress fees, granting the ability to store masses of data at the Cloudflare edge. The R2 solution (backward compatible with the S3 storage product) supports applications with predictable fees. In a recent release, the D1 SQL is the first database from Cloudflare and allows developers to query a full database to build full-stack applications.

Finally, Cloudflare is driving improvement and implementing technologies (such as HTTP/3 standards, Web 3.0 distributed infrastructure, and beta testing a persistent data store feature called Cache Reserve that can drive up cache ratio close to 100%) throughout its network to improve the Internet.

Conclusion

The marketplace of content delivery networks is fast changing, with network performance as the foundation, but providers have also dealt with the commoditization of static delivery services by expanding the range of capabilities and complementary services. Focusing on forward-looking perspective, Cloudflare drives the pace of innovation and pushes the boundaries of performance to create exceptional value for all types of customers. Cloudflare is growing rapidly in this space, building on its exemplary network on a uniform architecture for scale and ease of use. In addition to network speed, Cloudflare is a leader in creating innovative solutions and features that optimize dynamic delivery. With a broad portfolio developed as a cohesive and integrated platform, the company builds each product to work hand in glove with every other offering.

With its commitment to innovation and strong performance, Cloudflare earns Frost & Sullivan’s 2022 Global Technology Innovation Leadership Award in the content delivery network space.

What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at <http://www.frost.com>.

The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fueled by the Innovation Generator™.

[Learn more.](#)

Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

