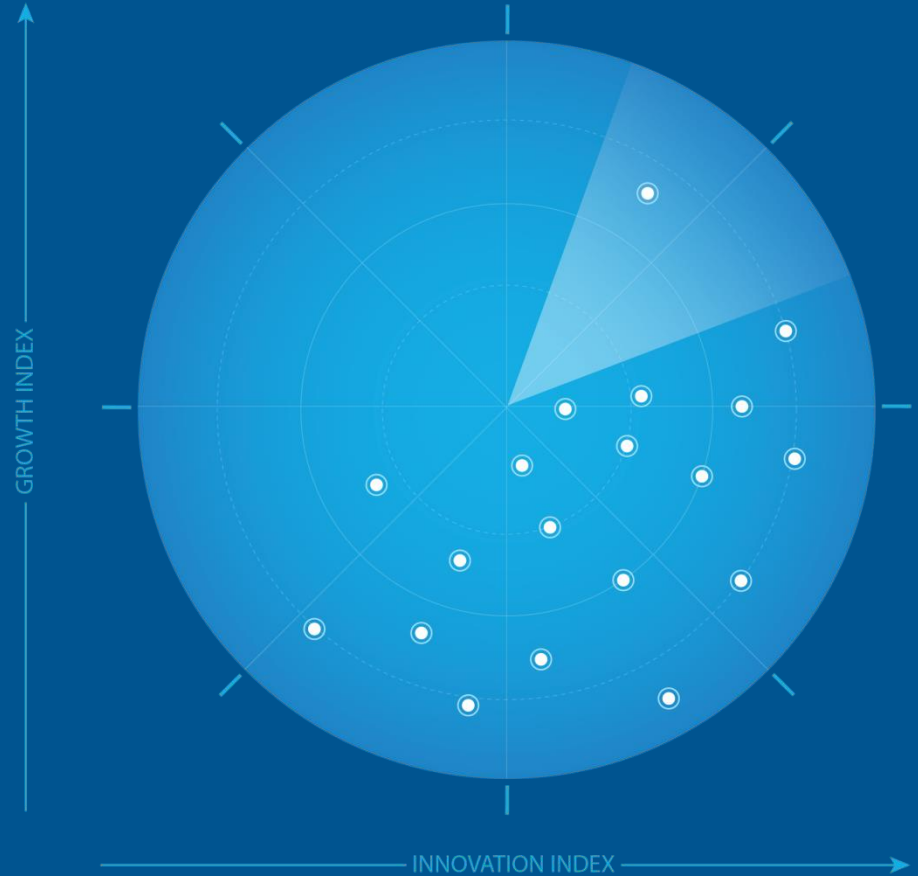


Frost Radar™: Global Content Delivery Network, 2023

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A Benchmarking System
to Spark Companies to
Action - Innovation That
Fuels New Deal Flow and
Growth Pipelines



Strategic Imperative

- Content delivery networks (CDNs) function as the lifeblood for services running webpages, data-heavy applications, and video. CDNs are coping with Transformative Mega Trends in consumer behaviors (such as identity broadcasting) and advanced computing.
- Consumers expect their videos, apps, and webpages to load fast and without issue, and any business with an online presence must recognize that user satisfaction connects with load time. Search rankings, sales conversations, and time spent on a website or in an app depend on load times.
- From massive sports streaming events to big video game download events to the rapidly increasing number of devices and users propelling data volumes upward, CDNs ensure the content flows at scale. Users demand near real-time latency for these big throughput events.
- Reliable and efficient data flow is essential for the products, solutions, and services consumers use daily. Centrally hosted data is becoming less efficient for many applications whereas distributed architectures are proving more effective.

Strategic Imperative (continued)

- In today's digital ecosystem, brands, content owners, and service providers understand that consumers will readily switch browsers, retailers, or channels if they experience network delays or slow performance. Ensuring speedy content delivery and fast functionality will become increasingly important to maintaining high conversion rates and reducing customer churn. This trend is propelling Competitive Intensity in the CDN market.
- To meet the demand for quick and seamless content delivery, network providers are continuously innovating and investing in new technologies to improve the speed, reliability, and scalability of their networks. They are also exploring new models, such as edge computing, that allow them to deliver content and services closer to the end users, which reduces latency and improves performance.
- Across the board, the digital ecosystem is becoming increasingly reliant on fast and reliable network connectivity, and service providers are investing in new technologies and architectures to meet the demands of consumers and businesses alike.

Strategic Imperative (continued)

- These trends are driving Industry Convergence, pushing together previously disparate segments such as content delivery, cloud providers, and telecommunications providers, into competition and cooperation to bring content to users.
- Overall, the CDN market is constantly evolving, with vendors seeking new ways to differentiate themselves and provide more value to customers. The shift toward edge computing and the use of emerging technologies are just two examples of the trends that are shaping the market and driving innovation.

Growth Environment

- Frost & Sullivan finds that the global CDN market reached \$14.68 billion in 2022. During the next seven years, Frost & Sullivan expects the market will grow at a 12.41% compound annual growth rate (CAGR) and hit \$33.30 billion in 2029. During that period, the content delivery segment will see a 4.58% growth rate, the edge compute segment will notch 30.99% growth, and the security segment will experience 15.71% growth.
 - The CDN market is feeling the bite of steady and unrelenting price erosion in the core delivery function.
 - This means that CDN providers would need to deliver greater and greater traffic to simply maintain revenues.
 - While delivery traffic is trending up, the CDN market has recognized the trend toward commoditization. In turn, providers seek to deliver greater value with integrated security services and by using their distributed networks as an edge platform.
 - CDN providers are no longer single-service vendors; they are evolving into multifaceted hybrid businesses serving a variety of industries and uses with a consolidated edge platform.
 - CDNs are building or acquiring edge, security, and programmable edge services to flesh out an integrated and cohesive offering.

Growth Environment (continued)

Macro Trends

- What a few years ago was a novelty—supporting edge workflows and serverless computing—has become the fashion for any company that hopes to have a large presence.
- Edge functions open a range of new options for customers, and CDN providers can continue to add value with new functions and tools. The most innovative CDN providers are developing supporting products (developer tools, dynamic routing, storage accelerators) to unlock further value with the dynamic power of edge computing, furnishing a new level of abilities at greater proximity to the end users.
- Despite fears of recession, companies are still in the midst of upgrading or embarking on digital transformation, so they will need support for their product and bandwidth growth initiatives.

Growth Environment (continued)

Blending Domains

- Both competition and cooperation are common among CDN operators, cloud service providers, and network operators as the landscape increasingly includes customers assembling multi-CDN deployments.
- CDN providers see opportunities in edge computing, increasingly mingling in a space where the big cloud providers (hyper-scalers) are moving and competing for a fast-growing total addressable market.
- CDN providers can demonstrate that reach (hundreds or thousands of locations across the globe) and distribution (relationships with internet service providers [ISPs]) accelerate content at the extreme network edge and deliver better experiences for end users and customer organizations alike.

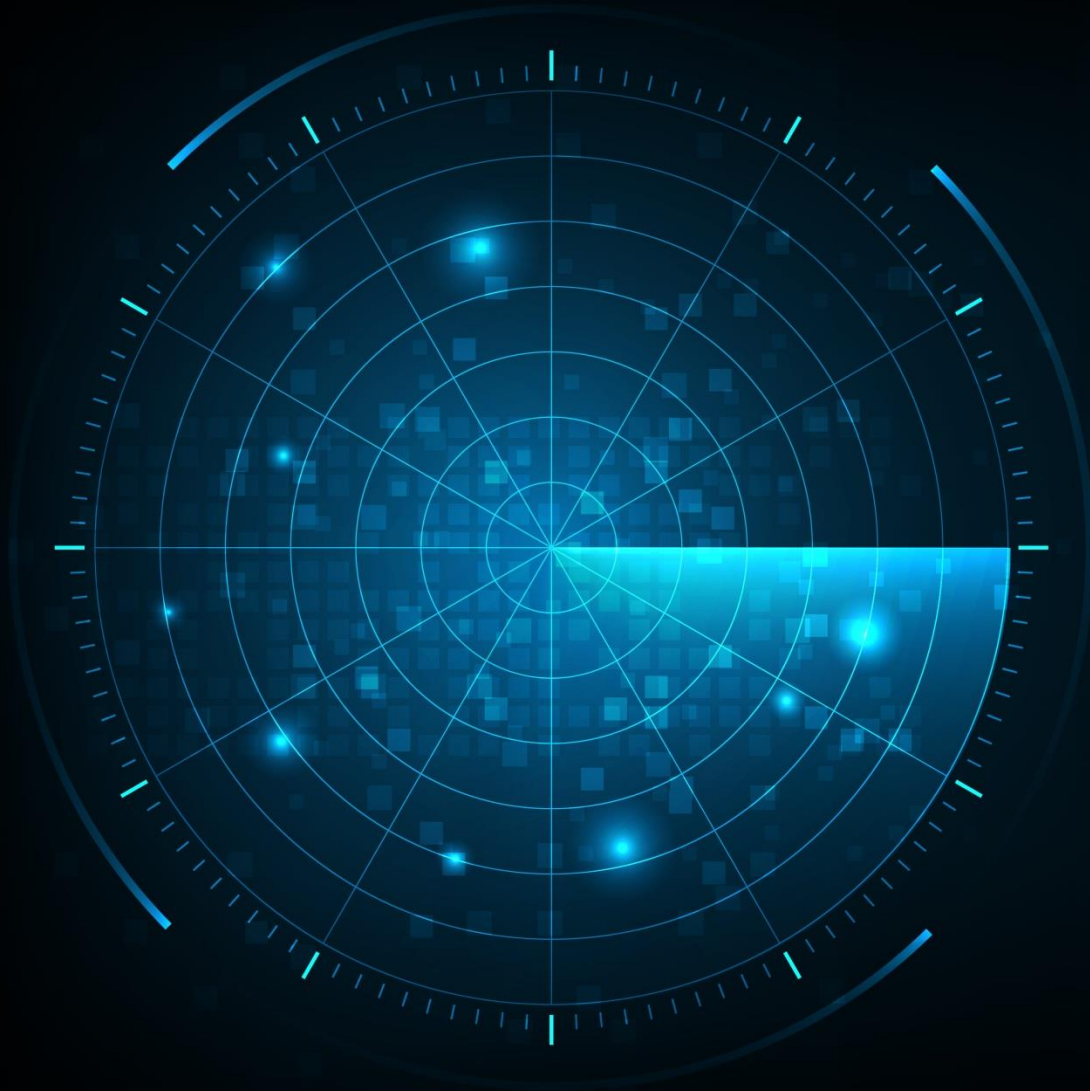
Growth Environment (continued)

Video Persists

- While CDNs are expanding their capabilities to include edge and security, video consumption is still by far the largest chunk of their business and will continue that way for some time.
- Over-the-top (OTT) video developing in untapped geographies will drive this consumption trend, as the transition from traditional broadcast to IP distribution over the internet proceeds worldwide, and as more and more screens populate developed markets.

Frost & Sullivan studies related to this independent analysis:

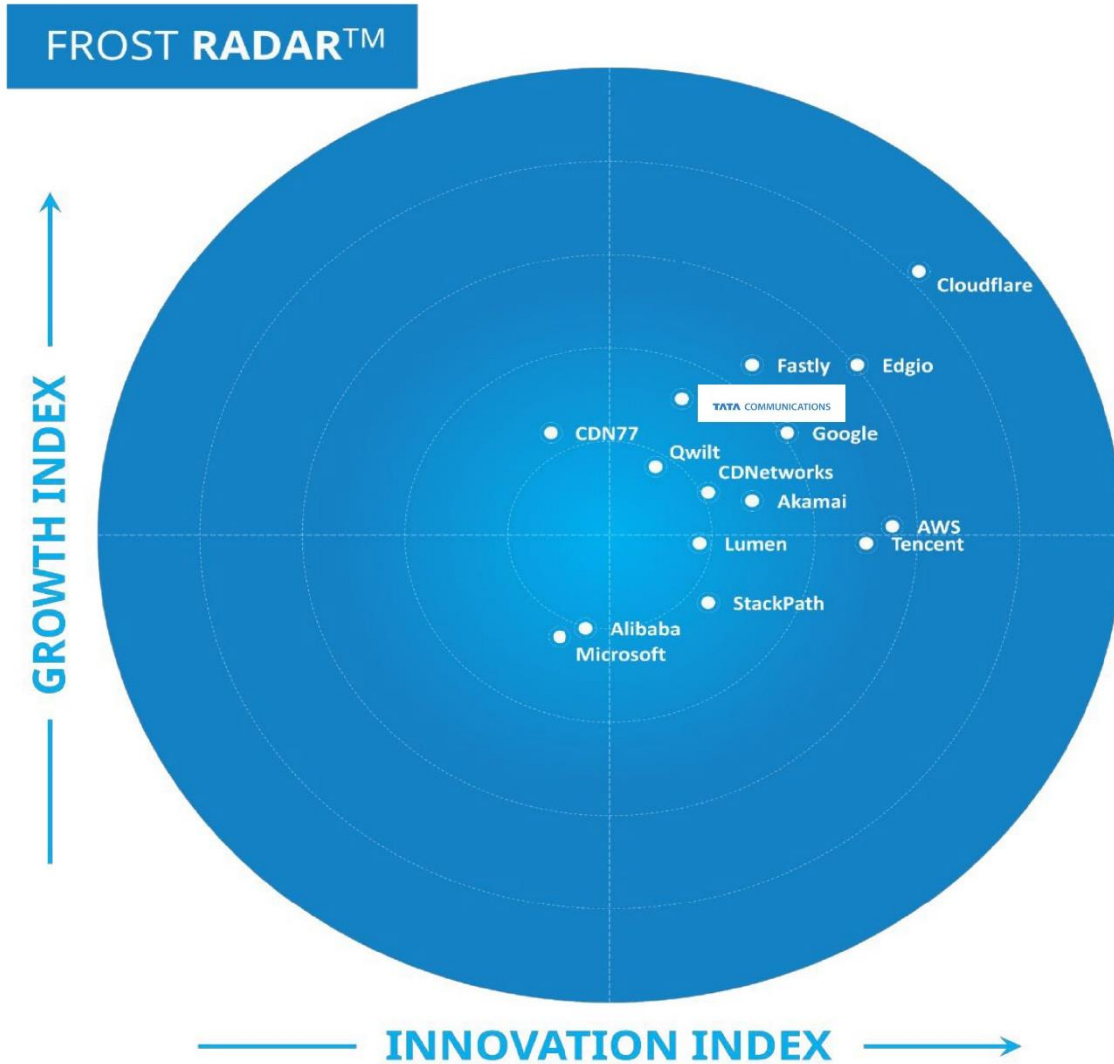
- [Global Content Delivery Network \(CDN\): Growth Opportunities and Analysis](#)
- [Customer Perspectives on Optimizing Content Delivery](#)



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**Global Contact
Delivery Network**

Frost Radar™: Global Content Delivery Network



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Competitive Environment

Scope of Environment

- This study focuses on infrastructure-based CDNs, meaning the companies that operate a network of global servers, routers, switches, and dedicated hardware. These locations are referred to as points of presence (PoPs). CDNs link with ISPs, networks, and other CDNs in peering points (the point where two or more networks exchange traffic). These PoPs and peering points are the physical parts of a CDN's global network. This study does consider the dedicated CDNs commercialized by the hyper-scale cloud providers.
- The study does not delve into the sub or parallel market of abstract CDNs. These companies run a software stack on top of a multi-cloud infrastructure, bare-metal virtual machines (VMs), or existing CDN infrastructure. Platforms (such as OTT, video on demand [VoD], or social networks) that build and operate their own CDNs are excluded.

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Competitive Environment (continued)

- Of the more than 50 noteworthy participants in the market, Frost & Sullivan has plotted 15 of the top providers in this Frost Radar™ analysis. Each has displayed continuous efforts to grow its presence and innovate in the evolving market, with annual revenues at or above \$50 million. The companies come in several shapes and sizes. There are big cloud providers with CDN services: Alibaba, AWS, Google, Microsoft, and Tencent. There are established CDNs: Akamai, CDNetworks, and Edgio (through the merger of two traditional CDNs). There are telcos with CDNs: Lumen and Tata Communications. There are up-and-comers: CDN77 and StackPath. There are non-conventional providers: Cloudflare, Fastly, and Qwilt.

Competitive Initiatives

- The market is set for healthy competition as enterprise customers increasingly migrate to the cloud and adopt multi-cloud workloads. This competition is driving CDN providers to accelerate cloud-based business operations and optimize end-user experiences.
- Vendors are investing in network expansion, new capabilities, and software innovation to remain competitive. Individual CDNs may operate best in specific regions (due to network density), for a specific type of media/web page (certain video codecs or file formats), or for particular speed variables (such as response time, latency, and throughput).

Competitive Environment (continued)

- CDN providers are rebranding as edge platform providers. This transition is blurring the lines between CDN providers, cloud providers, and telecommunications providers as they all offer services critical to delivering content and applications at the edge. As a result, CDN providers are diversifying their offerings and expanding their capabilities to encompass more than just content delivery.
- Furthermore, CDNs are now leveraging emerging technologies such as artificial intelligence (AI) and machine learning (ML) to optimize content delivery and enhance user experience. These technologies enable them to analyze data in real-time and make intelligent decisions about the best way to deliver content based on factors such as location, device type, and network conditions.
- The market dynamic is fluid, with fierce competition expected among top-tier providers and specialized vendors in the short and medium terms.
- Network size, location, and efficiency are still important factors impacting the performance, scale, and reliability that a provider can promise customers.

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Competitive Environment (continued)

- Increasingly, software innovations and usability (stratified for developers on the one hand and for non-experts on the other) affect which CDN customers will choose.
- On price, delivery is becoming ever-more commodified, so providers are responding by expanding product offerings to minimize egress costs as well as simplifying their pricing models. CDN customers seek more visibility and control into the egress, from the cloud and distribution to the ISP.

Generating Innovation

- Innovative products and features can give providers a competitive advantage in one aspect or a more comprehensive, total offering sense.
- A first-mover advantage can be powerful for CDNs with new products or offerings that present a more robust value proposition.
- Yet some innovations become common products as competitors rush to develop comparable offerings.
- For example, in the last few years, the market has seen this unfold with CDNs adding edge functionality, introducing developer platforms, and working with structured query language (SQL) databases and object storage.

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Competitive Environment (continued)

Developer-friendly Tools

- As momentum accelerates to build more application workflows directly at the edge, attracting and maintaining the interest and trust of developers is becoming more important for these edge platform providers.
- Creating the most useful development platforms and minimizing barriers to speed creation time can be potent factors in drawing developers to choose one edge over another.

Significance of Being on the Frost Radar™

Companies plotted on the Frost Radar™ are the leaders in the industry for growth, innovation, or both. They are instrumental in advancing the industry into the future.

GROWTH POTENTIAL

Your organization has significant future growth potential, which makes it a Company to Action.

BEST PRACTICES

Your organization is well positioned to shape Growth Pipeline™ best practices in your industry.

COMPETITIVE INTENSITY

Your organization is one of the key drivers of competitive intensity in the growth environment.

CUSTOMER VALUE

Your organization has demonstrated the ability to significantly enhance its customer value proposition.

PARTNER POTENTIAL

Your organization is top of mind for customers, investors, value chain partners, and future talent as a significant value provider.

Companies to Action: Tata

INNOVATION

- Tata Communications (Tata), part of the Tata Group, is a digital services provider offering various solutions for connectivity, cloud hosting, security, and media services.
- Tata has strength in the media and entertainment services ecosystem. With integrations to Tata infrastructure, the CDN supports end-to-end media workflows. This includes solutions for content acquisition, contribution, transcoding, and delivery. Notably, Tata created its own satellite downlinking (through an in-house teleport center) that provides transcoding and delivery workflow to serve live, linear channels on popular streaming apps.

GROWTH

- Tata's CDN runs on 28 super PoPs, and the network backbone peers with all major Tier 1 and Tier II ISPs. With a robust backbone connection, the network achieves single-digit latencies with point-to-point peering from the CDN to other ISPs.
- The company has found strong growth in maturing markets, peering with Tier II and Tier III ISPs to gain high penetration where digitalization is quickening for media consumption. Further, this capacity and its strength in rich media management position Tata ideally to serve the boom in education technology, sports events, and an emerging range of smaller firms entering the OTT delivery space.

FROST PERSPECTIVE

- Tata is finding success in providing media services to the growing IPTV and OTT markets. The company has strength in its home region (South Asia) but may run into greater challenges when competing with larger providers in other regions globally. Tata could lean into this strength and build a dense network in South Asia, a market with significant mobile growth ahead.
- The company's programmable edge can help it gain favor with DevOps teams, but increasing the pace of innovation and expanding the toolset will be critical for keeping pace with global competitors. Bringing The Switch into the fold will offer a compelling combination of network and layered services.

Companies to Action: Tata

INNOVATION

- Tata collaborates well with customers to drive innovation. This is especially visible in the way the company has created APIs for CDN federation, allowing for seamless integration with third-party networks. Also, it has focused recently on empowering organizations with programmable CDN that can be easily customized to meet specific business needs.

GROWTH

- Tata also indicates that it plans to acquire the end-to-end live video production company The Switch Enterprise, which will bring live production and immersive content capabilities into the fold. The addition, including a global reach of customers in more than 190 countries, will add to Tata's strength in media workflows, particularly live video content production and transmission.

FROST PERSPECTIVE

- Tata would do well to continue investing in sustainable technology, lowering the carbon footprint of its network and making workflows more flexible. Sustainable technology could be a major selling point in Europe and among climate-conscious companies across the world.

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Key Takeaways



Key Takeaways

1

CDN services are critical enablers of the high-bandwidth video content and applications that consumers crave.

2

CDN is no longer a single line of service as providers are transforming themselves into multifaceted businesses with wider portfolios, more customer touchpoints, and new perspectives on delivery at the edge. This movement brings CDN providers into closer cooperation and competition with other service providers at the edge.

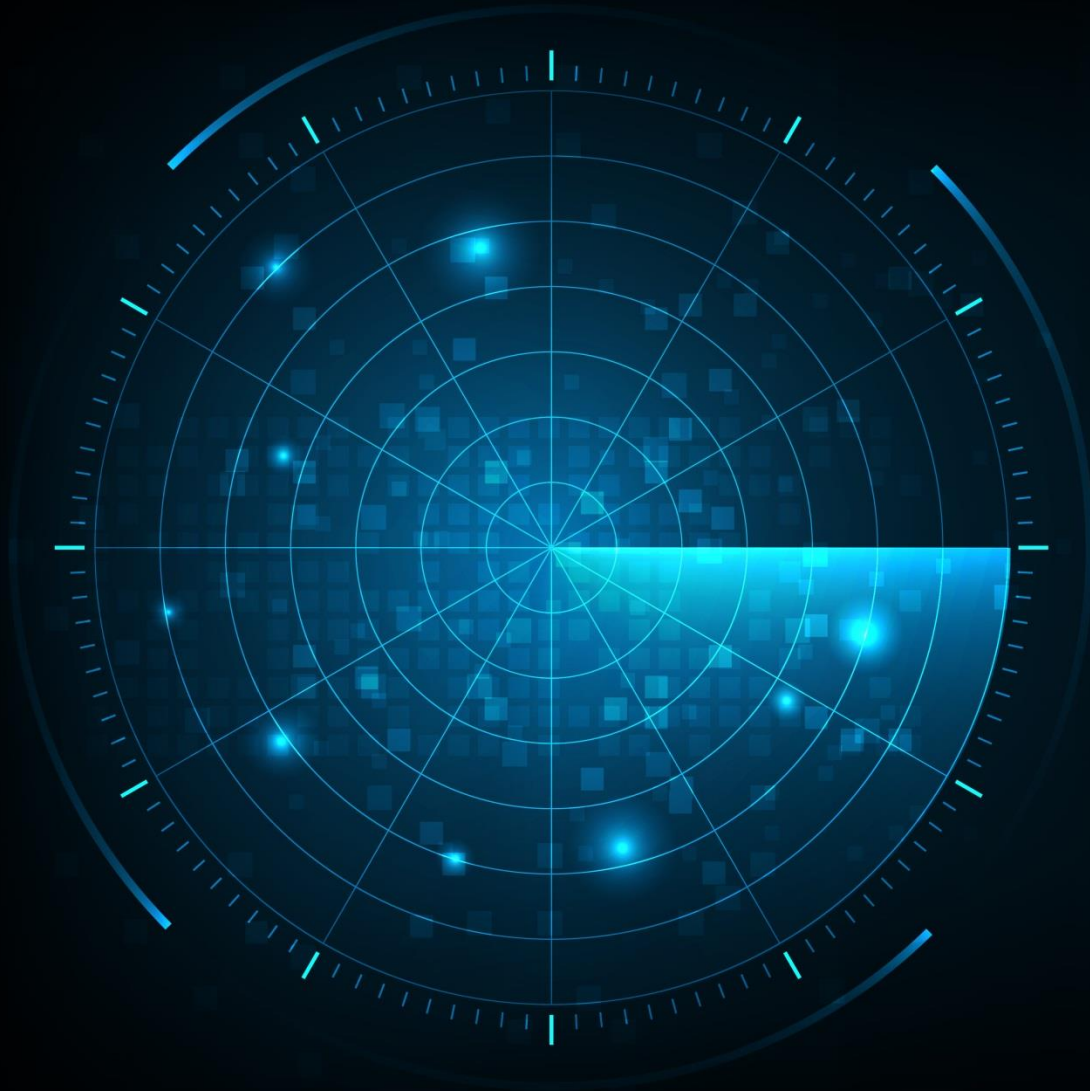
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Frost & Sullivan anticipates the CDN space, as it is currently identifiable, will experience steady revenue growth over the next 7 years. Despite the increasing commodification of straightforward delivery services, network traffic volumes are still increasing globally. In response, edge, and security services will be the most steeply rising growth drivers.

Key Takeaways (continued)

4

Providers must continue to push the boundaries of software innovation to support the data-intensive and dynamic use cases that are gaining traction (mobile video, AI, immersive applications, and edge computing).



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Analytics

Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

VERTICAL AXIS

Growth Index (GI) is a measure of a company's growth performance and track record, along with its ability to develop and execute a fully aligned growth strategy and vision; a robust growth pipeline system; and effective market, competitor, and end-user focused sales and marketing strategies.

GROWTH INDEX ELEMENTS

- **GI1: MARKET SHARE (PREVIOUS 3 YEARS)**

This is a comparison of a company's market share relative to its competitors in a given market space for the previous 3 years.

- **GI2: REVENUE GROWTH (PREVIOUS 3 YEARS)**

This is a look at a company's revenue growth rate for the previous 3 years in the market/industry/category that forms the context for the given Frost Radar™.

- **GI3: GROWTH PIPELINE**

This is an evaluation of the strength and leverage of a company's growth pipeline system to continuously capture, analyze, and prioritize its universe of growth opportunities.

- **GI4: VISION AND STRATEGY**

This is an assessment of how well a company's growth strategy is aligned with its vision. Are the investments that a company is making in new products and markets consistent with the stated vision?

- **GI5: SALES AND MARKETING**

- This is a measure of the effectiveness of a company's sales and marketing efforts in helping it drive demand and achieve its growth objectives.

Frost Radar™: Benchmarking Future Growth Potential

2 Major Indices, 10 Analytical Ingredients, 1 Platform

HORIZONTAL AXIS

Innovation Index (II) is a measure of a company's ability to develop products/services/solutions (with a clear understanding of disruptive Mega Trends) that are globally applicable, are able to evolve and expand to serve multiple markets, and are aligned to customers' changing needs.

INNOVATION INDEX ELEMENTS

- **II1: INNOVATION SCALABILITY**

This determines whether an organization's innovations are globally scalable and applicable in both developing and mature markets, and also in adjacent and non-adjacent industry verticals.

- **II2: RESEARCH AND DEVELOPMENT**

This is a measure of the efficacy of a company's R&D strategy, as determined by the size of its R&D investment and how it feeds the innovation pipeline.

- **II3: PRODUCT PORTFOLIO**

This is a measure of a company's product portfolio, focusing on the relative contribution of new products to its annual revenue.

- **II4: MEGA TRENDS LEVERAGE**

This is an assessment of a company's proactive leverage of evolving, long-term opportunities and new business models, as the foundation of its innovation pipeline. An explanation of Mega Trends can be found [here](#).

- **II5: CUSTOMER ALIGNMENT**

This evaluates the applicability of a company's products/services/solutions to current and potential customers, as well as how its innovation strategy is influenced by evolving customer needs.

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