



I D C T E C H N O L O G Y S P O T L I G H T

DNS: The Behind-the-Scenes Network MVP of Digital Transformation

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As enterprises and service providers undergo digital transformation, the nature of how applications and services are deployed and delivered is fundamentally changing. The domain name system (DNS) is emerging as a critical enabling technology for this transformation. This IDC Technology Spotlight focuses on why enterprises engaged in digital transformation need an advanced DNS and traffic management strategy and discusses the role NS1 plays in the DNS and traffic management market.

Introduction

Across the world, organizations of all types and sizes are in the developmental stages of digital transformation, defined by IDC as coupling digital technologies with organizational, operational, and business model innovation to create new ways of operating and growing businesses. The move to digital transformation has been powered by a paradigm of technological innovation known as the 3rd Platform. The 3rd Platform, built on the pillars of cloud, big data, mobility, and social business, is transforming the entire customer value chain. From initial customer engagement to service delivery and back-end operations, enterprises are racing to realize the enormous potential of the 3rd Platform as they accelerate their digital transformation initiatives.

What many enterprises have not recognized is how digital transformation is fundamentally changing the way underlying network infrastructure is utilized. Often taken for granted and viewed as simply the plumbing layer, network infrastructure plays a powerful role in delivering dynamic content, cloud migration, and application resiliency. The DNS is an integral part of that infrastructure technology.

DNS is an application layer service that employs human-usable domain names to direct traffic across network infrastructure to a specific IP address. Without DNS, consumers would have to remember countless IP addresses in order to access websites and other digital applications; hence the reason DNS is often called "the phone book of the internet." However, for modern applications, DNS is much more than a simple directory.

Because DNS is typically the first point of contact between a consumer and a digital asset, it is uniquely suited to leverage network, infrastructure, and application telemetry to make decisions in real time about where a user should be routed. This not only improves customer experience but also provides application developers with a powerful new set of tools to deploy and manage highly distributed infrastructure and deliver dynamic content. This paper explains the key role an intelligent DNS plays in enabling modern application delivery and digital transformation.

IT Trends Drive the Need for Intelligent DNS

DNS was developed in the early 1980s, even before the emergence of the web browser. It was designed to meet the needs of a fairly static, pre-3rd Platform internet that bears little resemblance to today's reality. As a result, a need for intelligent DNS technology has emerged. Today, this technology is addressing application delivery needs and challenges that simply did not exist just a few years ago, including:

- **The need for speed.** End users are simply intolerant of delays. The relationship among site performance, the propensity of users to abandon their sessions, and long-term site abandonment is well known. This has resulted in the proliferation of content delivery networks (CDNs) and a fundamental shift in how online services of all types are delivered to end users. Legacy DNS was not designed to make performance-based decisions in response to end-user service requests. Today, performance-based DNS routing is a must-have for any organization focused on end-user quality of experience.
- **Movement to cloud.** Among the benefits of hosting workloads on public and private cloud infrastructure is the ability to spin up service delivery platforms where and when they are needed. Legacy DNS systems do not provide native interfaces supporting automated orchestration and service discovery within cloud infrastructure simply because those DNS platforms were developed in an era before virtualization and cloud technologies existed. More recently developed, advanced DNS systems have the application programming interfaces (APIs) and integrations needed to support dynamic provisioning.
- **Global scale.** The internet provides enterprises with unprecedented access to global markets and has reduced much of the cost required to deliver products and services to virtually anywhere in the world. This places two concurrent requirements on the service delivery infrastructure. First, it must have high-performing global reach. Second, it needs to support very high service levels — with a built-in capability for continuous improvement. To illustrate: A 99% service level in a region with 10 million users means 100,000 users are not getting good service. No business can sustain that level of customer dissatisfaction long term. As customer bases grow, service-level pressures grow in tandem. Legacy DNS systems simply lack the sophistication to adjust to the dynamic nature of the global internet infrastructure.
- **Improved security.** Enterprise network managers and security architects are paying more attention to the role of DNS in overall network security. Distributed denial of service (DDoS) is a common attack method used by bad actors to take down enterprise networks. DNS systems are often targets of attack but also can provide valuable insights into the threats facing enterprises. A resilient, well-provisioned and well-secured DNS infrastructure is a critical component in maintaining availability of online services.

Intelligent DNS for the 3rd Platform

Once end users have basic network connectivity, whether on their desktop, notebook, or mobile device, they can start requesting services. Whether users want to shop online, stream music, or watch a sporting event, their request for a service starts with a DNS lookup. This is a critical decision point. With multiple points of presence for the same service, where the DNS decides to send a user determines the quality of experience that user will receive. An intelligent DNS can enable the deployment of 3rd Platform infrastructure and play a key role in optimizing that infrastructure for every customer engagement. The key attributes of intelligent DNS systems are outlined as follows:

- **Performance-optimized routing.** Enterprises want to bring their content and services as close to their customers as practical. On a global basis, this means service availability from multiple datacenters, CDNs, and cloud infrastructures. It means multiple network providers offering

specific connectivity and peering arrangements. In order for the system as a whole to deliver the optimal user experience, every end-user service request needs to trigger a complex routing decision that takes place in real time. By taking into account distance, server availability and load, network performance, and connectivity arrangements, each request can be served by a route-optimized answer. This is an area where advanced DNS is differentiated from legacy DNS. Intelligent DNS has the capability to make complex, real-time routing decisions that take into account multiple factors that affect performance and quality of experience.

- **Cost-optimized infrastructure.** Enterprises enjoy an unprecedented level of choice and diversity in building out their service delivery infrastructures. There are dozens of CDN providers, hundreds of cloud providers and colocation facilities, and many network and connectivity options. In building out 3rd Platform infrastructures, enterprises can realize substantial gains in performance and at the same time lower costs by taking advantage of this diversity. As a result, we see forward-leaning organizations — especially those that operate on a global scale — bringing more diversity into their infrastructures rather than consolidating. Intelligent DNS systems are proving to be an effective enabling technology supporting this trend.
- **Automation, automation, automation.** The IT world has undergone a transformation from the physical to the virtual. The process of adding a server, a link, or a service once involved hardware installs, cabling, and manual configuration. Today, compute, networking, and services are software defined and programmatically provisioned and configured. This has changed not only the nature of the infrastructure but also the work, tool sets, and skills of the people who operate it. Intelligent DNS systems are designed to be part of software-defined environments. As such they offer programmatically controlled APIs, language support, and SDKs that allow DevOps teams to embed DNS services into their tools and processes.
- **Application performance management as a service.** As more intelligence is built into the network, this intelligence is creating new and better alternatives to the traditional role played by appliance-based devices. The ability to ingest and act on server and datacenter telemetry is creating compelling alternatives to traditional hardware-based, dedicated global load balancing and application performance management solutions.

Considering NS1's Intelligent DNS

NS1 is an intelligent DNS platform designed to meet the demands of how application services are deployed, managed, and delivered. NS1's intelligent DNS and traffic management platform, with its data-driven architecture and unique Filter Chain routing engine, is purpose built for the most demanding, mission-critical applications on the internet. NS1's comprehensive platform technology leverages infrastructure, application, and network data to make intelligent routing decisions in real time, ensuring optimal application performance and reliability.

NS1 offers three core SaaS-based solutions aimed at the 3rd Platform needs of online enterprises, SaaS providers, and cloud service providers.

- **Managed DNS.** Built upon a SaaS model based on traffic volume and feature utilization, NS1 Managed DNS delivers high reliability and performance alongside advanced traffic management capabilities. NS1 Managed DNS provides the APIs, tools, and granular control capabilities that enable the buildout and deployment of complex service delivery infrastructures. It is a cloud-based managed offering, deployed on a resilient, high-performing, and reliable globally "anycasted" network.

- **Dedicated DNS.** Built upon the same stack as NS1 Managed DNS, NS1 Dedicated DNS operates on a SaaS model based upon the number of DNS server instances on which the solution is deployed. It provides enterprises with the option to deliver DNS services for their private networks, to create hybrid public/private (split horizon) DNS services, and to create a redundant DNS service to complement their Managed DNS. NS1 Dedicated DNS is managed under the same control plane as Managed DNS, providing fully unified and integrated record management. As a managed SaaS offering, NS1 maintains, monitors, and supports Dedicated DNS deployments — thus relieving customers of the need to patch and maintain DNS software and servers.
- **Pulsar Intelligent Traffic Management.** NS1 Pulsar is a granular, real-time, telemetry-driven traffic management solution natively integrated with NS1 Managed and Dedicated DNS. Like all NS1 solutions, it operates on a SaaS model, with a billing model based on traffic volume and data options. Pulsar leverages real-time network, server, and RUM telemetry to intelligently route users to the optimal service delivery endpoint.

Challenges

Digital transformation efforts entail a complex set of technical, process, and skill changes within the enterprise. Forward-leaning organizations are discovering that an intelligent DNS can play a significant role in the success of their transformation efforts. For the majority of enterprises, however, DNS is viewed as a basic building block technology that performs a necessary, but not a particularly innovative, function. This point of view is becoming obsolete. Line-of-business decision makers should elevate the position of DNS as they evolve and transform the IT infrastructure and evaluate the benefits of intelligent DNS and traffic management as a part of their digital transformation initiatives while devising strategies to educate all stakeholders about the need for intelligent DNS and mitigate any resistance.

Conclusion

Digital transformation is demonstrating the need for intelligent DNS solutions for mission-critical enterprise and service provider networks. DNS should no longer be viewed as a background player; rather, it should be viewed as enabling technology for traffic management and application delivery. To achieve the levels of application performance demanded by today's users, along with operational agility and cost control, digital enterprises should evaluate intelligent DNS platforms such as NS1 as part of their digital transformation strategy.

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