WHITE PAPER

3 Common Enterprise DNS Challenges and How to Solve Them

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Introduction

Increased demands are being placed on IT departments as enterprises embrace cloud computing, respond to the consumerization of IT, and as they adopt the DevOps model for application delivery – all of which present significant DNS challenges.

For decades, Open Source technology has been the goto solution for solving DNS and traffic management challenges on internal networks and on the Internet. In fact, the majority of DNS servers on the internet are running Open Source solutions such as BIND, djbdns, PowerDNS, gdnsd, and NSD. Commercial DNS appliances also have open source BIND at their core.

These traditional DNS platforms were designed to meet the requirements of a static "phone book" DNS paradigm. The focus was basic performance and availability of the DNS service. This was adequate in an era where infrastructure was relatively static and updates were planned days or weeks ahead of time. In today's world, automation and virtualization have compressed deployment cycles from days to seconds. And as application architectures become more distributed it is not enough for DNS to do simple look-ups. The DNS needs to make intelligent traffic management decisions that ensure users are optimally routed to application delivery end points.

In this white paper we explore three of the ways that Open Source DNS solutions can present challenges when deployed in your infrastructure and how NS1's DNS solution addresses these challenges.

> I've never seen another DNS service quite like NS1. I feel that their data-driven approach, combined with their incredible flexibility, makes them the next generation DNS host.
>
> **- Alan Schaaf, CEO, Imgur (Alexa Top 50 Global Traffic)**

Challenge #1: DNS Automation

Consider the following scenario. You are an online retailer with a catalogue of over 10 million items. Your online services comprise several hundred discrete applications that work together to deliver customized online shopping experiences for individual customers. You also have millions of customers and demand for your online services fluctuates rapidly.

DNS is a vital element of this infrastructure. In this highly dynamic environment where service instances are constantly being created and destroyed, DNS provides the mechanism for application services to find each other and ultimately for customers to connect to and use online services. To match the scale and speed requirements the DNS system must have a native RESTful API supporting high frequency call rates. Leveraging a high performance native API, the DNS must integrate with the infrastructure as code (IAC) tools your DevOps teams use to automate deployments.

Traditional DNS systems were not designed to operate in that mode. They typically lack native APIs. This results in slow API response rates and limited support for IAC tools and methods. NS1's DNS platform has an API first architecture supporting a wide variety of integrations with IAC tools and programmatic options.

Challenge #2: DNS Change Propagation

With a globally distributed user population, DNS services need to be instantly available to every user, everywhere. This requires a distributed network of DNS servers, otherwise latency and bottlenecks will impact the user experience. Frequent, automation driven DNS updates must be propagated in seconds to all serving nodes to prevent users from receiving stale DNS information that would result in errors and timeouts. Traditional DNS systems use slow transfer protocols that were never intended to support today's dynamic infrastructures. The NS1 DNS platform is designed with high speed database transfer capabilities that propagate changes across the globe in seconds.

> NS1 is a critical component of our application architecture. We've seen amazing performance from the platform, enabling us to deliver a flawless experience to our customers' end users.
>
> **- Julien Lemoine, CTO, Algolia**

Challenge #3: DNS Traffic Management

For routing and traffic management, sending a user to the closest available server is considered to be a best practice. Although Open Source DNS solutions can be modified to incorporate geography and up/down measurements into their decision-making process, enablement and maintenance of these functions requires significant modifications or complex third party software integrations.

Consider a scenario when the geographically closest server is not the best option. What if the closest server is overloaded or if poor network conditions have reduced inbound connections to a crawl? Open Source DNS solutions are incapable of responding appropriately to situations like these. In these cases it would be ideal to leverage an intelligent routing solution that could detect these states and route traffic elsewhere. NS1's DNS platform enables you to easily and intelligently manage traffic across your network in a manner that makes the best use of your infrastructure. It enables you to easily configure routing algorithms that orchestrate traffic on your infrastructure on the basis of a combination of metrics important to your business. For example, you can route traffic based on overall system health, eyeball telemetry, geography, network location, system load, service provider bandwidth commits and more, including your own custom-defined metrics. This will empower you to wring every last drop of performance from your infrastructure, resulting in the most bang for your buck.

ROUTING CAPABILITY	NS1	OPEN SOURCE DNS
Geotargeting	✓	✓*
Up/Down (Failover/DR)	✓	✓*
System Health	✓+	✓
Network Location	✓	✓
System Load	✓+	✓
Bandwidth Commits	✓	✓
Eyeball Telemetry	✓	✓
Custom Metrics	✓+	✓
3rd Party Data Feeds	✓	✓

* Requires significant modification or complex third party software
+ Available via simple API integrations

NS1 offers enterprise DNS solutions for your private network and internet facing online services.

Managed DNS
Cloud based, intelligent DNS for internet facing online services

Private DNS
NS1's carrier grade DNS platform for self-hosted deployments

Dedicated DNS
A single tenant managed solution for DNS redundancy

Pulsar
Real user measurement based traffic routing for application optimization

ABOUT NS1

NS1 is the leader in next generation DNS solutions that orchestrate the delivery of the world's most critical internet and enterprise applications. Only NS1's purpose-built platform, which is built on a modern API-first architecture, transforms DNS into an intelligent, efficient and automated system, driving dramatic gains in reliability, resiliency, security and performance of application delivery infrastructure. Many of the highest-trafficked sites and largest global enterprises trust NS1, including Salesforce, LinkedIn, Dropbox, Nielsen, Squarespace, Pandora and The Guardian.