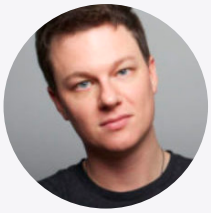
NS1.

A Wave of Open Source Innovation at NS1 Labs

Solving challenges in modern application delivery through innovation in foundational technologies supporting the global internet

What is the Vision Behind NS1 Labs?

A note from our CEO and Co-Founder, Kris Beevers



Kris Beevers
CEO & Co-founder, NS1

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At NS1, we've never hesitated to pursue new opportunities for innovation at the foundations of the internet. When your technology sits in the stacks of the most innovative companies in the world, new insights and opportunities for even deeper innovation emerge constantly, and we've developed a strong reputation at NS1 for pursuing new ideas in foundational infrastructure in close partnership with our customers. That reputation is a huge point of pride for myself and the rest of the NS1 team.

We recently announced NS1 Labs, a more formal umbrella at NS1 to explicitly invest in innovation in foundational networking and application infrastructure technologies. From NS1's vantage point, we have a clear view of the next decade in application connectivity, and NS1 Labs is one of the ways we'll invest to build that future.

In the next few years, applications will continue to drive innovation in foundational networking services. Audiences will become increasingly distributed and dynamic as devices, connectivity options, and mobility explode. And applications themselves will evolve to meet ever more stringent expectations from users, with global, highly dynamic footprints optimized to provide predictably fast and secure application experiences.

Overview of NS1 Labs

At NS1 Labs, we focus on three key areas:

Researching Experimental Concepts

We continually research, develop and test new foundational technologies and functionality so that NS1 and the industry can solve the evolving challenges of supporting the connected economy.

Sharing Industry Expertise

We believe the industry and technology insights we gain from our research can benefit the entire industry. That's why one of our core areas of focus is speaking at events, creating reports and sharing our research with the world.

Creating a Vision for the Future of the Industry

Our industry is evolving rapidly to keep up with the demands of our connected world. Our labs team looks to the future of the industry and investigates future technologies so we can create new solutions for the challenges of the future.

This guide focuses primarily on three projects from NS1 Labs: Orb, pktvisor, and investing in open-source NetBox. You can learn more about all the exciting projects we are working on at NS1 Labs by visiting: ns1.com/labs

Observability at the Edge: Orb and pktvisor

Here's how you can get engaged with Orb:

- Sign up to get updates on Orb and pktvisor from the team
- Check out Pktvisor's docs and get started with the ready-made docker image or other options
- Star Orb and pktvisor on Github and contribute, open issues, or read the code
- Bookmark GetOrb.io for future releases
- Join the NS1 Labs Slack to engage with Shannon and the rest of the Orb community

We've operated a large, globally distributed edge network at NS1 for over 8 years. My own background before NS1 was building edge services like CDN, globally distributed public cloud, and of course, global DNS. One of the most challenging problems in operating global edge infrastructure is understanding what is happening in that infrastructure in real time, to diagnose and solve problems before they become catastrophes.

Orb and its cousin pktvisor are tools we developed at NS1 specifically to solve that problem because no existing technology in the market could meet our needs for real time edge visibility, with dynamic policy, at scalable cost. pktvisor in particular was built to find the needles in the haystack of our gigantic stream of global DNS traffic - millions of queries per second - so we can respond to malicious activity like DDoS attacks on a second to second basis. And it is rock solid - pktvisor has formed the core of our edge observability strategy for more than 5 years.

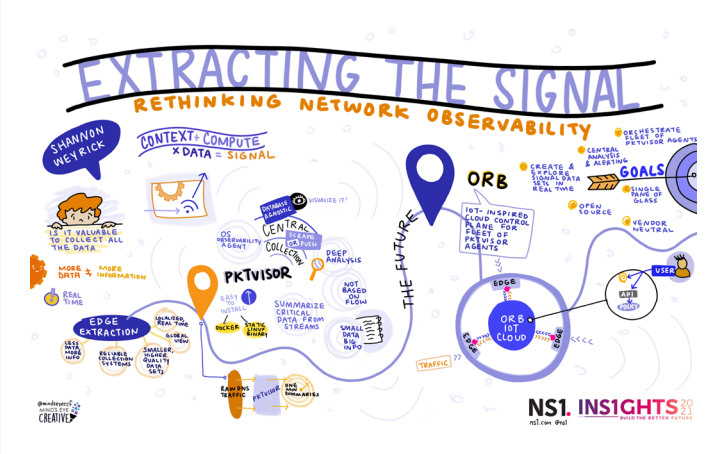
As NS1's customers increasingly build their own global edge footprints leveraging our application traffic steering technologies, time and again we hear from them about observability challenges that to us are eerily familiar. Either they are swamped with data that's too expensive to process to derive insights in time to take action, or they need to sample so aggressively they miss most of the key events they're seeking to observe in the first place.

Pktvisor solves those problems by moving the analysis of streams of data - especially, network traffic - to the edge, distributing the workload across the fleet. And Orb multiplies the power of pktvisor's edge observability by making it dynamic with a global orchestration layer that can adjust the observability strategy across a fleet of pktvisors, and collate the data from the fleet, on a second to second basis.

We believe any Dynamic Edge Observability solution must meet four basic principles:

1. Small Data: Compute analytics at the edge to find the needles in the haystack and ignore the noise
2. Highly Distributed: Widespread fleets across global edge footprints
3. Globally Orchestrated: Get the visibility you need, where and when you need it with dynamic management of the fleet
4. Real Time: Find the signal as it appears with the power of small data - no more expensive and slow batch analysis

Orb and pktvisor are our investments to make Dynamic Edge Observability a reality. The projects are led by Shannon Weyrick, our VP of Research on the NS1 Labs team. Pktvisor is open sourced and available today. Orb will be released - fully open source - later this year.



Extracting the Signal: Rethinking Network Observability

What do Orb and pktvisor solve for?

More data does not necessarily mean more information. Orb and pktvisor were created to help organizations extract the signal from their data - and then take action on that information in real-time.

What is pktvisor?

pktvisor is an open source observability agent that pushes the extraction process to the edge. With pktvisor, you can extract business intelligence that passing by in data streams in real-time - computed at the edge.

Where Orb Comes In

Orb is a new open source project from NS1 Labs. It is a control plane that dynamically manages a fleet of pktvisor agents. It adds critical functionality beyond central management of this data - it actually makes dynamic edge observability a reality.

Investing in Open Source NetBox and the Community

NetBox Cloud - Bringing Open Source NetBox into the Cloud to Accelerate Adoption at the Enterprise Level

Recently, NS1 announced NetBox Cloud - a SaaS-based, cloud-delivered version of open source NetBox.

NetBox Cloud is part of NS1's commitment to NetBox and its community, as it provides enterprise-grade features and support for companies that can't solely rely upon open-source projects.

You can learn more about our early access program for NetBox Cloud by scanning the QR code below:

As we've rapidly scaled our enterprise footprint over the last several years, especially with our Enterprise DDI products, one open source project - NetBox - has been mentioned by our customers with increasing frequency and now appears in many of their networks. NetBox was started by Jeremy Stretch while he was building networks at DigitalOcean, and the project turns 5 next week. NetBox is a fully open-sourced platform for modern network automation and infrastructure resource management, with feature rich, API addressable functionality for IP address management (IPAM), datacenter infrastructure management (DCIM), and more.

Earlier this year I met with Jeremy several times and I was deeply compelled by his vision, the philosophy of the NetBox project, and the incredible community that has formed around NetBox - as evidenced by its over 8,000 stars on Github, active discussion group, and busy Slack. Most importantly, when I met with NS1 customers who use NetBox, what I found was excitement at the incredible potential they saw for the software in their networks, and a strong sense of NetBox's value for their network automation strategies compared with other tools.

We decided to invest in NetBox because of its deep alignment with our mission to connect the world's applications and audiences, in this case by unlocking powerful network automation for increasingly distributed and dynamic enterprise network footprints. Jeremy joined NS1 Labs as a Distinguished Engineer, where he will focus all of his efforts on NetBox and its community.

Our top priority at NS1 with respect to NetBox is to support the community and open source NetBox project in ways that align with the community's philosophy and values. As a software engineer for over 20 years, I truly believe in the power of open source to change the world. I myself have made a number of open source contributions and open sourced quite a few projects. Building what Jeremy and the NetBox community have built is no

small feat, and our first rule at NS1 for NetBox is: don't break what's working well - support it!

We will also work with the NetBox community and our customers to find ways to more tightly integrate NS1's products with NetBox, and we will seek strategies to meet the needs of our enterprise customers for support, enterprise grade features, and ease of management that align to the goals of the community and enable NS1 to increase our investment in NetBox over time.

NS1 Labs focuses on finding innovative solutions to the challenges of modern internet application delivery. The team conducts research, develops technology, and advances industry knowledge through the sharing of information.

Visit **ns1.com/labs** to:

- → Learn more about exciting projects coming out of NS1 Labs
- → Get updates on Orb, pktvisor, NetBox, and other projects we're working on
- → Learn how you can participate in our open source projects

About NS1

The internet and applications powering our world depend on NS1. Billions of people connect to work, school, entertainment, healthcare and stay informed because of the company's innovative technology. As an ally for innovators, NS1 helps our customers turbocharge their ideas in pursuit of building the better future through connecting applications and audiences at the distributed edge. NS1's application traffic intelligence and automation portfolio makes applications faster, reliable and secure everywhere. With technologies for cloud-native network services, edge to cloud networking, and application traffic optimization, NS1 helps eliminate the barriers between applications, users, infrastructure and data. NS1 has more than 725 customers across the globe such as Dropbox, Fox, Salesforce.com, LinkedIn, and Ebay.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