

PowerDNS **DNSdist**

Intelligent DNS Traffic Management.
Secure. Scalable. Always Available.

The Challenge

Modern DNS infrastructures must do far more than distribute queries between servers. Service providers and enterprises require intelligent traffic management that ensures high availability, low latency, security, and operational resilience while protecting critical DNS services against abuse and attacks.

Traditional load balancers lack DNS awareness, making them unable to optimize traffic based on DNS-specific information, perform intelligent health checks, or provide advanced security features such as encrypted DNS and DDoS mitigation. Organizations need a purpose-built DNS proxy that combines traffic management, security, caching, and observability in a single platform.

The Solution

PowerDNS DNSdist is a high-performance DNS proxy, load balancer, and traffic management platform designed for modern DNS infrastructures.

Positioned in front of recursive or authoritative DNS servers, DNSdist intelligently distributes traffic and optimizes performance through DNS-aware routing and caching. By terminating encrypted DNS connections, filtering malicious traffic, and protecting backend infrastructure from abuse, DNSdist serves as a unified security layer and significantly improves the availability and security of modern DNS services. Its flexible policy engine and cloud-native deployment capabilities make it an ideal front-end for large-scale DNS environments ranging from enterprise networks to Internet service providers.



Key Capabilities

DNS-Aware Load Balancing

Unlike traditional load balancers, DNSdist makes routing decisions based on DNS-specific information. Multiple built-in load balancing policies, continuous health checks, and intelligent traffic distribution ensure optimal performance and high availability across backend DNS servers.

Benefits include:

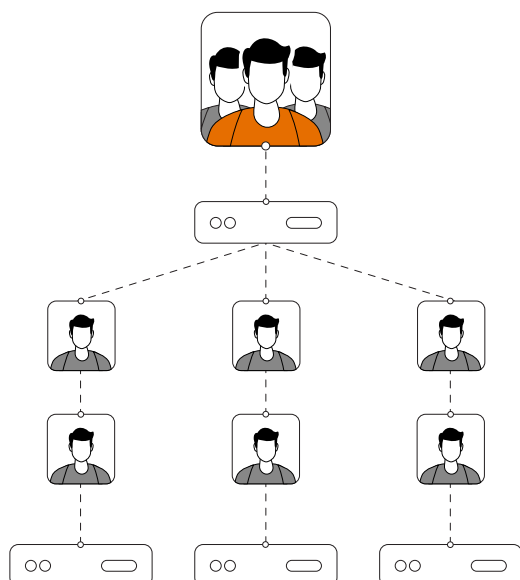
- ✓ Intelligent traffic distribution
- ✓ Automatic health checks
- ✓ High availability and failover
- ✓ Multiple load-balancing algorithms
- ✓ Flexible routing policies

Policy-based Traffic Management

DNSdist dynamically routes traffic using multiple DNS-aware load balancing algorithms. These customizable policies ensure optimal resource utilization while maintaining uninterrupted DNS service.

Available policies include:

- ✓ **leastOutstanding**
- ✓ **firstAvailable**
- ✓ **weighted random**
- ✓ **weighted hash**
- ✓ **consistent hash**
- ✓ **round robin**



Encrypted DNS

DNSdist provides comprehensive support for modern encrypted DNS protocols, protecting user privacy while preventing DNS interception.

Supported protocols include:

- ✓ **DNS-over-TLS (DoT)**
- ✓ **DNS-over-HTTPS (DoH)**
- ✓ **DNS-over-HTTP/3 (DoH3)**
- ✓ **DNS-over-QUIC (DoQ)**

Intelligent DNS Caching

DNSdist includes a high-performance packet cache that accelerates DNS responses while reducing load on recursive and authoritative servers.

Support for negative caching and tiered caching architectures further improves scalability and resilience in large DNS deployments. Deploying DNSdist at the network edge brings DNS caching closer to users and client devices, further reducing latency and backend load.

Benefits include:

- ✓ **Faster DNS responses**
- ✓ **Reduced backend load**
- ✓ **NXDOMAIN caching**
- ✓ **Tiered caching support**
- ✓ **Improved cache efficiency**

Flexible Policy Engine

DNSdist provides a powerful Lua scripting environment that enables organizations to implement highly customized routing, filtering, and traffic management policies.

Lua scripting can be used to:

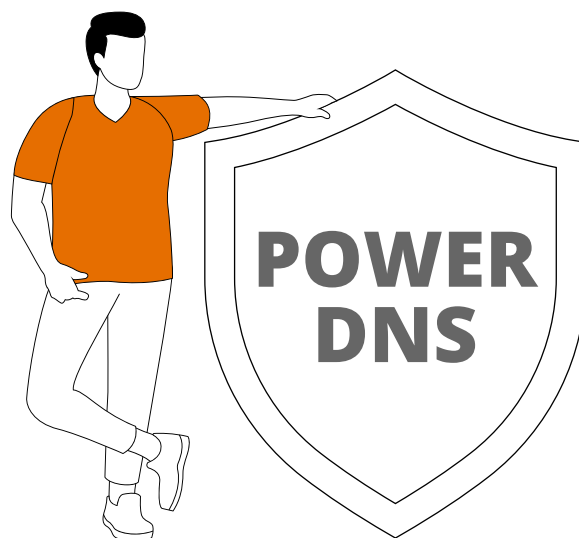
- ✓ **Build custom DNS applications**
- ✓ **Integrate external security feeds**
- ✓ **Create dynamic policies**
- ✓ **Implement advanced traffic engineering**
- ✓ **Automate complex decision logic**

DNS Security & Protection

DNSdist, combined with its extension DNSdist Defender, helps protect DNS infrastructures against malicious traffic through intelligent filtering, rate limiting, traffic shaping, and attack mitigation. DNSdist therefore provides the foundation for DNS-based security services while protecting backend resolvers against overload and abuse.

Together with DNSdist Defender, DNSdist protects against:

- ✓ **DNS tunneling**
- ✓ **Data exfiltration**
- ✓ **Pseudo-Random Subdomain (PRSD) attacks**
- ✓ **DNS reflection/amplification threats**
- ✓ **Device takeovers via Command-and-Control (C2) attempts**



YAML-Based Configuration

DNSdist supports a modern, structured YAML configuration format that simplifies deployment, configuration management, and automation.

The YAML format improves readability, reduces configuration complexity, and integrates seamlessly with Infrastructure as Code (IaC), configuration management tools, and cloud-native deployment workflows.

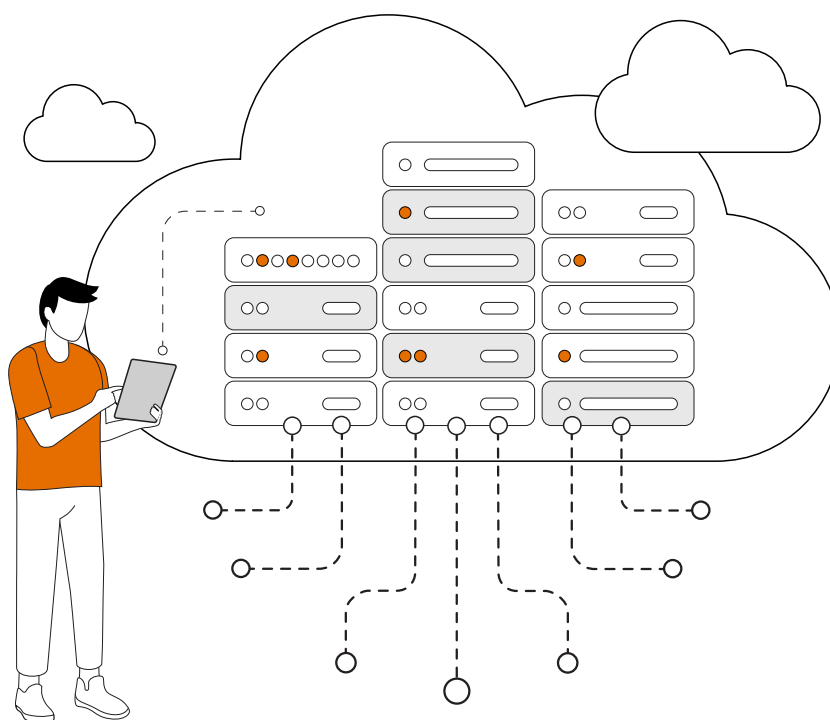
Benefits include:

- ✓ **Structured, human-readable configuration**
- ✓ **Simplified configuration management**
- ✓ **Improved automation and version control**
- ✓ **Better integration with Kubernetes and container platforms**
- ✓ **Consistent deployments across environments**

Deploy Where You Need It

DNSdist can be deployed conventionally in front of the PowerDNS Recursor or PowerDNS Authoritative Server, but also works seamlessly with non-PowerDNS, legacy DNS solutions. It can be deployed on bare metal, as part of Virtual Network Functions (VNF), or in cloud-native environments. Cloud-native deployments are enabled through PowerDNS Cloud Control, allowing DNSdist to be automatically deployed, scaled, and managed across distributed Kubernetes environments.

It can also run directly on the router or CPE, enabling DNS encryption at the source and enhancing the confidentiality and integrity of traffic right at the first mile of the internet connection.



Product Extensions

DNSdist Defender

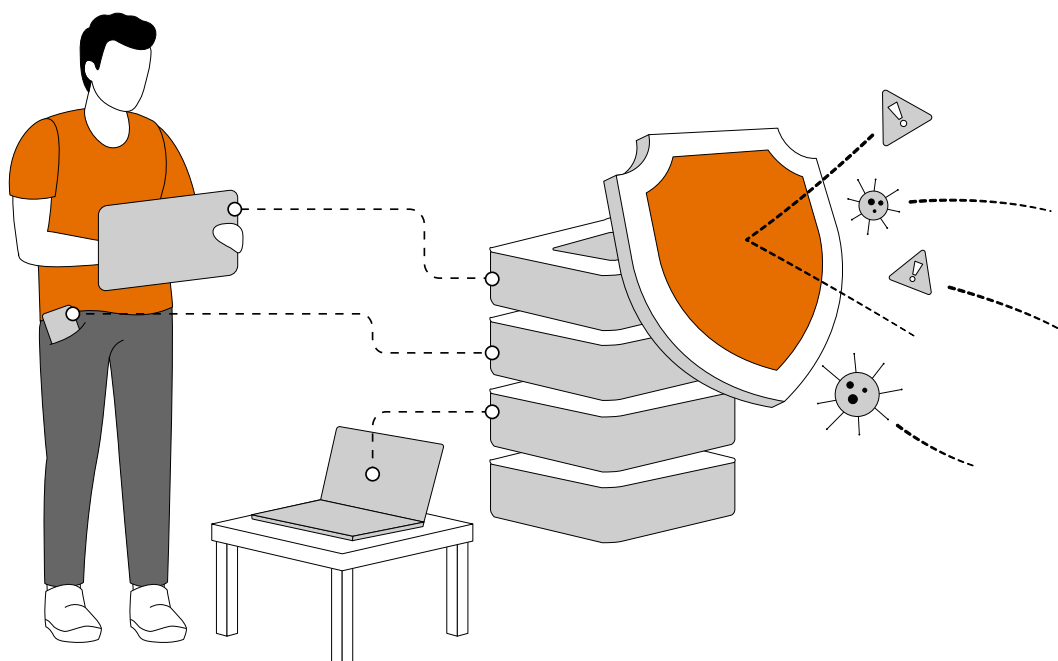
DNSdist Defender extends DNSdist with advanced DNS security and attack mitigation capabilities. It protects DNS infrastructures against DNS tunneling, data exfiltration, pseudo-random subdomain (PRSD) attacks, DNS reflection and amplification attacks, and command-and-control (C2) communication. Defender also simplifies policy management through YAML configuration, curated rule sets, and an intuitive API for custom filtering logic.

PowerDNS Cloud Control

PowerDNS Cloud Control is a cloud-native deployment platform for PowerDNS products. It provides a highly scalable and distributed implementation of DNS, while simplifying deployment and scaling for operations teams. By combining containerization, automation, orchestration, lifecycle management, monitoring, and alerting, Cloud Control enables more efficient resource utilization and a cost-effective way to scale DNS deployments as demand grows.

PowerDNS dstore

PowerDNS dstore is a high-performance data collection and processing platform. It receives Protocol Buffer (Protobuf) log messages, distributes DNS events to multiple destinations, converts them into various output formats, and aggregates data for reporting and analysis.



Key Benefits at a Glance



DNS-aware **load balancing**



Automatic **health checks**



Intelligent **traffic routing**



Simplified **YAML configuration**



High-performance **caching**



Flexible **Lua scripting**



Modern **encrypted DNS protocols**



Cloud-native deployment



Advanced **DDoS mitigation**

Ready to modernize your DNS traffic management?

Learn how DNSdist's intelligent load balancing, high-performance caching, encrypted DNS, and advanced security can enhance the resilience, scalability, and security of your DNS infrastructure.

[Contact us](#)

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