

PowerDNS Recursor Plexus

Low Latency. Stable Performance. Even After Restarts.

The Challenge

Every DNS resolver restart comes at a cost: temporary but measurable performance degradation.

Although DNS resolvers are not intended to restart frequently, operational reality makes it unavoidable. Configuration changes, software updates, and security patches all require regular restarts.

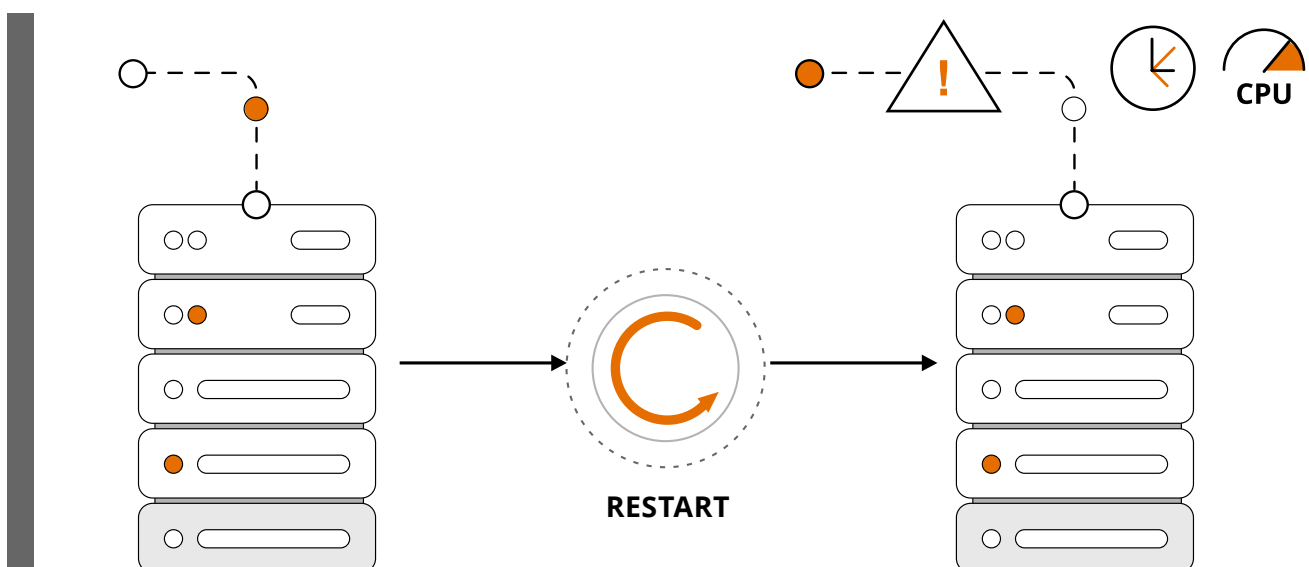
Every restart wipes critical runtime state, including the DNS query cache, NXDOMAIN and other negative responses, DNSSEC validation data, runtime statistics, and accumulated knowledge about authoritative servers such as NS records, response times, reachability, EDNS capabilities, and DNSSEC support.

The Impact

Every restarted resolver must re-learn what it already knew. In large deployments, this results in:

- ! **Significantly increased query latency during warm-up**
- ! **Additional recursive traffic to root and TLD servers**
- ! **Higher CPU load**
- ! **Degraded client experience**

Together, these factors have a direct and significant impact on resolver performance at scale.



The Solution

PowerDNS Recursor Plexus is a PowerDNS Recursor add-on that automatically preserves and restores critical DNS state at resolver restarts.

When a Recursor restarts, Plexus immediately repopulates it with runtime data from its peers. This restores operational context, preserves accumulated resolver intelligence, and eliminates the warm-up phase that would otherwise impact performance.

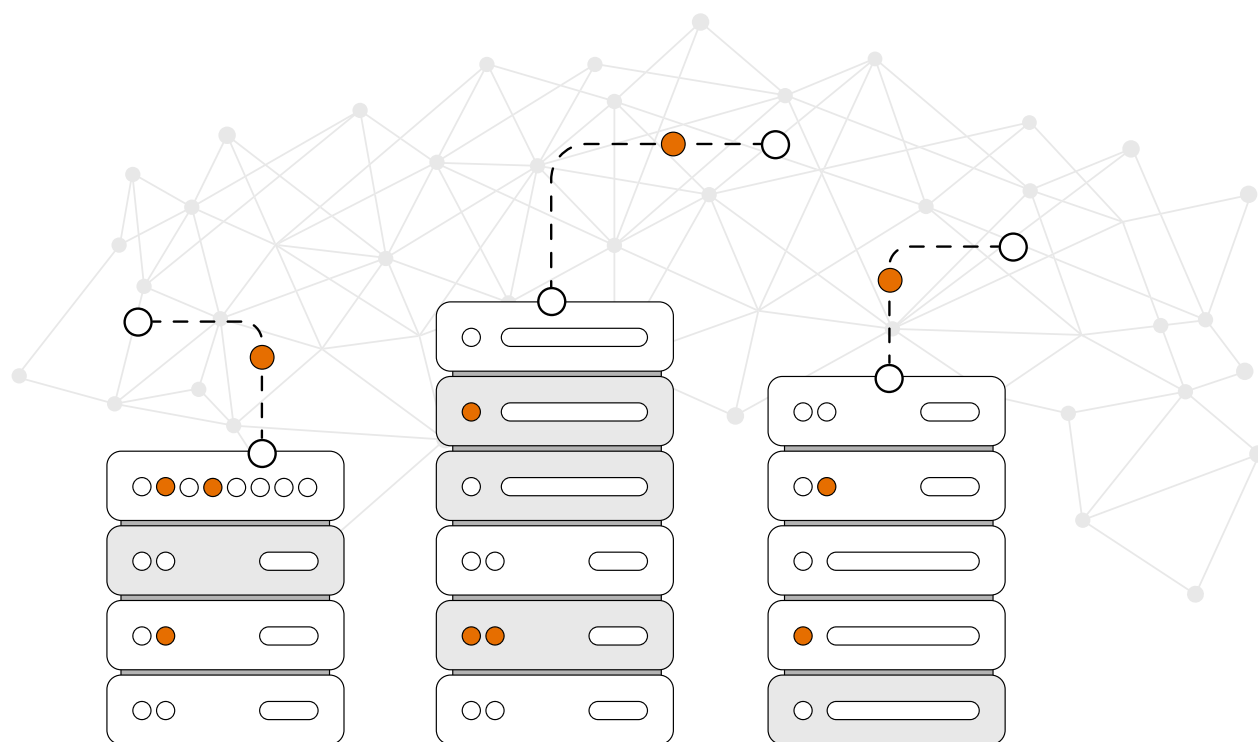
Plexus enables seamless state synchronization across multiple PowerDNS Recursor instances. It continuously distributes the recursive DNS cache, DNSSEC validation state, and authoritative server intelligence, including response times, timeout history, NS rankings, and RTT metrics.

How It Works

Plexus establishes a mesh network between individual PowerDNS Recursor instances. Each Recursor continuously publishes its runtime state to the shared Plexus layer using lightweight NATS messages.

When a Recursor restarts, it retrieves the relevant state data from Plexus and resumes operation with its operational context fully restored – within seconds. Plexus leverages the NATS messaging system for asynchronous, lightweight communication between Recursor instances – no direct real-time sender-receiver connections required.

The lightweight, resilient design of NATS makes it an ideal messaging backbone for high-availability DNS environments.



Authoritative Intelligence: The NS Speed Table

Plexus distributes an up-to-date NS speed table to every restarted Recursor. The table contains response time metrics, timeout history, NS rankings, and RTT values, enabling resolvers to immediately identify the

fastest and most reliable authoritative servers. No relearning. No unnecessary retries. Fewer timeouts from the very first query.

Key Benefits at a Glance



Seamless State Synchronization

Powered by NATS, Plexus continuously receives live DNS state from all Recursor instances.



Instant Authoritative Intelligence

Newly started Recursors immediately benefit from authoritative server intelligence, including response metrics and performance rankings.



No Costly Warm-Up Phase

Preserved cache intelligence eliminates the latency spike typically associated with resolver restarts.



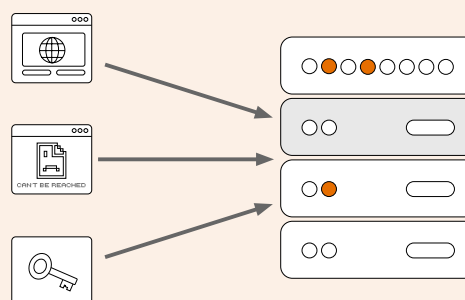
Stable Performance After Every Restart

Consistently low latency, fewer timeouts, and highly stable DNS resolution from the very first query.

Ready to eliminate DNS warm-up delays?

Discover how Plexus keeps your PowerDNS Recursors performing at full speed, even after every restart. Explore the technical documentation or contact our team to discuss your deployment requirements.

[Contact us](#)



docs.powerdns.com