ORYXLABS’ PolarDNS goes Modular - A Comprehensive Update



By Ivan Jedek, Senior Security Researcher

Welcome to the latest chapter in ORYXLABS’ PolarDNS journey, our uniquely specialised authoritative DNS server.
Since its launch in November 2023, PolarDNS has carved out a niche for itself within the DNS security community, enhanced along the way by valuable contributions from its users.

Today, we are excited to unveil a **major update that represents a significant advancement for the project,** and introduce you to its new features and improvements which will significantly enhance its usability and empower users to fully leverage PolarDNS's capabilities.

Challenges with the Initial Design

For DNS-focused security enthusiasts, PolarDNS has been a welcome new addition to the repertoire of tools suitable for in-depth DNS protocol security testing. Nevertheless, while it offers a diverse set of features with wide-ranging flexibility, the first PolarDNS model came with a significant challenge: its foundation and infrastructure were monolithic, making new feature additions and tailored customisations difficult to integrate into the platform.

The monolithic design meant that every feature was embedded in a singular, rather complex codebase. Adding or modifying features required a steep learning curve and familiarity with the code, making it difficult for newcomers to upgrade or tailor the software.

To address these issues, **the team has taken steps to revise PolarDNS's internal designs and its implementation**, to empower users to experiment with the server and add new features with ease.

The Evolution: New Modular Architecture

In its latest version, 1.1, PolarDNS shifts to a modular architecture. This not only brings added flexibility and scalability, but considerable improvements in the development process of new features. All existing features, more than 70 in total, have been rewritten into standalone modules.

This new modular design allows users to compartmentalise new features into small individual packages, in a similar fashion to projects such as the Nuclei vulnerability scanner, Metasploit framework, among others. Beyond modularity, the entire codebase has been refined into a more concise structure that's easier to navigate and understand.

Additionally, **the project now integrates seamlessly with popular code editors, such as PyCharm**. Users can run PolarDNS directly from the PyCharm editor and use its built-in debugger to inspect the runtime. This integration makes it easier for users to get started with PolarDNS, to experiment, and to become familiar with the code - enabling them ultimately to implement their own ideas more quickly and easily.

Lastly, documentation has also been significantly improved. A brand-new contribution guide has been created to help users extend PolarDNS's capabilities. This includes step-by-step instructions that serve as a comprehensive learning resource, covering core concepts and guidelines for users which can be referred to throughout the entire development process - from start to finish.

The Importance of Modular Design

Why is this modular shift significant? This approach is reminiscent of the modular architecture seen in other community projects, such as Metasploit Framework, Nuclei vulnerability scanner and SpiderFoot, among others. **Modular design allows the community to contribute and share individual features as independent modules**, making it easier to maintain and enhance incrementally over time.

This approach not only fosters collaborative growth but also drives innovation. Users can build and share modules that others can use and refine. It also provides a framework that will continue to adapt and expand as new ideas emerge, without compromising performance or stability.

The new update marks a new era for PolarDNS, its new modular architecture not only resolves the issues of the past but also sets the stage for future development, community contribution and innovation. **By creating a system where features are modular, the team has ensured that PolarDNS remains flexible, dynamic, and increasingly useful for its users.**

ORYXLABS hopes you will embrace this new design and form a part of our growing community, contributing to, and benefiting from, a truly collaborative and modular security platform.