



DNSXplore

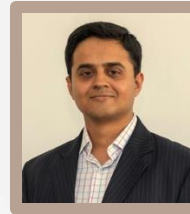
A DNSSEC Archival & Diagnostic Platform



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DNSXplore Team

We are working to develop the **DNSXPLORE platform** for the Internet community that will help in DNSSEC archival, verification requirements of end users, especially academia, cyber security experts and DNSSEC implementers (telcos)



Dr. Naveed Bin Rais

Director DNSXplore Project
Professor Ajman University, UAE



Hafiz Farooq

NomCom 2026 Delegate
RSSAC Caucus, GNSO CBUC (Large)

Jehandad Khan (Project Architect)

Shahzaib Jutt (BE Developer, DNSSEC Engineer)

Ahmad Waqar (FE Developer)

Sana Abouelnour (Junior Developer)



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What's DNSXplore Project

DNSXplore is an **ICANN funded project** to develop a DNSSEC Archiving and Diagnostic Platform. Currently there are no comprehensive platforms in the world for the Internet community (especially gTLD and ccTLD community), which provides historical DNSSEC data to better understand the implementation flaws, security weaknesses and design loopholes



DNSXplore

Funded by ICANN Grant Program



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DNSXplore Project

Project Features



Funded by ICANN Grant Program 2024

Analyze DNSSEC Records for 600Million+ Internet Domains

DNSSEC Crawl rate: 10Million Domains / Day

DNSSEC Data Retention: 1 Year

Free DNSSEC Data Access to Internet Community



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DNSXplore Project

Project Beneficiaries

Uniting the Impact | Together We Shape Futures

Internet Community

gTLD Registrars

gTLD Registries

Researchers

Academia

Cyber Security Experts

ccTLDs



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DNSXPLORE

PASSIVE DNSSEC PLATFORM

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DNSXplore Project

DNSSEC Statistics



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- **Time Series analysis** of DNSSEC Signed Zones
- **gTLD** wise DNSSEC Adoption timelines
- **ccTLD** wise DNSSEC Adoption timelines
- **Algorithm Usage** Reports (DSA, RSA, ECDSA, GOST)
- Verification Failure **Reasons**
- **Rollover** Statistics
- RSA **Exponents** Statistics
- **NSEC** vs **NSEC3** Adoption



Zone Wise Stats



TLD Wise Stats



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DNSXplore Project

Project Timelines



Funded by ICANN Grant Program 2024

MILESTONE1

Project **Planning** and
Hardware **Procurement**

2025

Dec



MILESTONE2

Lab **Commissioning**
and initial **Testing**

2026

Jan



MILESTONE3

DNSSEC **Crawler**
Deployment & Testing

2026

Feb



MILESTONE4

Analysis & Crawling of
all **Internet Domains**

2026

Jun



MILESTONE5

Project **Go Live** and
accessible to community

2026

Oct



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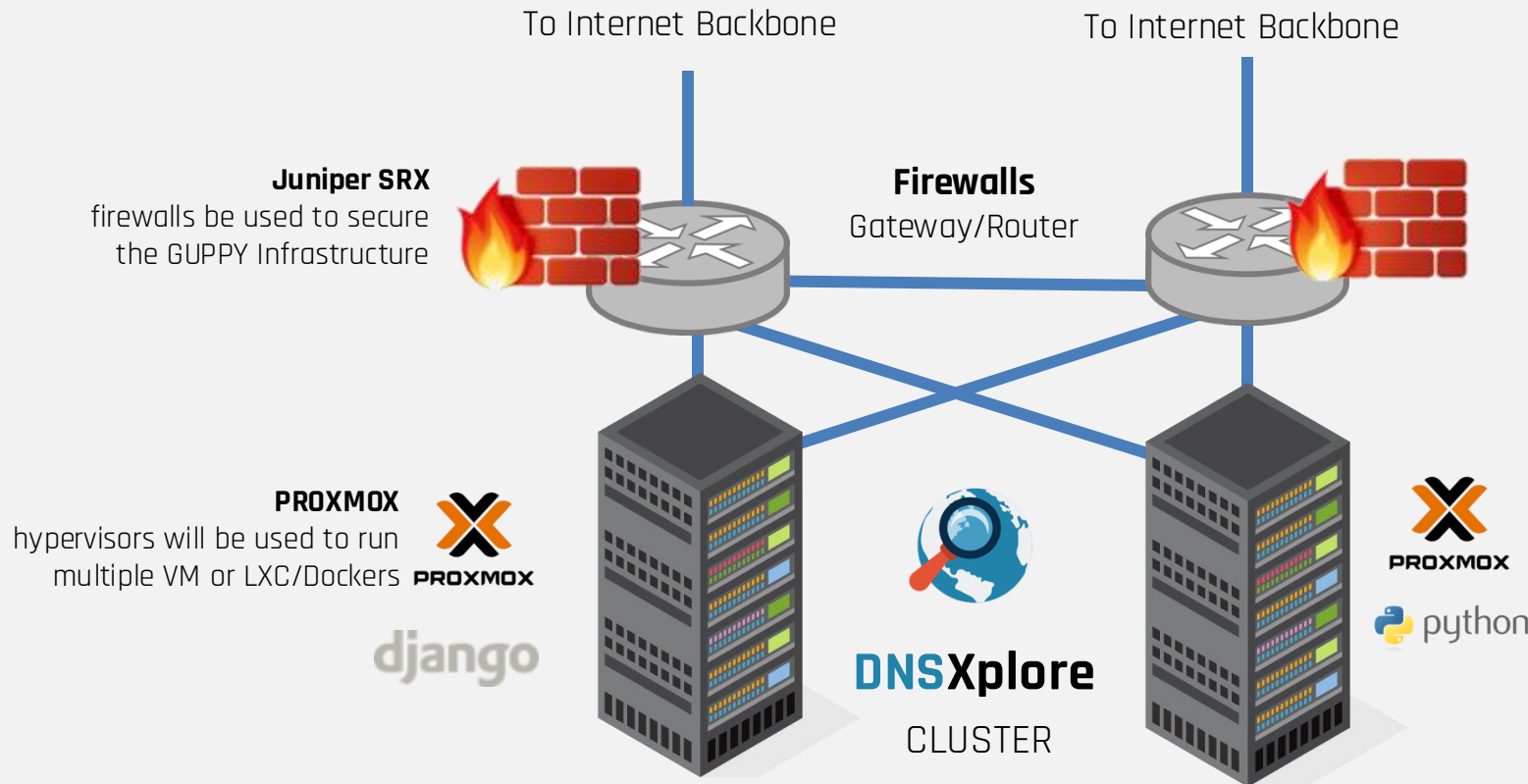


DNSXplore Project

DNSSEC Research Lab



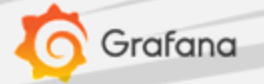
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Apache **Kafka** will be used for streaming the Passive DNNSEC data collected through crawlers



Grafana will be used for the real time dashboarding and visualizations



BIND9 service will be used for DNSSEC validation



MongoDB will store all the DNSSEC raw data objects for longer duration



GraphQL will be used for the API interface for the Data Warehousing



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PASSIVE DNSSEC PLATFORM

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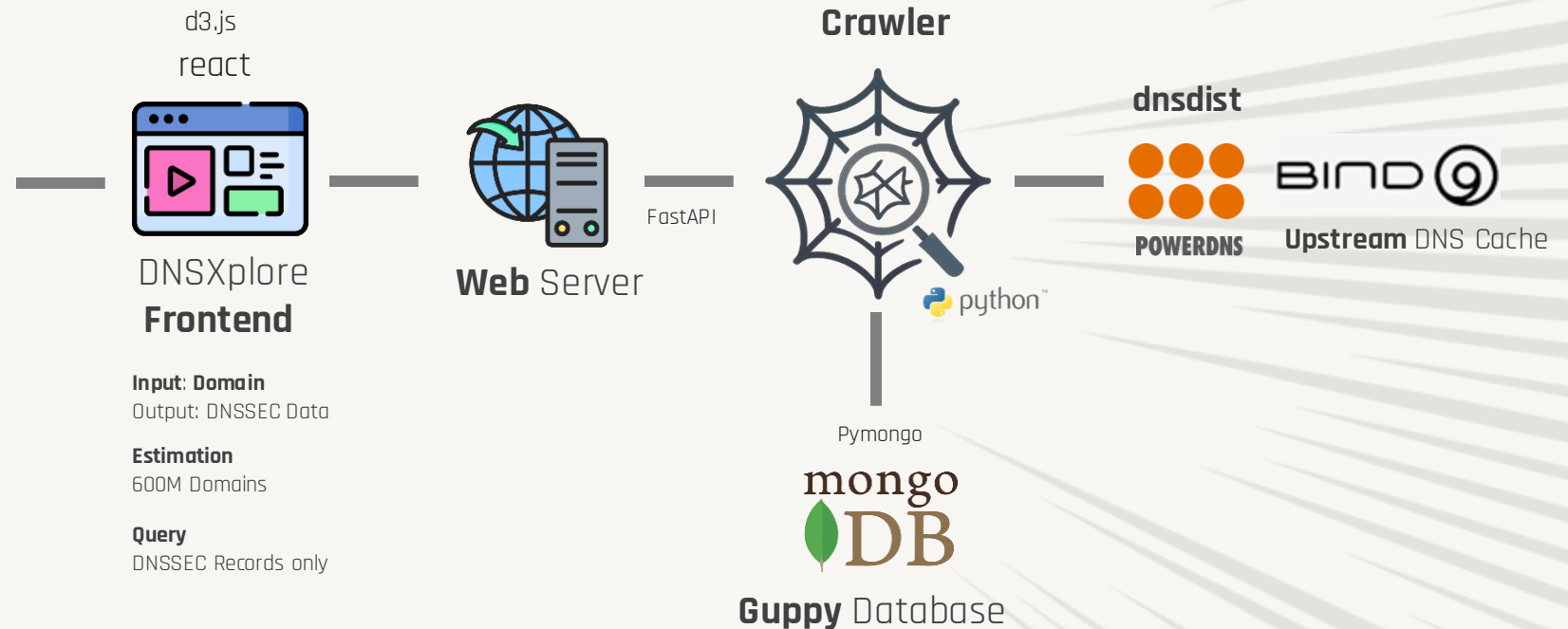


DNSXplore Project

SYSTEM ARCHITECTURE

DNSSEC Crawler
to crawl 24x7
all the registered
Internet
Domains

Crawl Frequency
One Month or Higher



Funded by ICANN Grant Program 2024

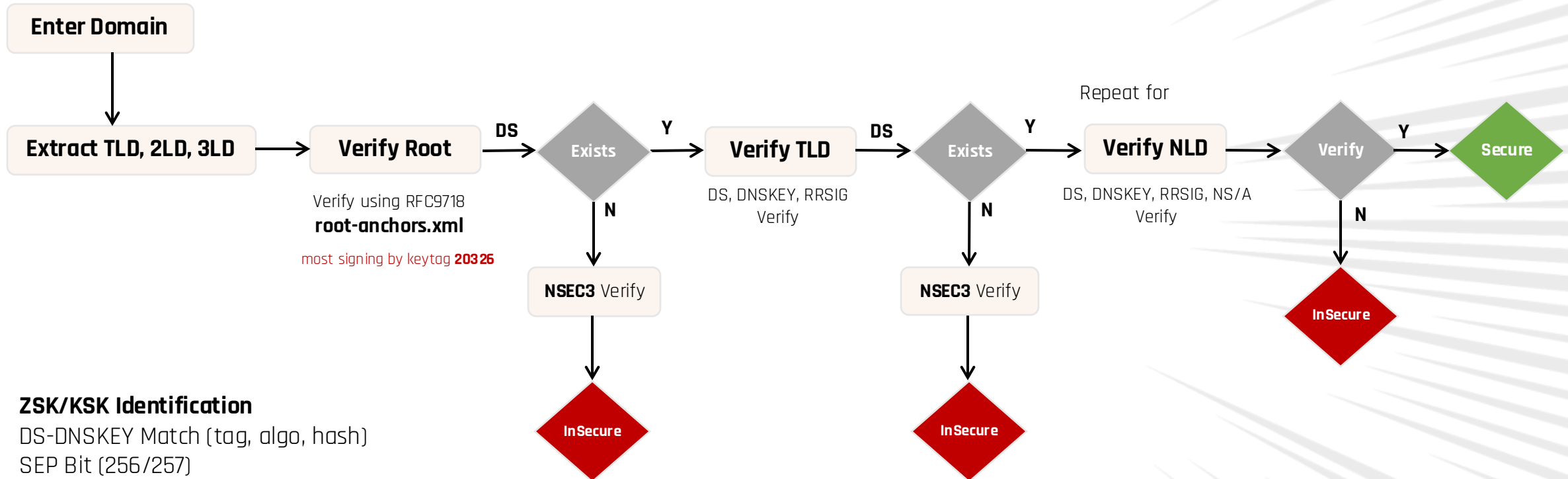


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RFC 8027 DNSSEC Roadblock
RFC 4431 DNSSEC Lookaside Validation (DLV)
RFC 9824 Compact Denial of Existence in DNSSEC
RFC 9718 DNSSEC Trust Anchor Publication
RFC 9364 DNS Security Extensions (DNSSEC)



ZSK/KSK Identification

DS-DNSKEY Match (tag, algo, hash)

SEP Bit (256/257)

Key Size (ZSK: 1024, KSK: 2048)

Expiry (ZKS expires early)



Data Collaboration



- **OpenIntel**, University of Twente
- **Measuring DNSSEC Adoption**, University of Duisburg-Essen
- **African DNS Observatory**
- **YODNS Resolver**, <https://github.com/DNS-MSMT-INET/yodns>



<http://dnsxplore.com>



SHORT DEMO
DNSXplore



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QUESTIONS & ANSWERS DNSXplore Project



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