netbox

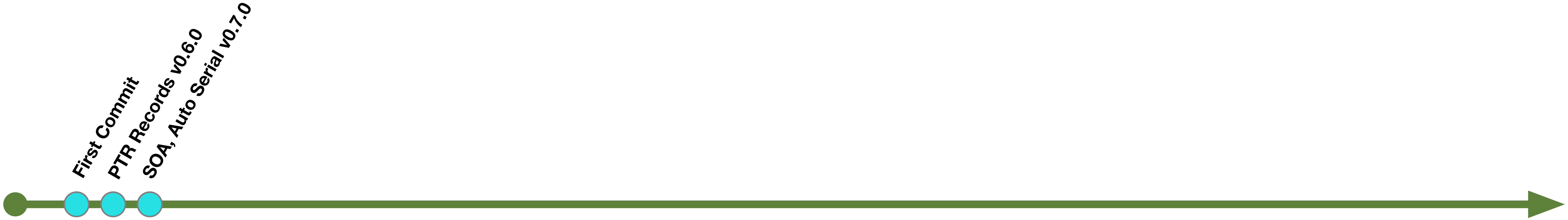
2021-2024

Peter Eckel, FOSDEM 2025

Peter Eckel

- Started hacking in the early eighties
- Studied computer science and mathematics
- Full-time freelance IT consultant since 1994
- Working for multiple clients most of the time, some of them have been customers for many years (more than 20 in one case)
- FOSS preferred in projects, but sometimes one can't avoid proprietary stuff

2021



First Commit

PTR Records v0.6.0

SOA, Auto Serial v0.7.0

Customer Project

DNS infrastructure for a Linux infrastructure

- Separate environments for production and test systems
- Independence from the AD infrastructure maintained by the internal IT department
- Full and autonomous control over production DNS zones
- Initial concept created 2009
- Mandate for realisation given Q3/2021

DNS Infrastructure? 🫡

... but we need a GUI! 😱

Selection Criteria

- Open Source
- Web-based frontend
- Well-maintained, living project
- APIs for Ansible automation
- Reasonably lightweight

netbox

Can NetBox do DNS? 🧐

Not really. 😞

But there are plugins! 😎

auroraresearchlab/netbox-dns

The good …

- Pretty young project – just two months old when I found it
- Maintained by some friendly guys in Istanbul
- Can store name servers, zones and records
- **Very** decent GUI and API support
- **Many** automated tests ❤️

auroraresearchlab/netbox-dns

... and the bad.

- No validation of names and record values (e.g. IP addresses)
- Some of the tests were using syntactically incorrect data
- No automation at all: NS, SOA and PTR records need to be created and updated manually
- The NetBox plugin API wasn't really complete, so some functions were using reserved interfaces

All in all a good starting point!

So I started working 🚧

Validation

- RR types
- DNS names (total and label length, general format)
- RR formats (e.g. MX, SOA)
- RR type constraints (CNAME/DNAME, Singletons)
- Punycode/IDN correctness
- RR names
- Names in RDATA

Name Validation Examples

- name.example.com ✅
- na-me.example.com ✅
- na_me.example.com ✅/(❌)
- _name.example.com ✅/❌
- na--me.example.com ❌
- xn--aa.example.com ✅
- xn--bb.example.com ❌

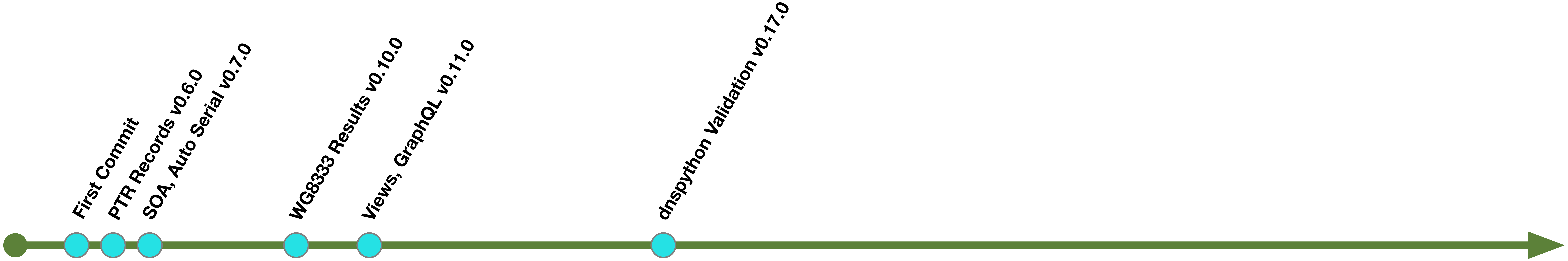
Wrap-Up 2021

- Basic validation for IP addresses, zone and name server names etc.
- Generation of PTR records for address records
- Generation of NS records for name servers
- Automatic generation of SOA SERIAL
- Generation of SOA records from zone properties
- **Many** additional tests for the new functionality

At this point the plugin was fit for the customer's use case.
✅

Unfortunately I got hooked.
💉

2022



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Views, GraphQL v0.11.0

dnspython Validation v0.17.0

NetBox WG 8333

Goal: Improved and extended plugin API for NetBox!

- Initiated by the NetBox project
- Collected and discussed ideas for the further development of the NetBox plugin API
- As a contributor to NetBox DNS I was invited to join
- Many points were taken up and implemented, Jeremy himself contributed some functionality to NetBox DNS
- That **really** helped!

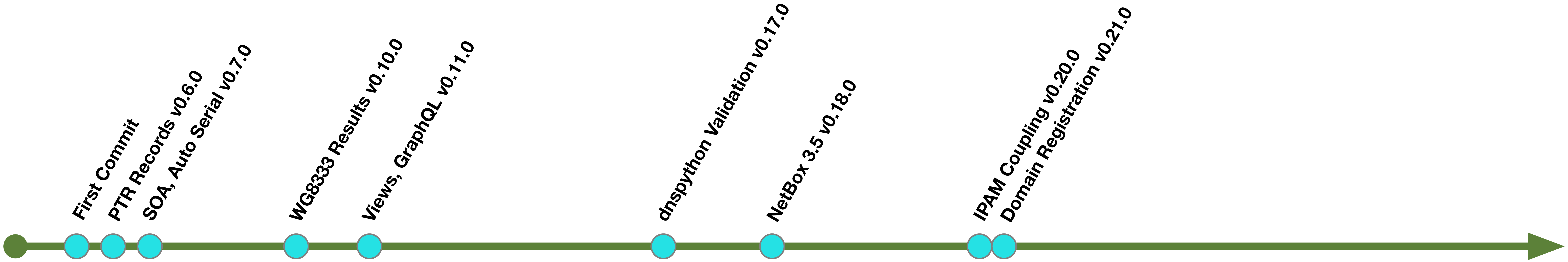
NetBox WG 8333 Results

- Support for many formerly core-only features for plugins (e.g. DynamicModel.*ChoiceField, custom links, webhooks, export templates etc.)
- Support for standard features such as tagging, journaling
- Support for adding plugin-specific top level menu items in the navigation menu
- Plugin development tutorial
- Vastly improved documentation for plugin authors

Wrap-Up 2022

- NetBox 3.2 was released with many of the results from WG 8333
- Re-implemented many functions to use the new interfaces
- Added support for the GraphQL API
- Added views to the data model
- Name and value format validation of DNS records (using dnspython)
- Added support for Punycode and IDNs
- Added support for the global search index

2023



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NetBox 3.5 v0.18.0

IPAM Coupling v0.20.0

Domain Registration v0.21.0

Wrap-Up 2023

- Some example custom scripts for exporting data and synchronising with IPAM IP addresses
- Started porting to NetBox 3.5 ...

(this part intentionally left blank)

The maintainers fell silent.

I never found out what had happened,
but apparently the project was dead.

So I forked.

Forking was painful.

- GitHub was no problem at all (at first)

- Since the PyPI project "netbox-dns" was taken and the maintainers were unavailable, I created a new one named "netbox-plugin-dns"

- To maintain compatibility, I left the directory tree as it was

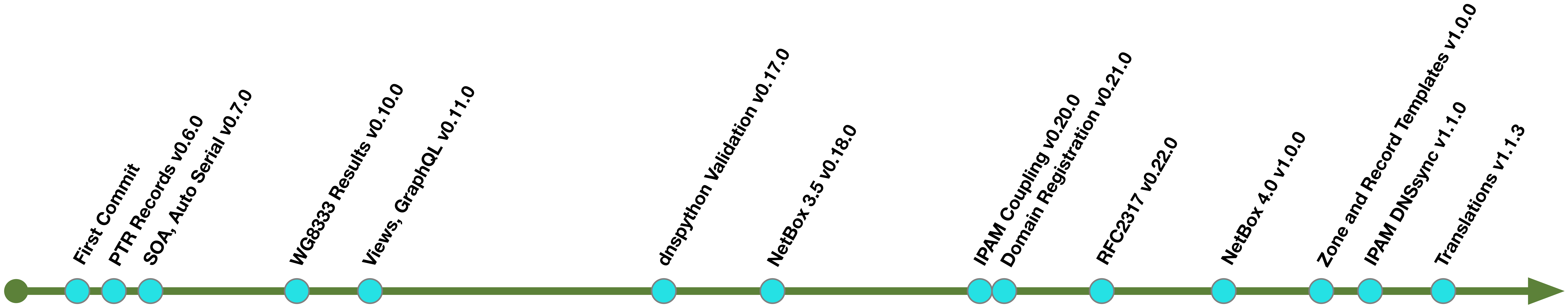
- GitHub search always found the old plugin because it had more stars, so many issues were opened in the wrong repository

- Not renaming the directory turned out to be a good and a bad idea at the same time and created some interesting issues

Wrap-Up 2023 (continued)

- Finished porting to NetBox 3.5
- Validation for many special cases I didn't think of initially (root zones, wildcard records, you name it ...)
- Validation for CNAMEs, DNAMEs and singletons
- Added domain registration models for zones
- First implementation of IPAM/DNS integration: IPAM Coupling by @jean1 (Thank you very much, Jean!)

2024



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Domain Registration v0.21.0

RFC2317 v0.22.0

NetBox 4.0 v1.0.0

Zone and Record Templates v1.0.0

IPAM DNSsync v1.1.0

Translations v1.1.3

Wrap-Up 2024

- Added support for RFC 2317 reverse zones for legacy IP delegations smaller than /24
- Extensive validation of record values for all record types
- Compatibility with NetBox 4
- Implemented zone and record templates
- Second implementation of IPAM/DNS integration: IPAM DNSsync
- Added support for localisation (currently only German - volunteers for other languages welcome!)

RFC 2317 (1998)

~~Solution~~Workaround for a typical IPv4 problem: Small subnets

- Zone delegation in in-addr.arpa is limited by dots in the IP address

- That means you can only delegate /24, /16 or /8 reverse zones

- But these days, many organisations only have smaller CIDR subnets, /25 ... /29.

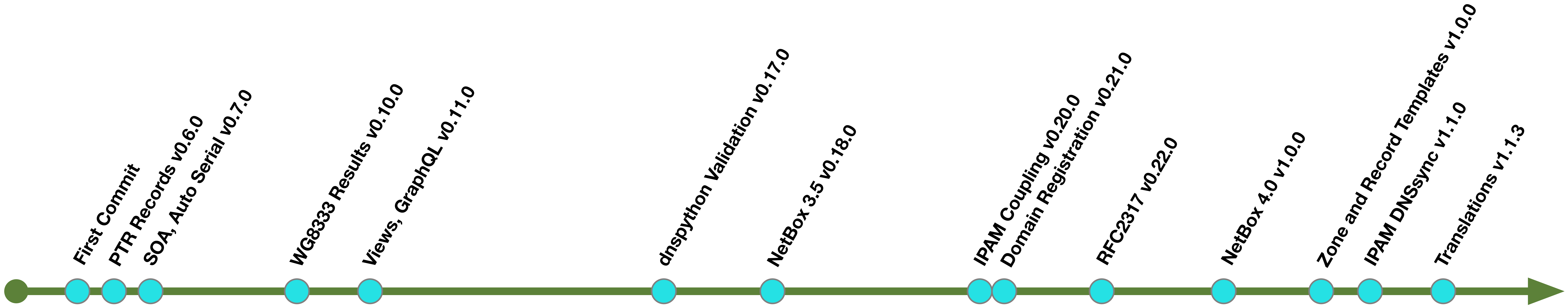
- Reverse zones can only be maintained by their provider, or ... via RFC 2317

IPAM DNSsync

Automatically create address records for IPAM IP addresses

- Creates and maintains address records for IP address objects in NetBox
- IPAM Prefixes are linked to one or multiple DNS views
- The "DNS Name" field of any IP address in the prefix is then matched against zones in these views
- If one or more suitables zone is found, address records are created in these zones

2025?



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Planned for 2025

- Support for DNSSEC (e.g. Key Algorithms, NSEC/NSEC3)
  - Most DNSSEC stuff is handled by the name servers themselves, but some support makes sense
- Mirror zones (replicate all or specific records from a different zone)
- Extended support for zone delegation
- [Insert your favourite feature here]

Thanks! Questions?

https://github.com/peteeckel/netbox-plugin-dns

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