getdns

API implementation

Update

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NLnet Labs

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getdns API is:

- A *DNS API* specification (for resolving)
  by and for application developers (for applications)
- First implementation by VERISIGN LABS and NLnet Labs

From Verisign:

Allison Mankin, Glen Wiley, Neel Goyal, Angelique Finan, Craig Despeaux, Shumon Huque, Duane Wessels, Gowri Visweswaran, Scott Hollenbeck, Prithvi Ranganath, Sanjay Mahurpawar, Rushi Shah

From NLnet Labs:

Willem Toorop, Wouter Wijngaards, Benno Overeinder

From Sinodun:

Sara & John Dickinson

From No Mountain Software:

Melinda Shore

Motivation - for a new DNS API

From API Design considerations:

> *... There are other DNS APIs available, but there has been very little uptake ...*
>
> *... talking to application developers ... the APIs were developed by and for DNS people, not application developers ...*

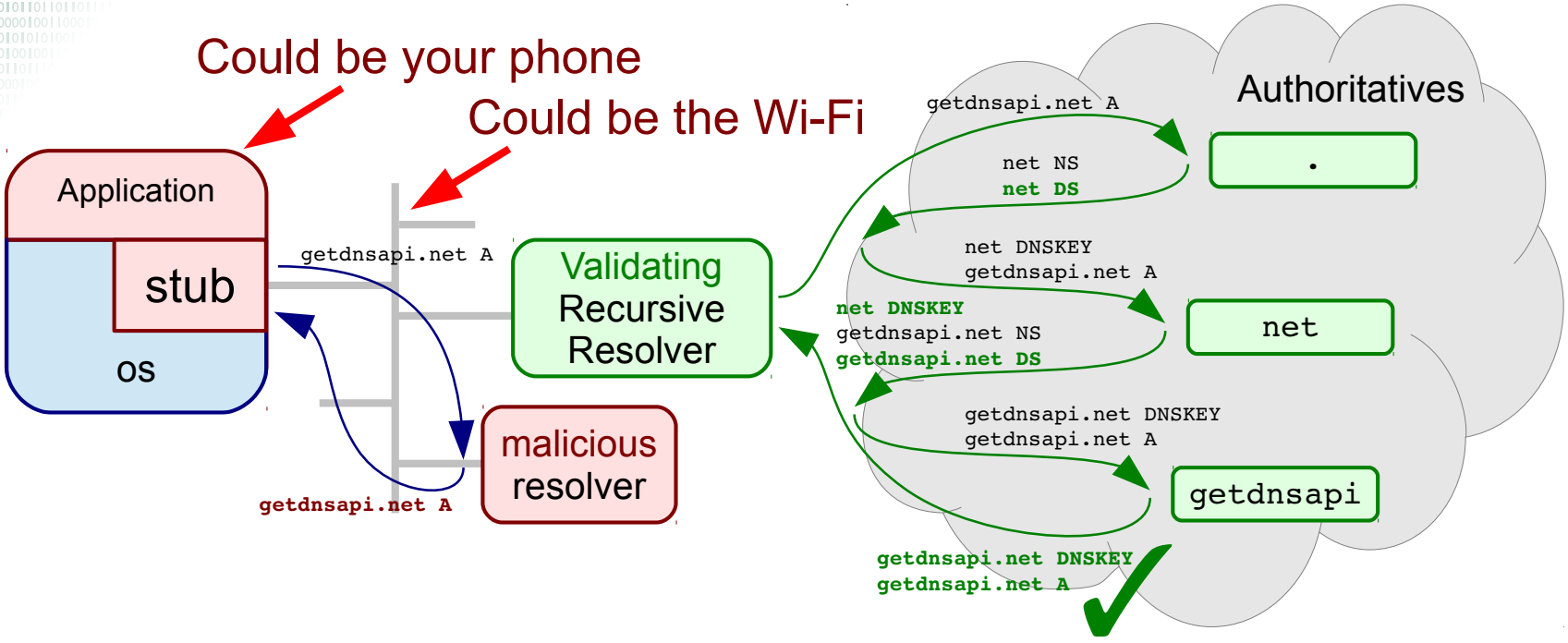
Goal

> *... API design from talking to application developers ...*
>
> *... create a natural follow-on to* `gettadrinfo()` *...*

`https://getdnsapi.net/spec/`

- Originally edited by Paul Hoffman (publiced April 2013)
- Maintained by the getdnsapi.net team since October 2014

Motivation - The Last Mile



- A DNSSEC enabled resolver protects against cache poisoning
- Is the local network resolver trustworthy?

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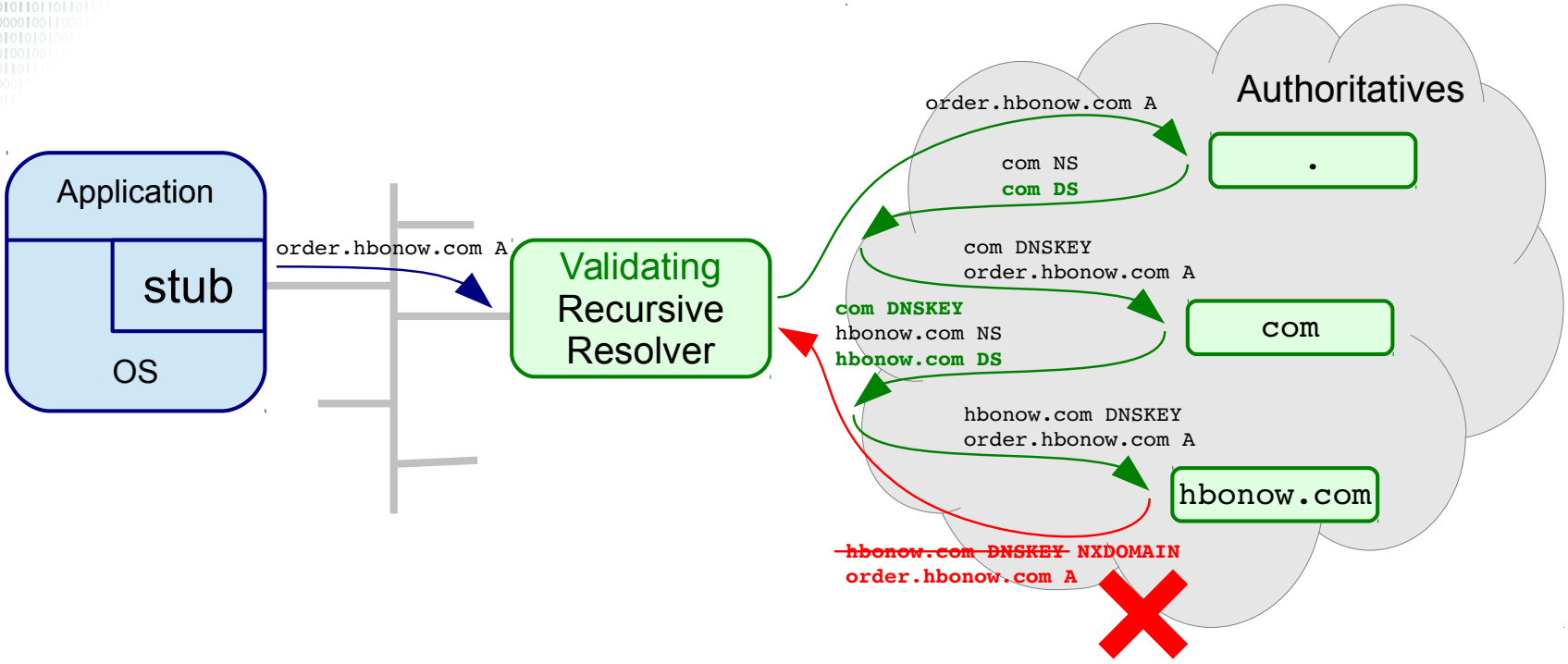

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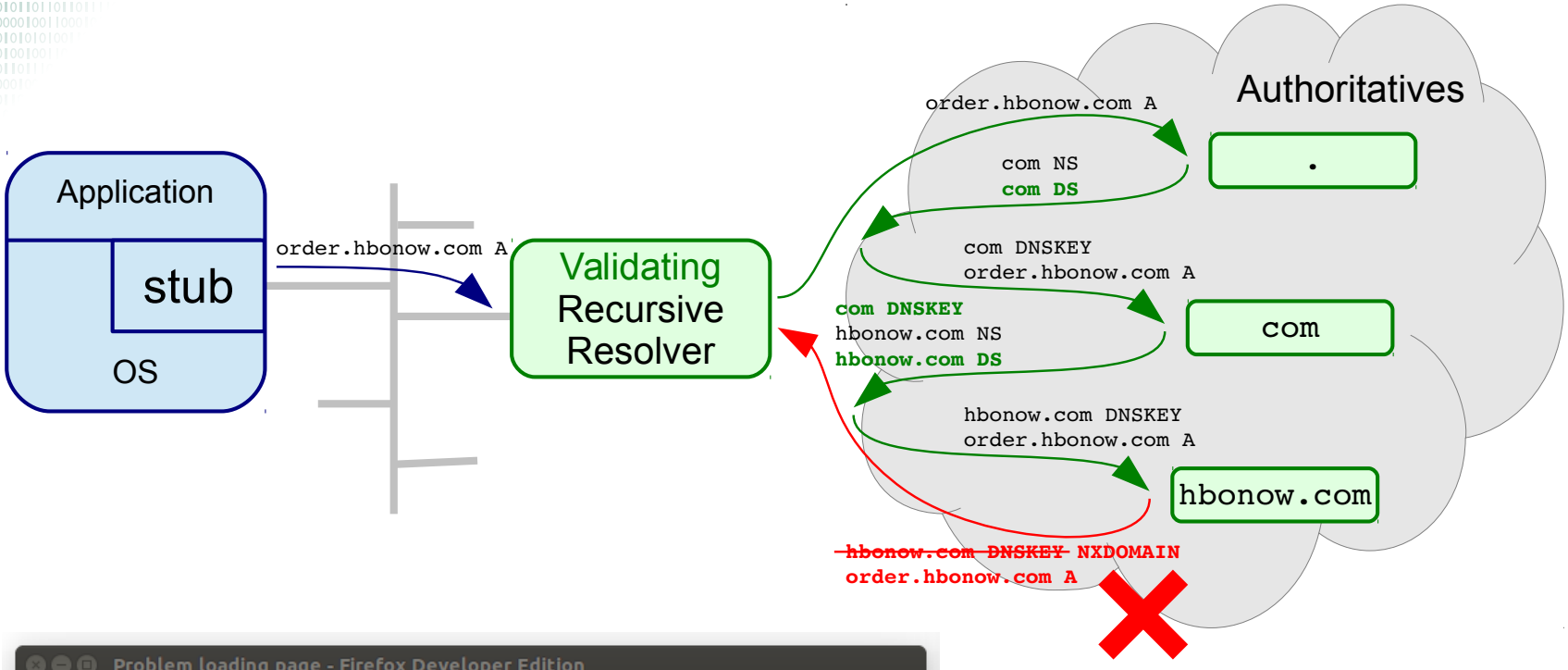

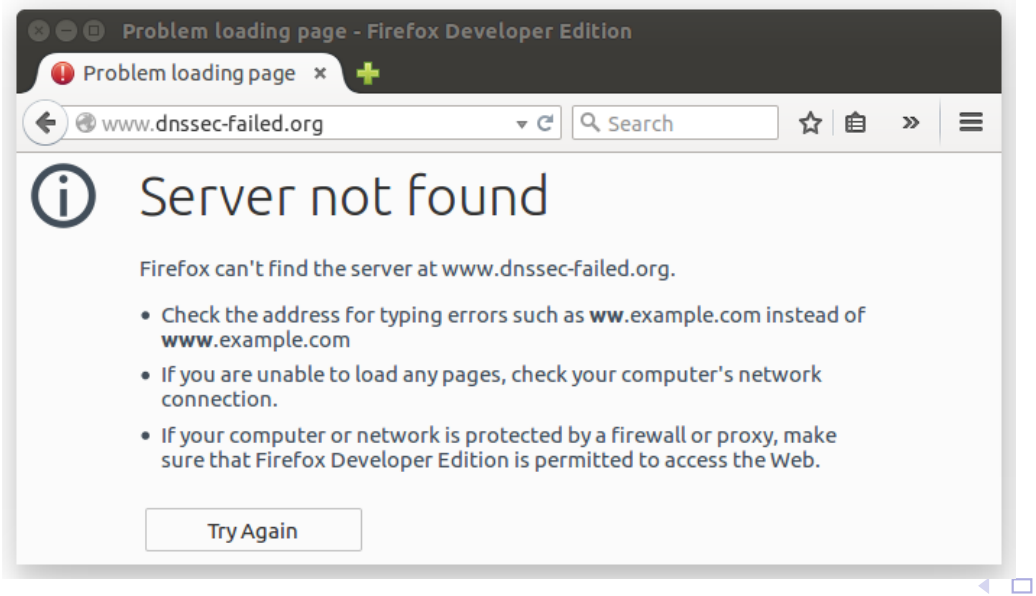

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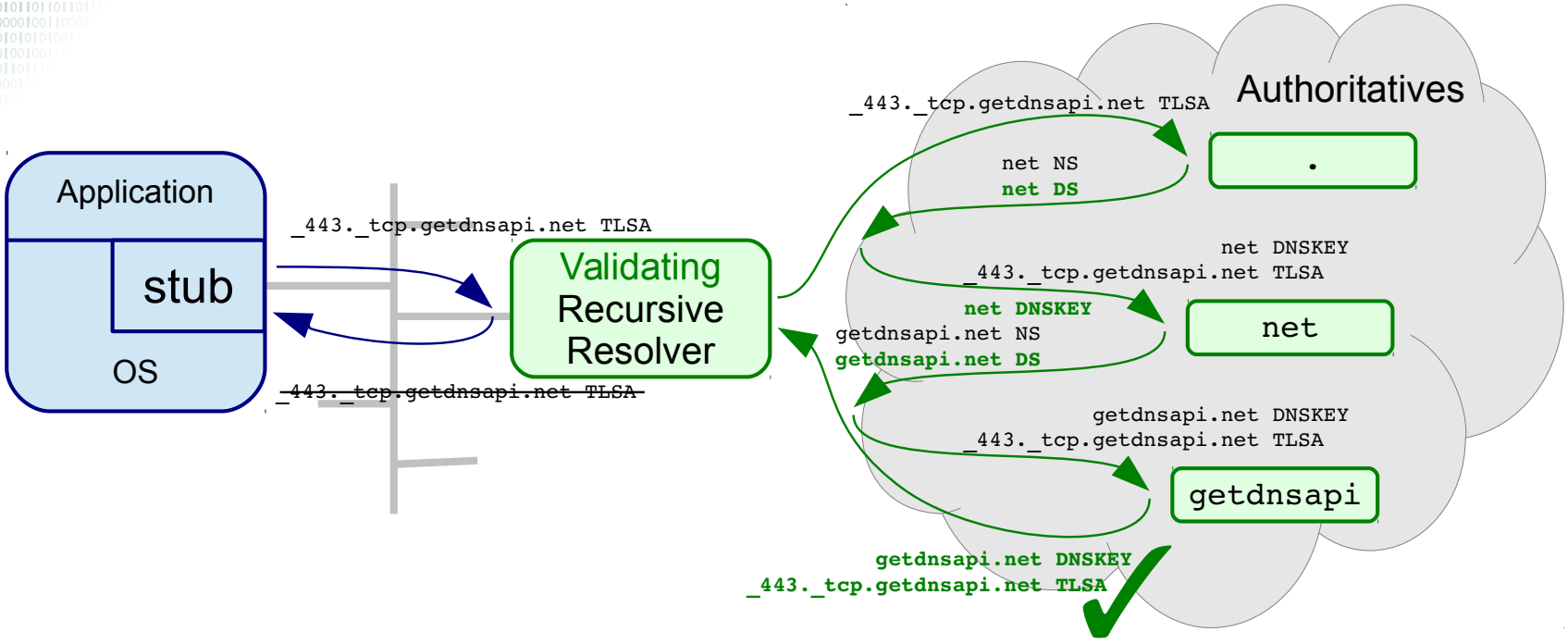

- A DNSSEC enabled resolver protects against cache poisoning
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- Who's to blame?
- Application does not know an answer is secure
  (AD bit not given with `getaddrinfo()`)

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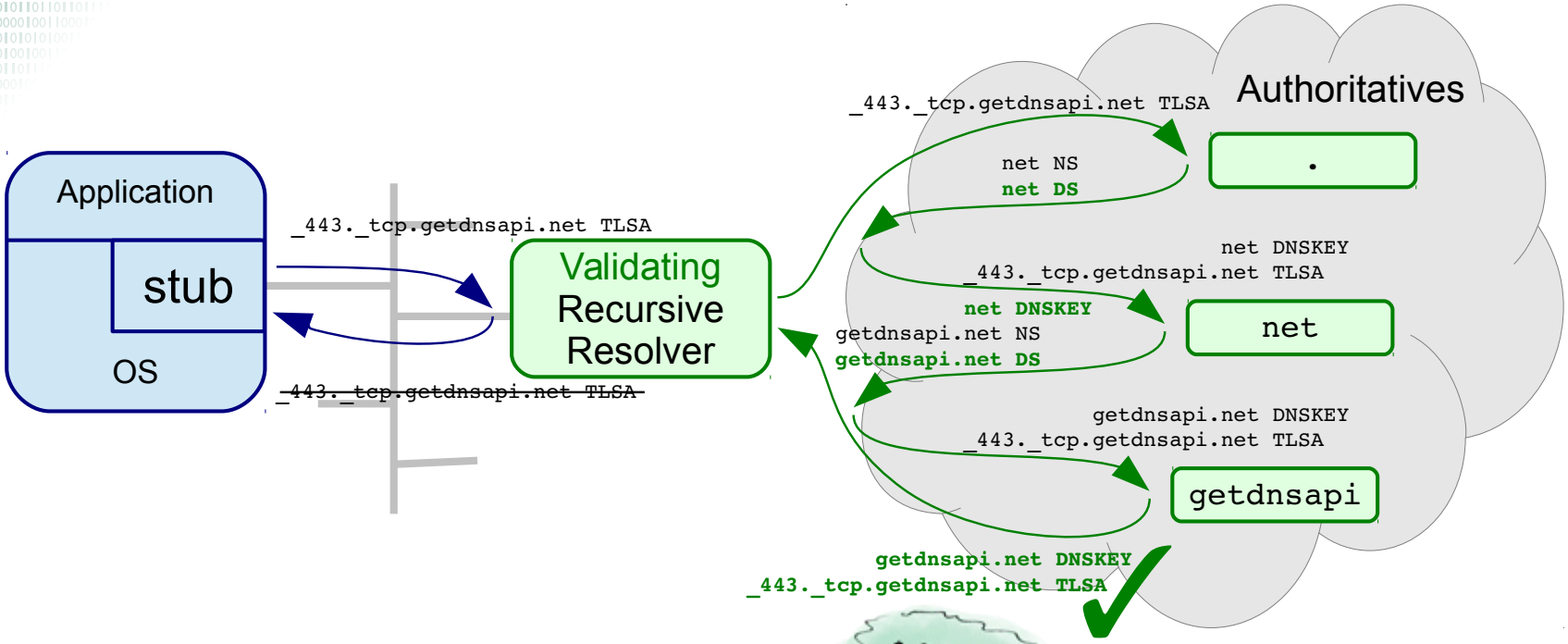

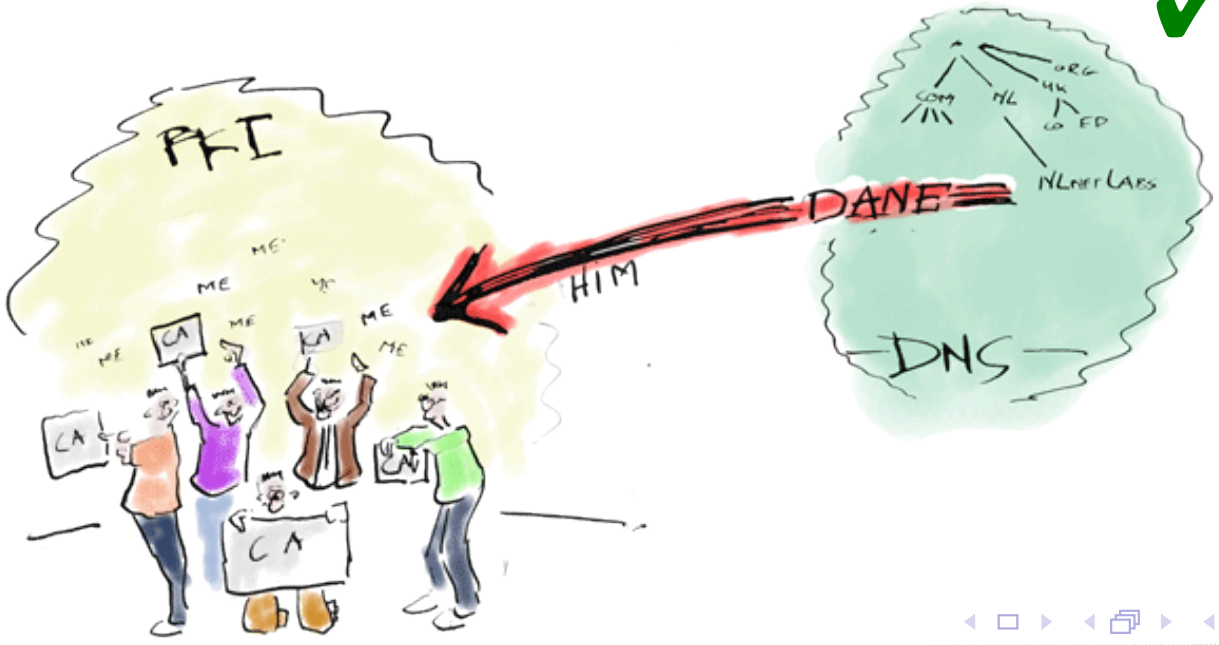

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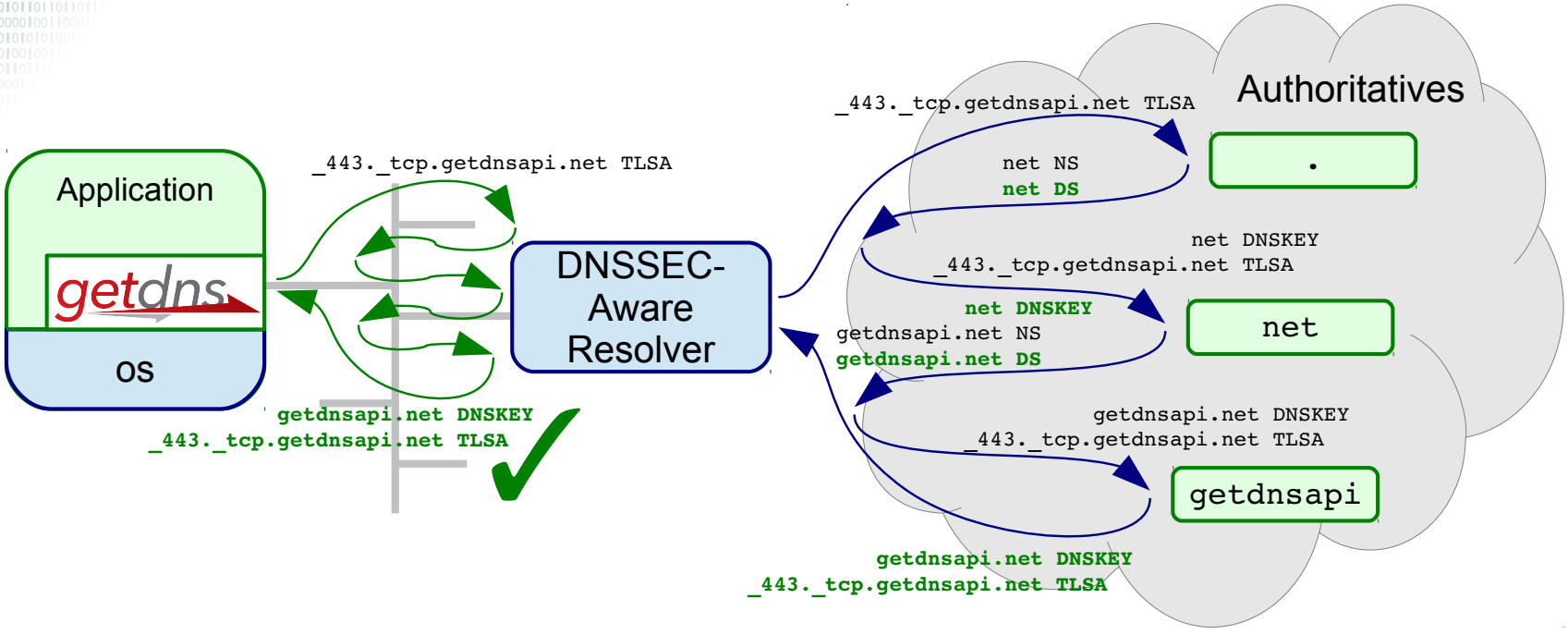

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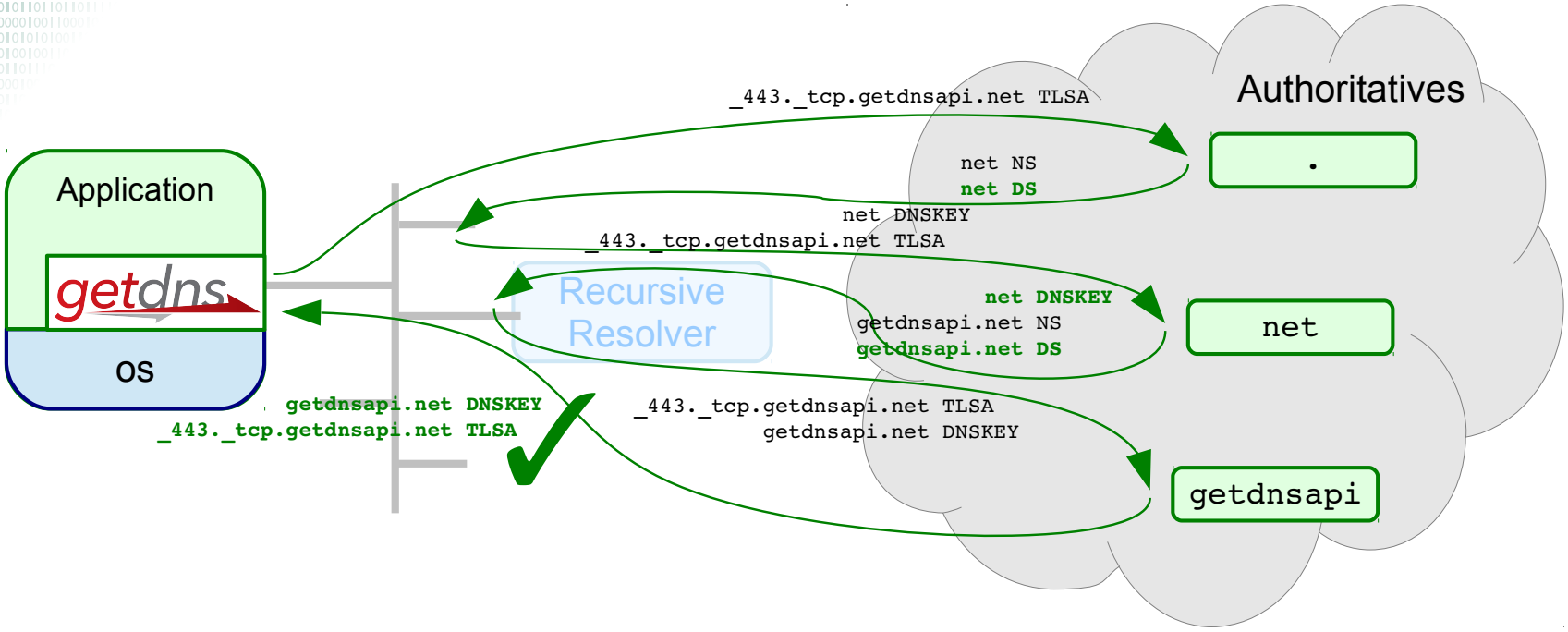

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- Is the local network resolver trustworthy?
- Who's to blame?
- Application does not know an answer is secure
- Network resolver doesn't need to validate.
- And when it is not even DNSSEC-aware?

Implementation - Features

- Both stub and full recursive modes (recusive by default)
- Delivers validated DNSSEC even in stub mode (off by default :( )
- Resolves names and gives fine-grained access to the response with a response dict type:
  - Easy to inspect: `getdns_pretty_print_dict()`
    - `getdns_print_json_dict()` ***new***
  - Maps well to popular modern scripting languages
  - Have a look at `https://getdnsapi.net/query.html`

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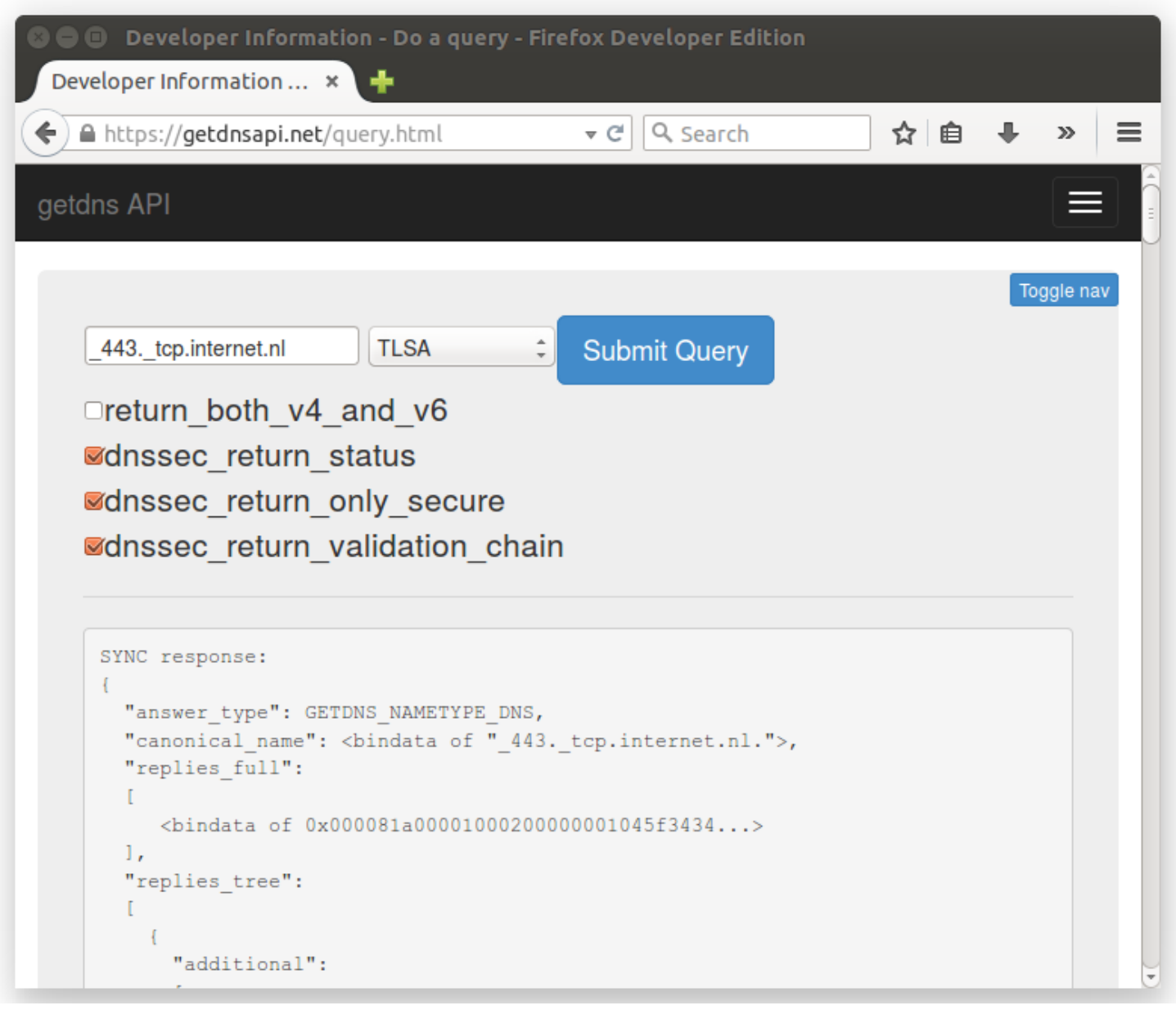

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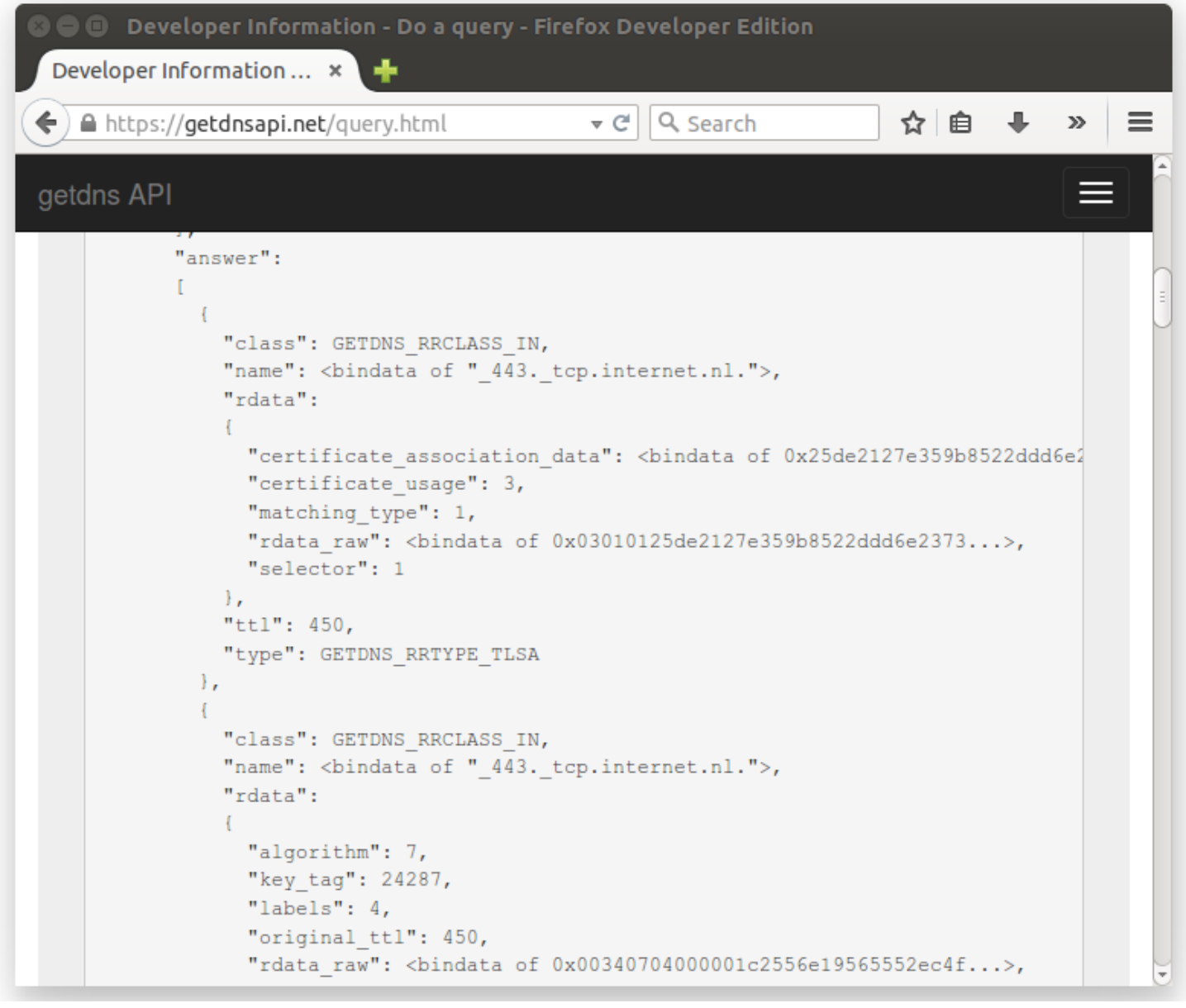

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- Set custom memory management functions
  - No none-custom `mallocs` when in stub mode anymore *__new__*
    - native stub resolver replaced libunbound
  - Minimizing memory allocations and deallocations *__new__*
    - No intermediate ldns host format
    - More optimizations in the future

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- Asynchronous modus operandi is the default
  - Use `getdns_context_run()` *new*
  - Use an even base of choice: `libevent`, `libev`, `libuv`
  - *Or hook into the applications native event base* *updated*
    - The nodejs bindings
    - iOS POC example hooked into grand central dispatch

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- Last two give firm grasp on lower-level behaviour of the library

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- TCP Fast Open (RFC 7413) `--enable-tcp-fastopen`
- New transport options `GETDNS_TRANSPORT_` ...
  - `TCP_ONLY_KEEP_CONNECTIONS_OPEN`
    - Works on (some) existing name servers
  - `TLS_ONLY_KEEP_CONNECTIONS_OPEN`
  - `TLS_FIRST_AND_FALL_BACK_TO_TCP_KEEP_CONNECTIONS_OPEN`
  - `STARTTLS_FIRST_AND_FALL_BACK_TO_TCP_KEEP_CONNECTIONS_OPEN`
    - Following `draft-ietf-dprive-start-tls-for-dns-00`

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    - Following `draft-ietf-dprive-start-tls-for-dns-00`
- Special Cookies/TCP/TLS only open resolver for experimentation available on 2a04:b900:0:100::38 and 185.49.141.38

Implementation - Bindings

- **nodejs** by Neel Goyal `https://github.com/getdnsapi/getdns-node`
- **python** by Melinda Shore
  `https://github.com/getdnsapi/getdns-python-bindings`
  - Now does async processing too! *new*
- **java** bindings by Prithvi Ranganath and Sanjay Mahurpawar *new*
  `https://github.com/getdnsapi/getdns-java-bindings`
- **php** bindings by Scott Hollenbeck *new*
  `https://github.com/getdnsapi/getdns-php-bindings`

Road map

C library

- Release candidate for 0.2.0 just announced
- Version 0.3 will contain native stub DNSSEC validation (soon)
  - No dependency on ldns any more
- Version 0.5 will do Just In Time wire format parsing (@IETF93)
- Better timeout and transport fallback handling (in 0.3)
- `TSIG`, Dynamic Updates

More language bindings, more platforms, more name systems

- Perl, Ruby
- MS-Windows, Android
- DNSSD

The Next Web - Hack Battle - 22 & 23 April 2015 A'dam

Bambi - DNS Slack bot

- A bot doing lookups on request in a chat environment
- by Tom Mazer

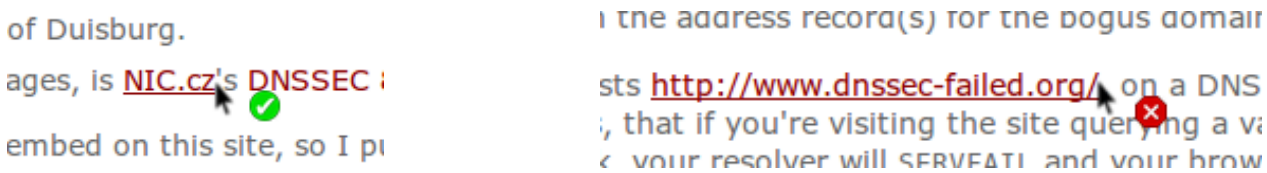
spytransfer

- A from the ground up secure alternative to WeTransfer using a DNSSEC zone for transfer of encryption keys
- by Bas van Ooyen, Willem Westra, Bart van Halder and Wessel Stoker

Looksig

- Give visual (emojicon) representation of KSK keytag for an email address (`OPENPGPKEY`) lookup
- by Jelle Herold
- Part of his security and privacy for the non-tech users project

getsec (winner)



- Browser plugin that returns DNSSEC status already on hover
- by Timothy Armstrong, Warren Pai and Nicola Chinellato

Security starts with a name

website	https://getdnsapi.net
API spec	https://getdnsapi.net/spec.html
latest tarball	https://getdnsapi.net/dist/getdns-0.2.0rc1.tar.gz
github repo	https://github.com/getdnsapi/getdns
node repo	https://github.com/getdnsapi/getdns-node
python repo	https://github.com/getdnsapi/getdns-python-bindings
java repo	https://github.com/getdnsapi/getdns-java-bindings
php repo	https://github.com/getdnsapi/getdns-php-bindings
API list	http://www.vpnc.org/mailman/listinfo/getdns-api
users list	https://getdnsapi.net/mailman/listinfo/users
me	Willem Toorop <willem@nlnetlabs.nl>