dnSSexy

a verifying DNS (SEc) proXY

Willem Toorop

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NLnet Labs

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Motivation

Prevent bogus zones getting out in the wild.

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- There are quiet a few DNS(SEC) verifyers available

OpenDNSSEC Auditor .SE dnssec-monitor jdnssec-tools
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validns Vantages D-Sync ldns-verify-zone
YAZVS AFNIC ZoneCheck *

*list taken from the MEN&MICE website

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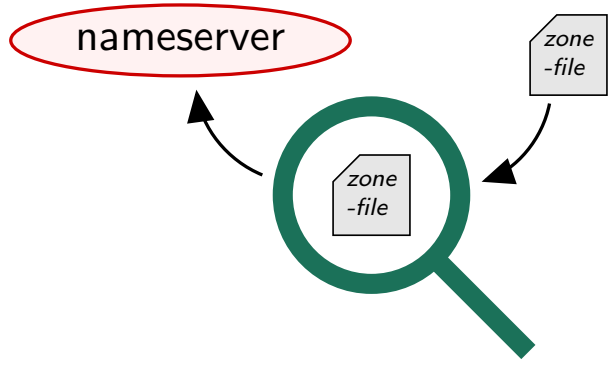
- But they need to check the *zone-file* before it is served



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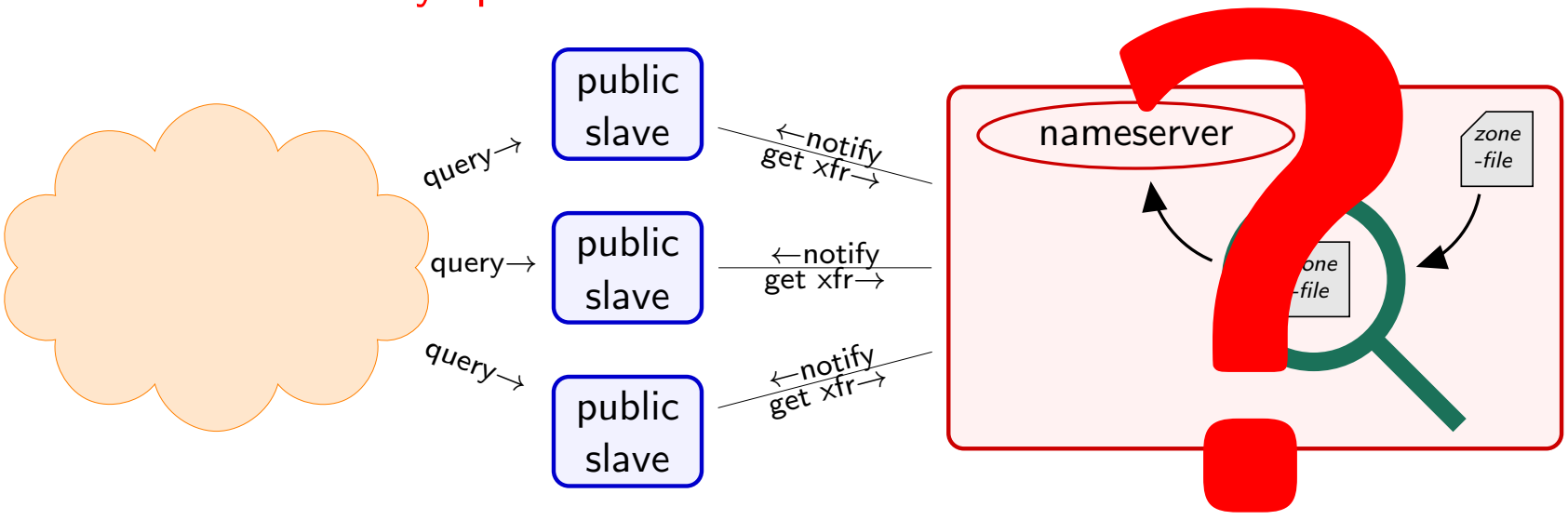
- There are quiet a few DNS(SEC) verifyers available
- But they need to check the *zone-file* before it is served
  - Not always possible ...



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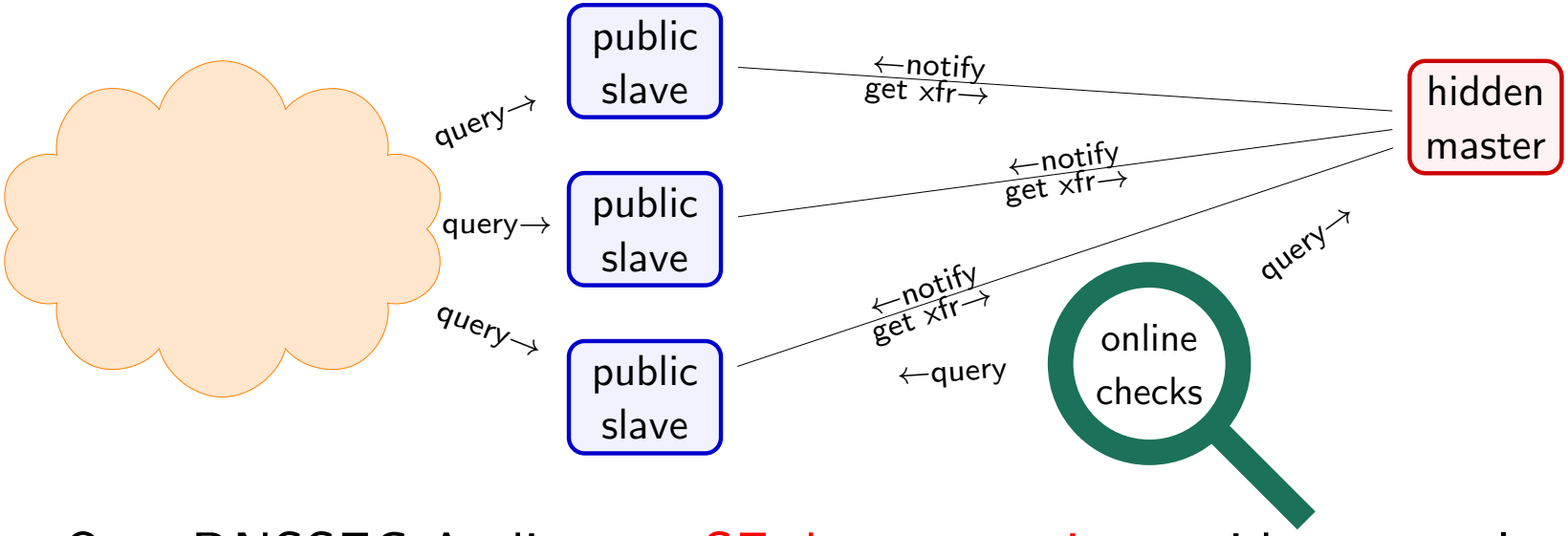
- But they need to check the *zone-file* before it is served
- Or query a zone and thus detect flaws post-factum



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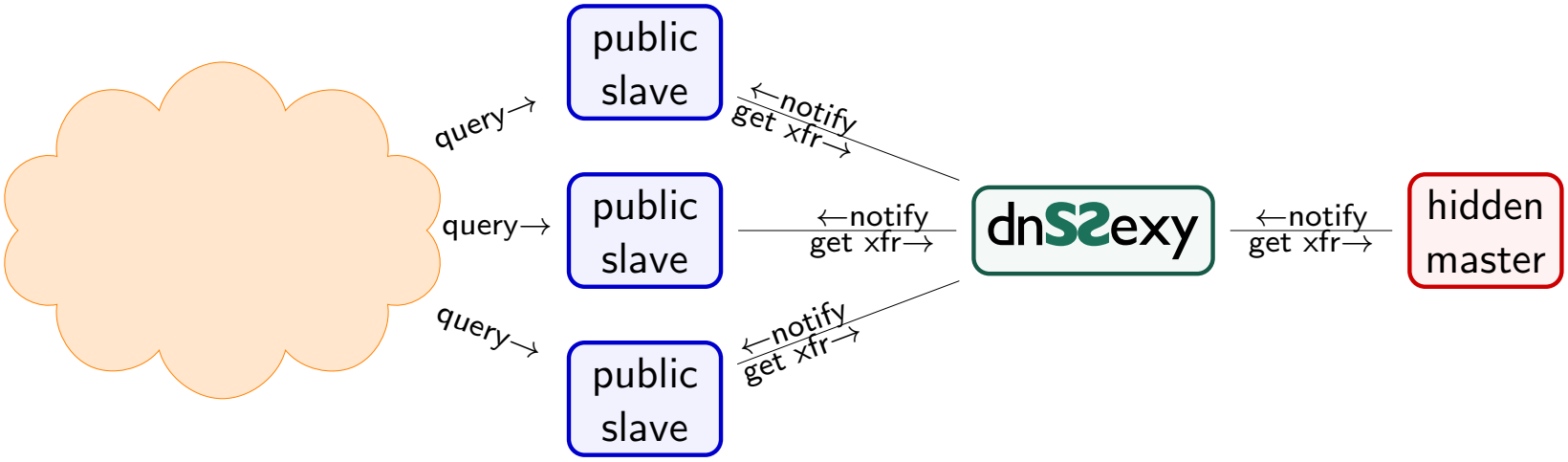
dnSSexy a DNS (SEc) proXY

- dnSSexy is just another nameserver that sits between the hidden master and the public slaves



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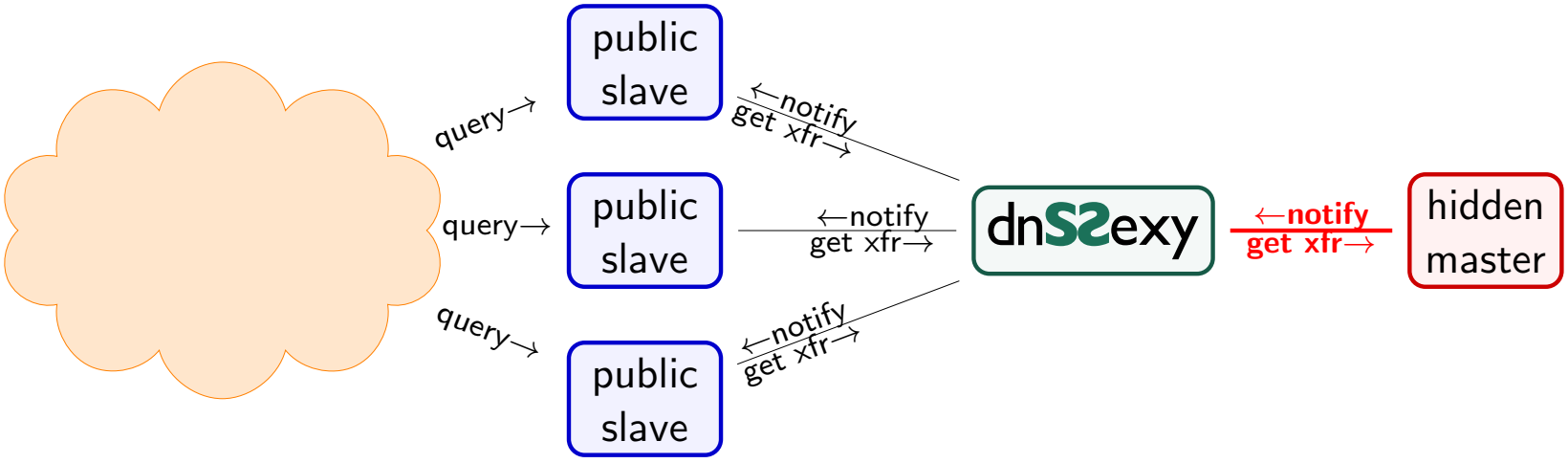

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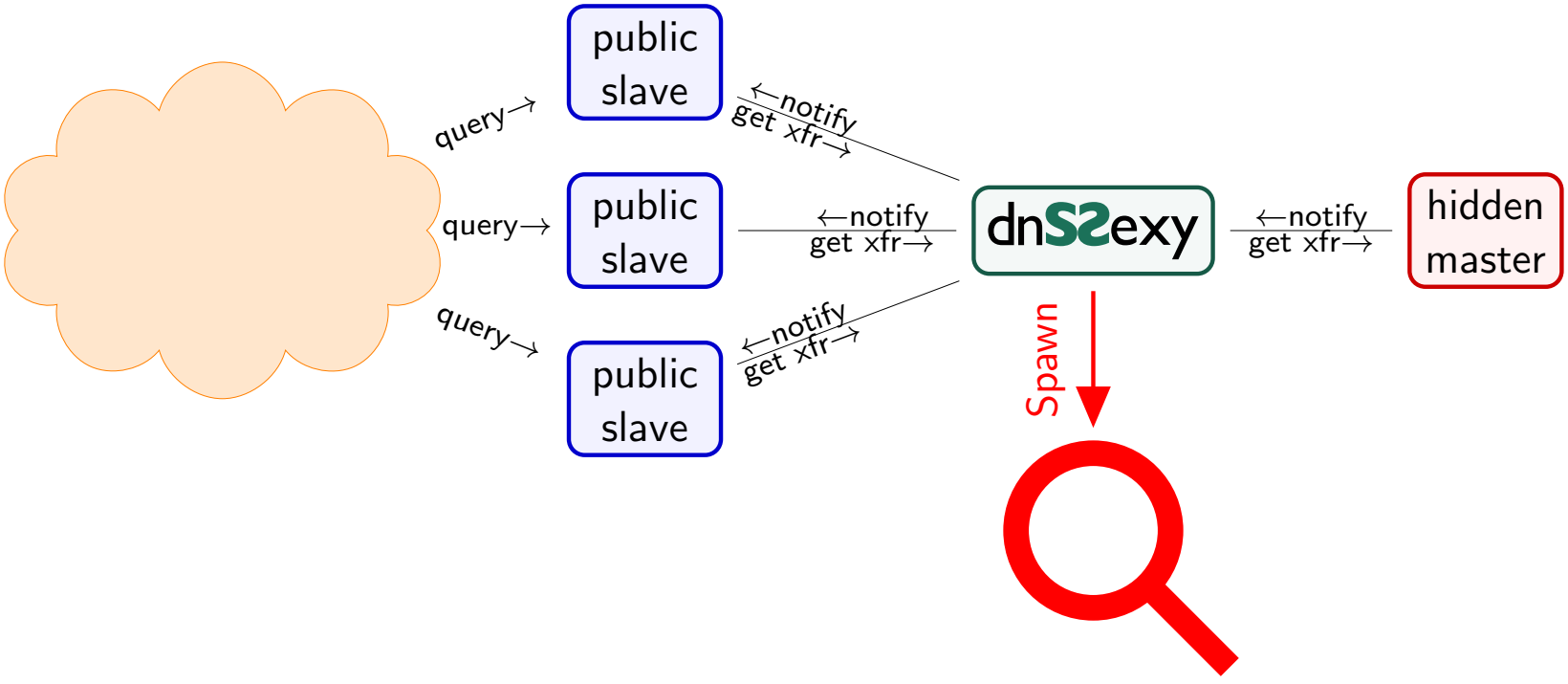

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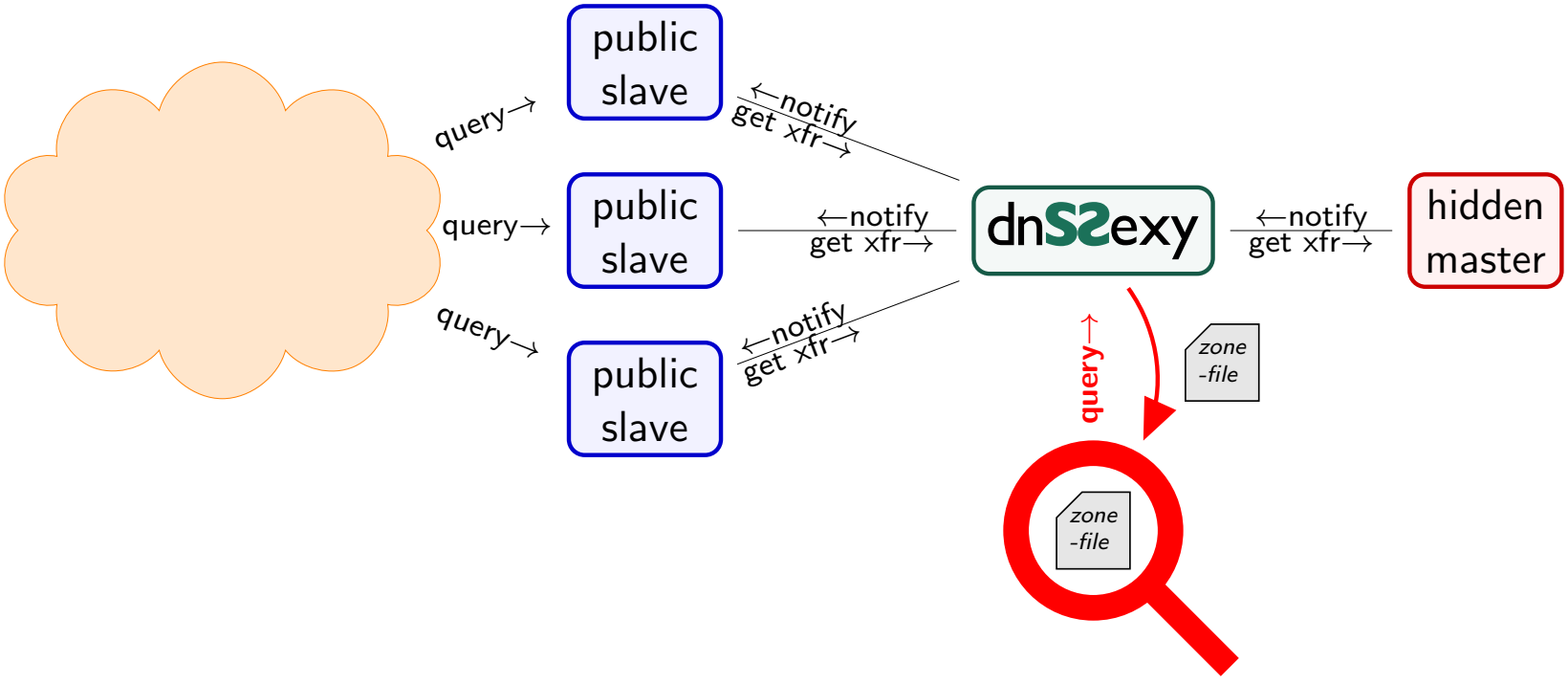
- The updated zone is fed and served to the verifier



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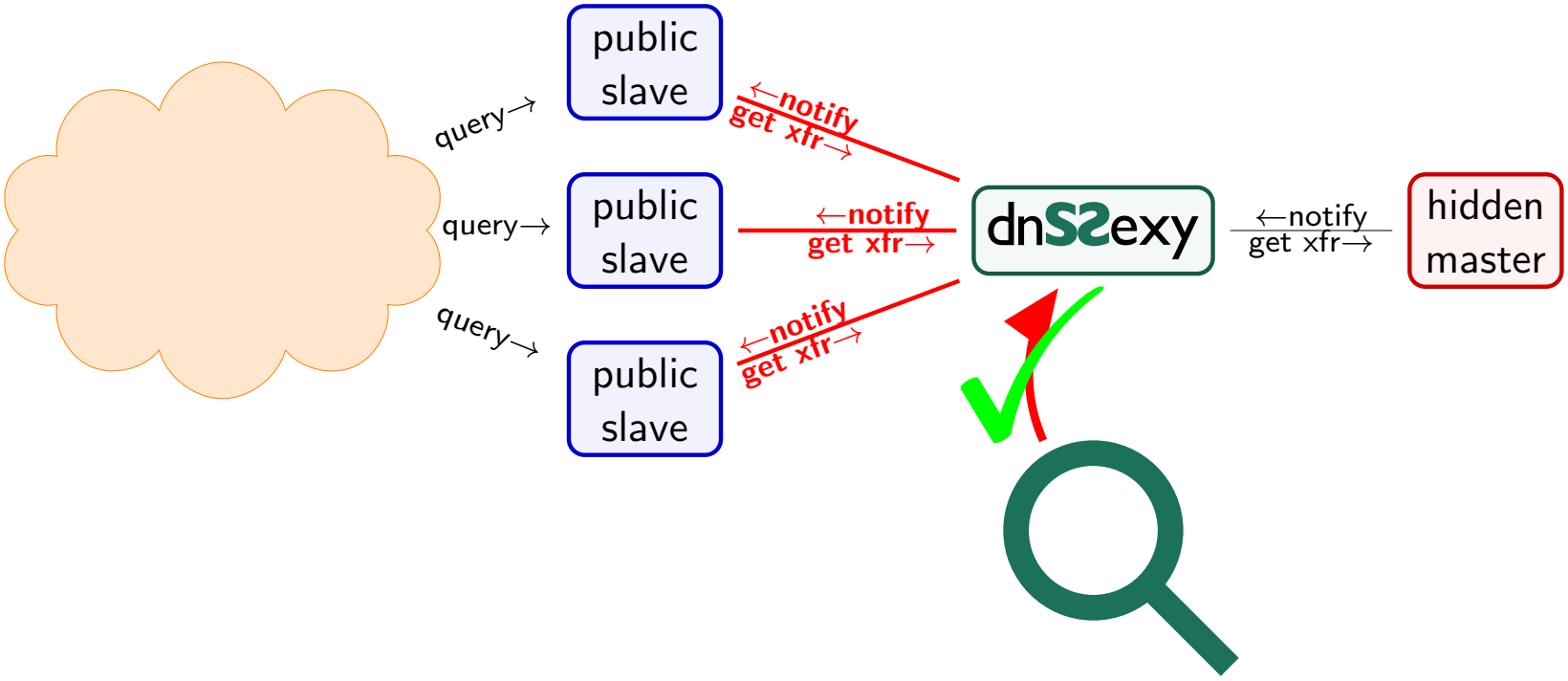
- On update dnSSexy is notified, transfers, but does not serve yet
- First a process is spawn for verifying the zone
- The updated zone is fed and served to the verifier
- Only when the verifying process exits succesfully, the zone is loaded and served.



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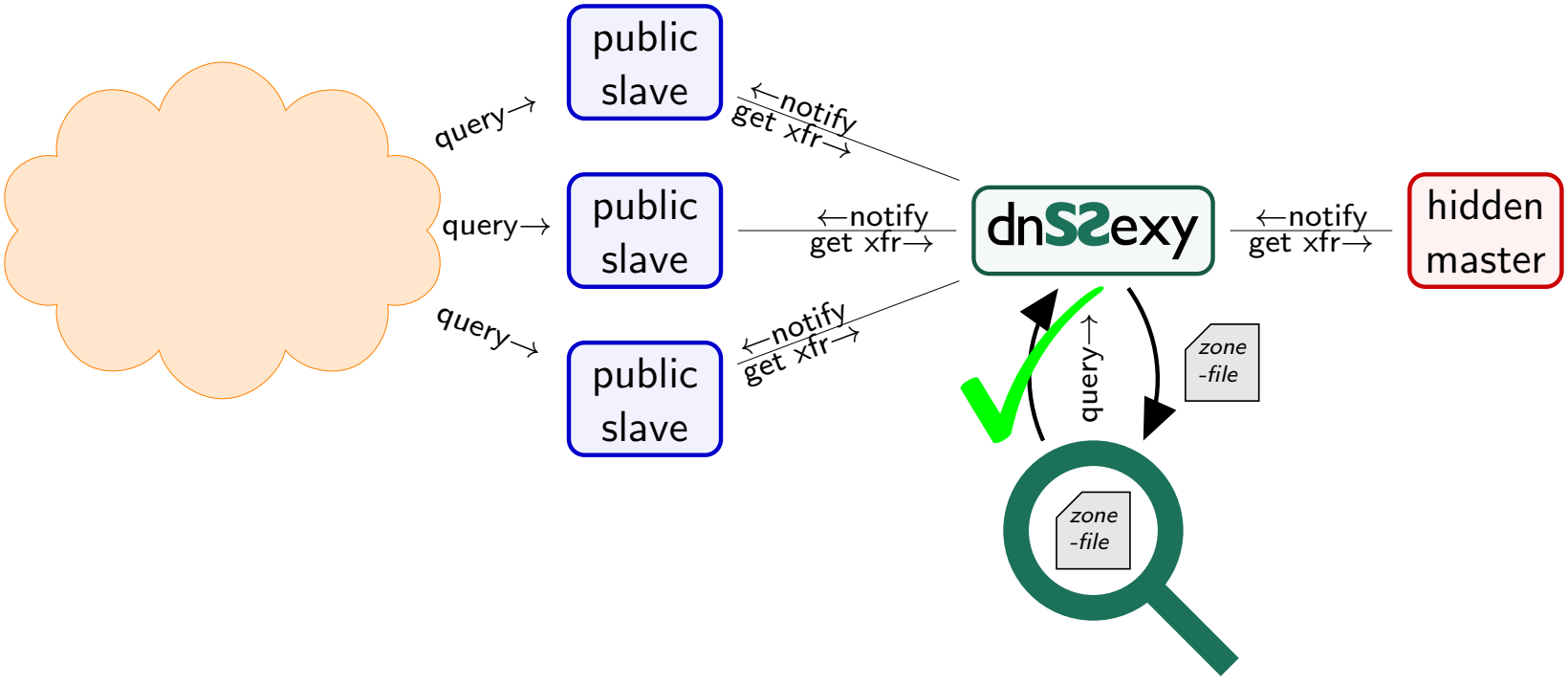
- Can use both **querying** and **zonefile** reading verifiers **pre-factum**



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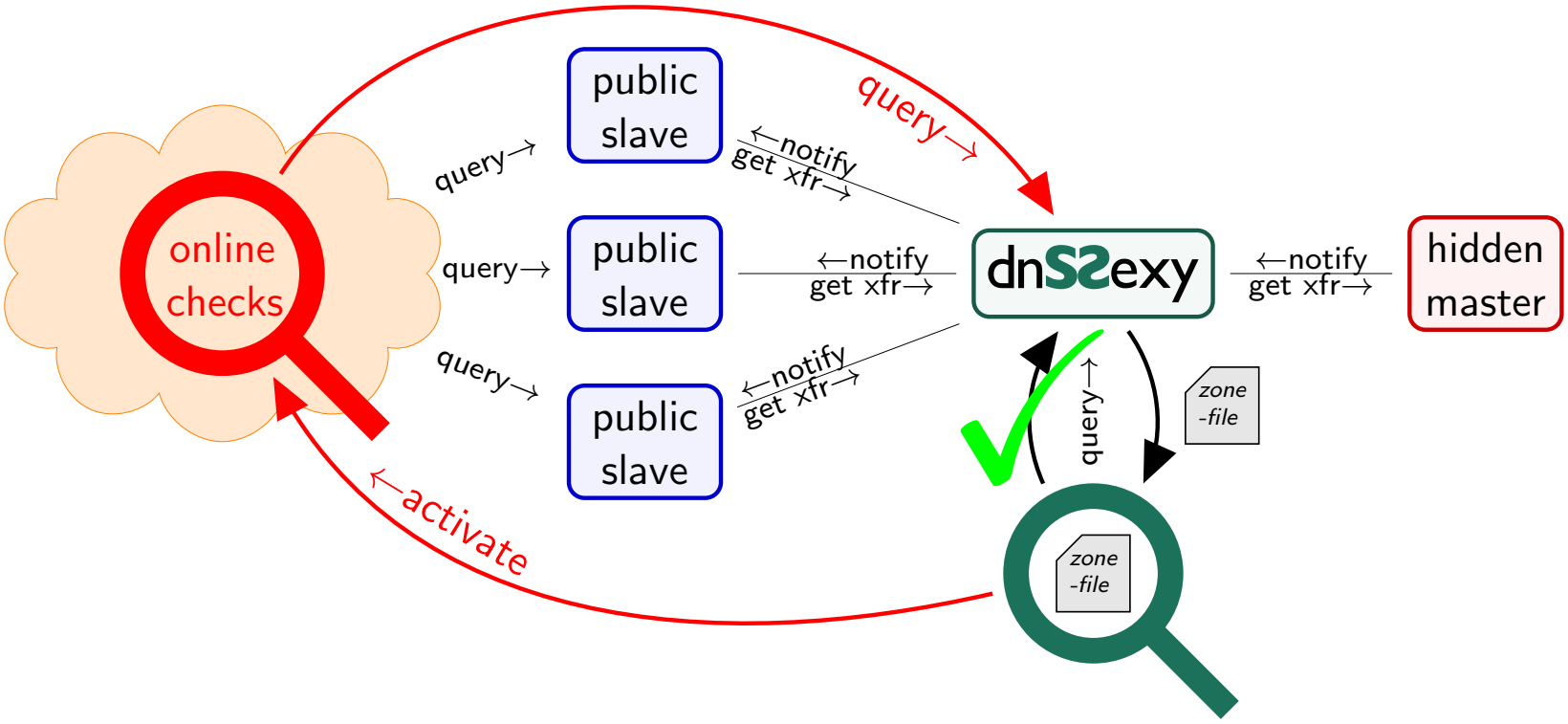
- Can use both **querying** and **zonefile** reading verifiers **pre-factum**
- Or even use online verifying services



Implementation

dnS2exy is a fork of NSD version 3.2

- `svn co https://open.nlnetlabs.nl/svn/nsd/branches/NSD_3_2_SEXY`

\+ Robust proven nameserver

\+ All facilities for notify/xfr already there

\+ Fork-kill modus operandi suits **dnS2exy** well!

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Zone Options

For every zone the options need to be specified in one zone: clause. The access control list elements can be given multiple times to add multiple servers. These elements need to be added explicitly.

name: <string>
zonefile: <filename>

allow-notify: <ip-spec> <key-name | NOKEY | BLOCKED>

request-xfr: [AXFR|UDP] <ip-address> <key-name | NOKEY>

notify: <ip-address> <key-name | NOKEY>

provide-xfr: <ip-spec> <key-name | NOKEY | BLOCKED>

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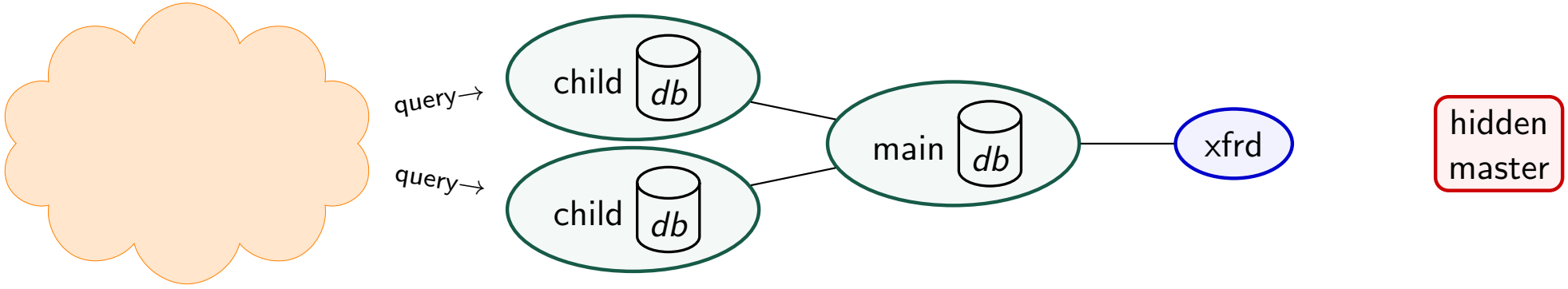

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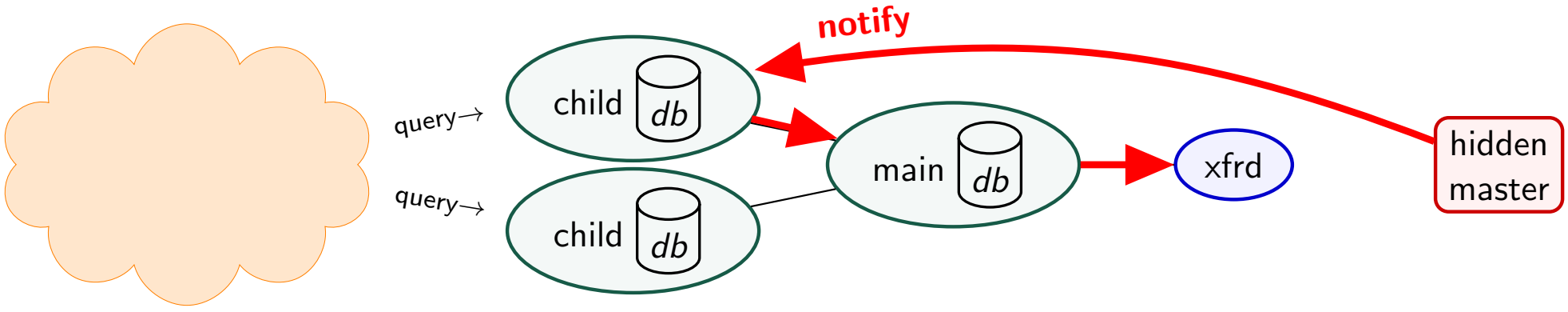

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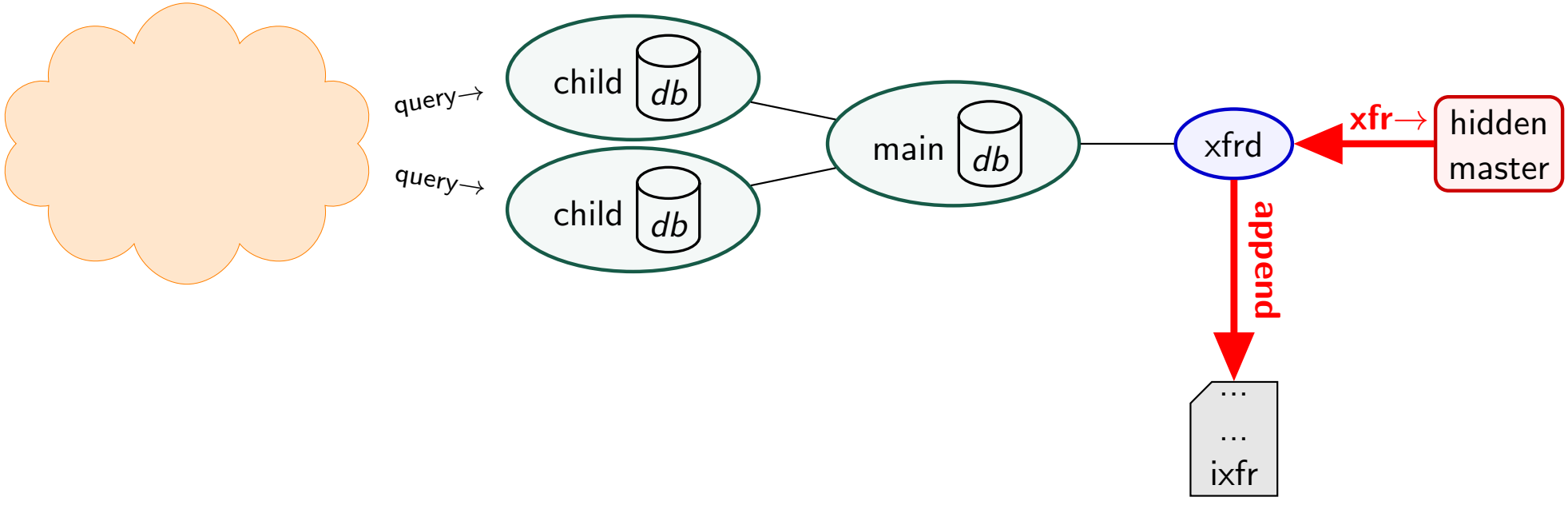

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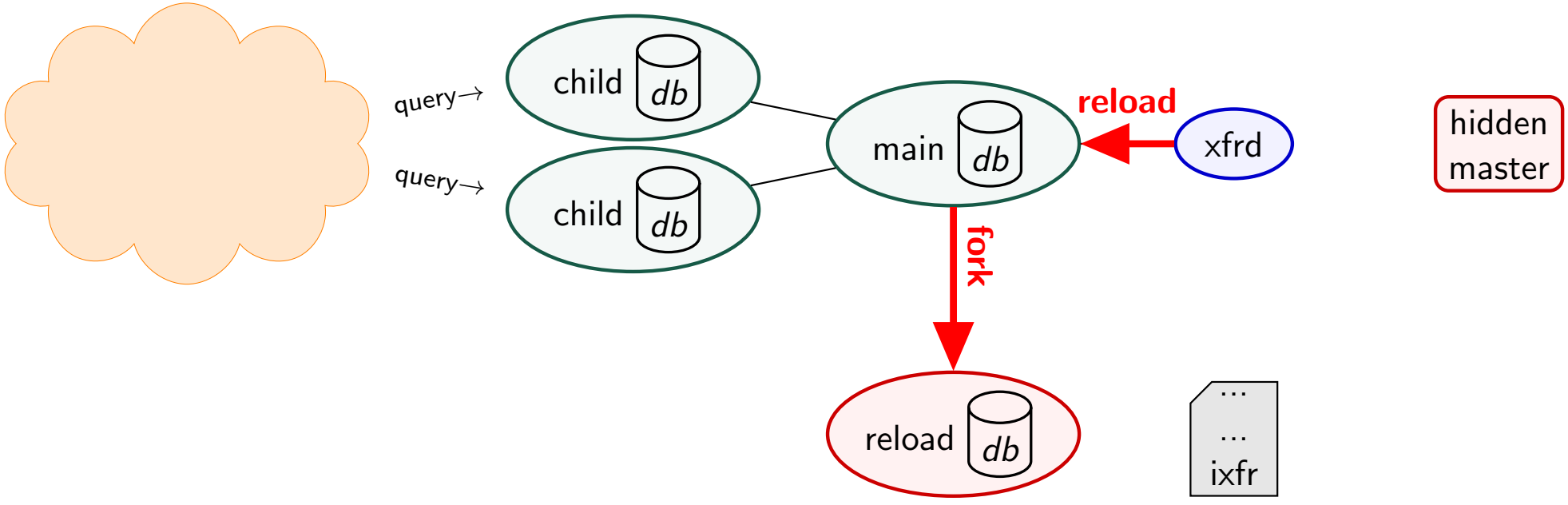

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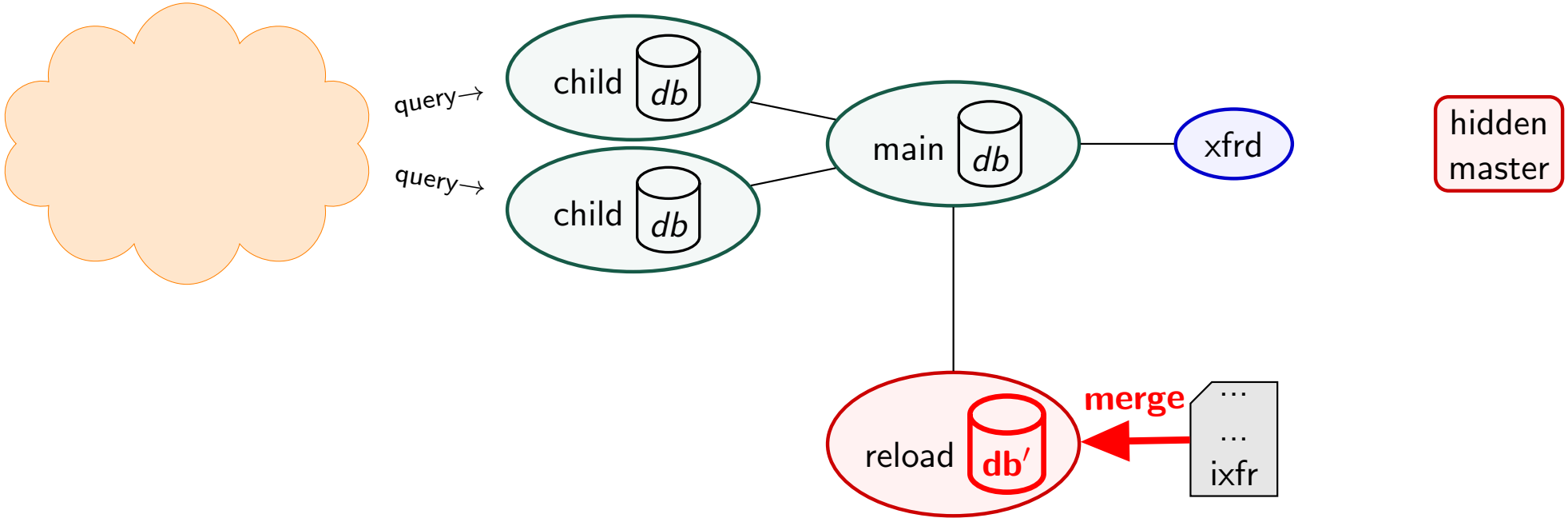

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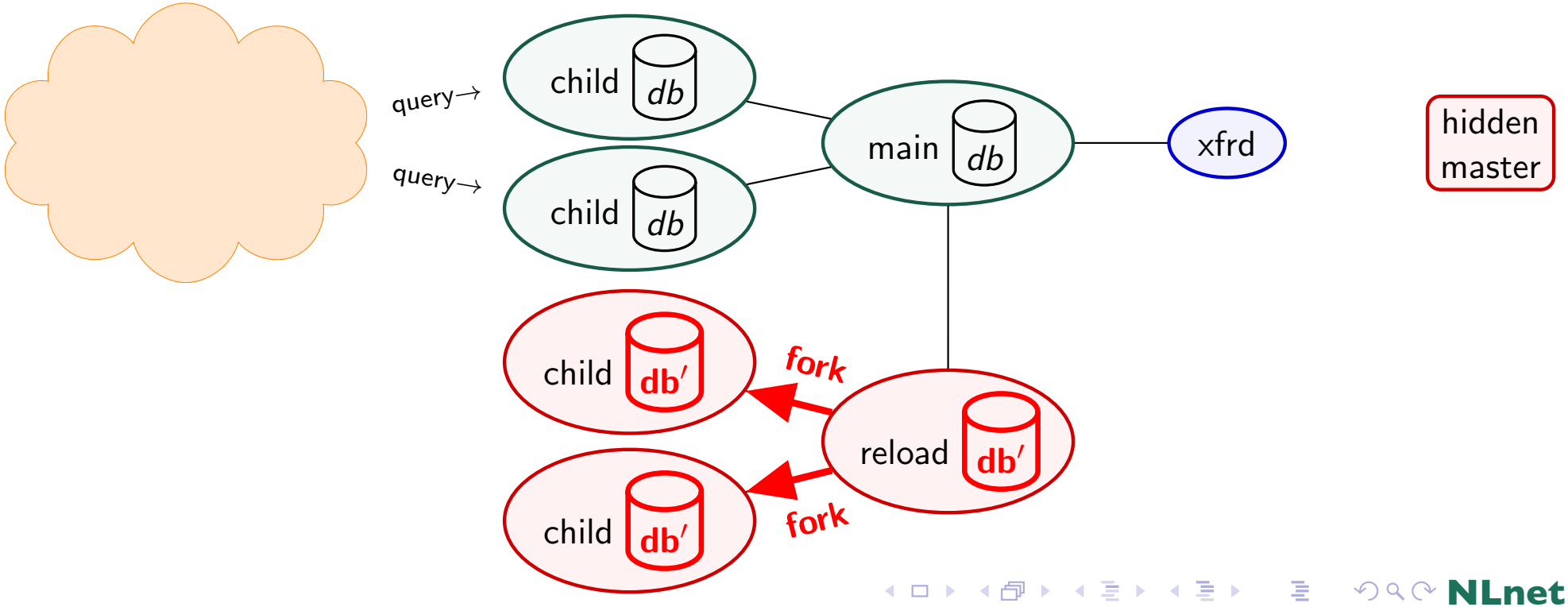

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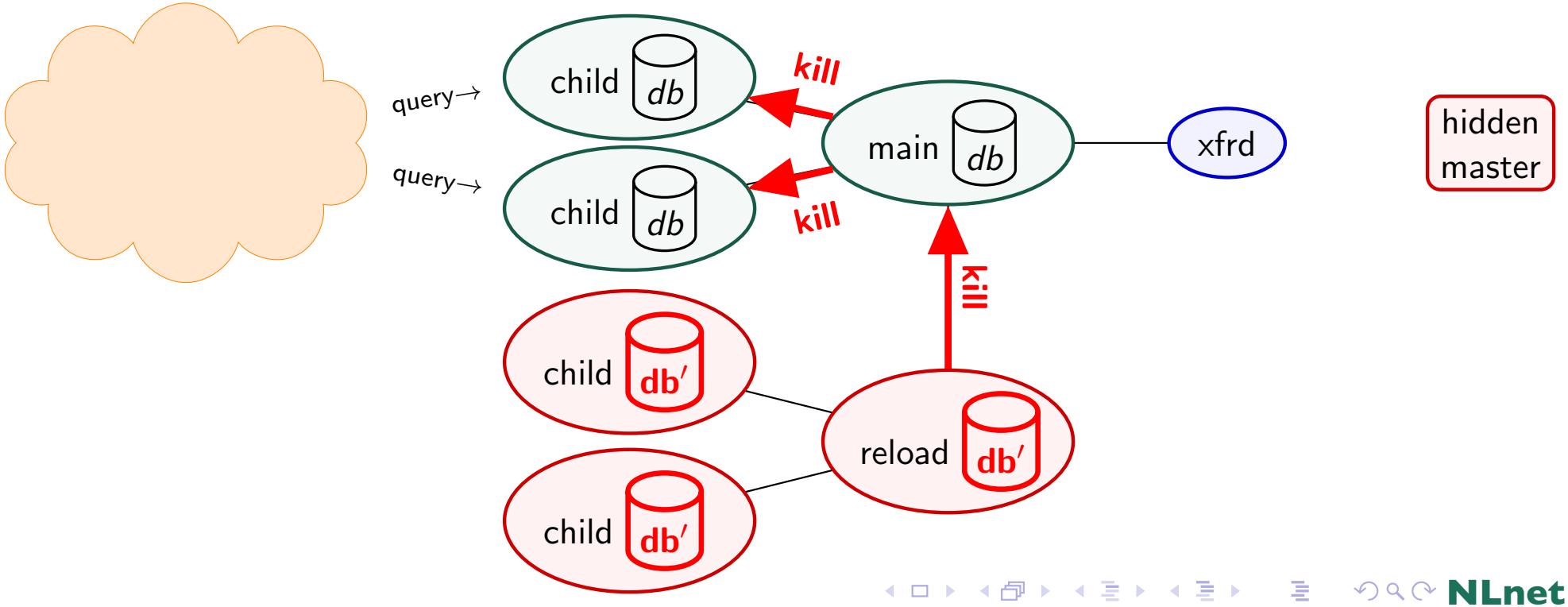

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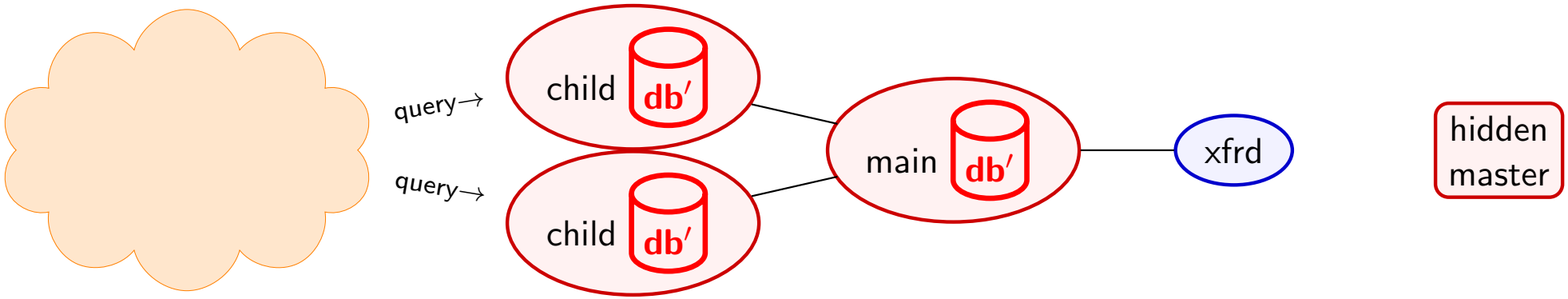

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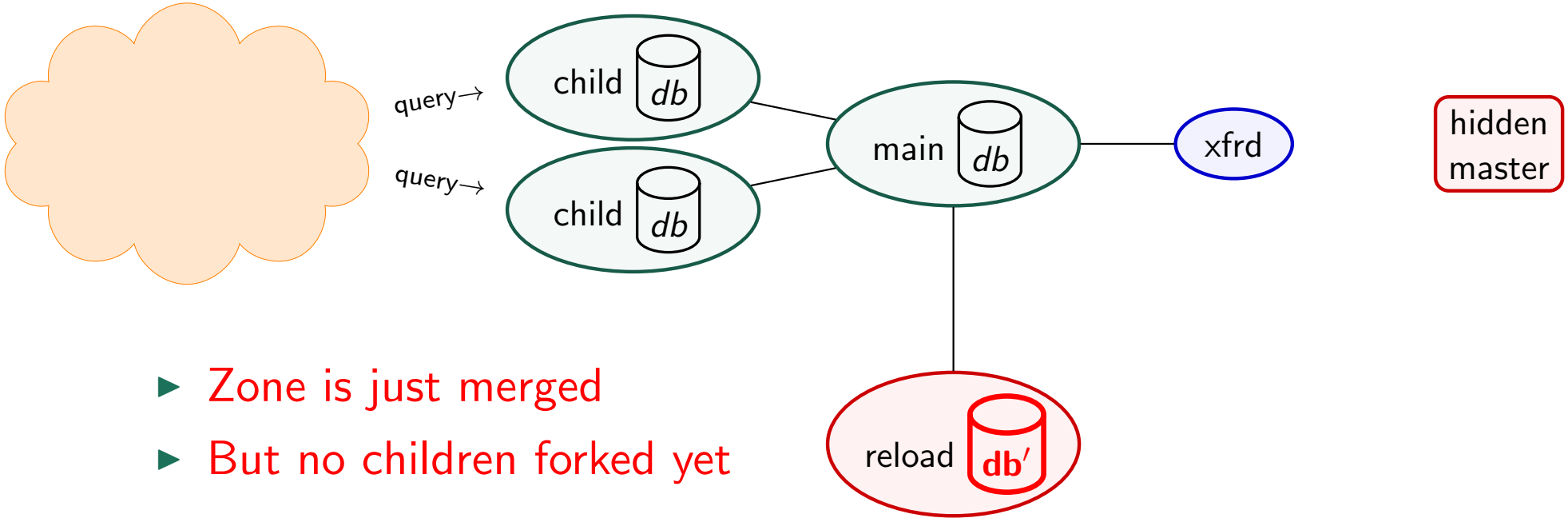

- Zone is just merged
- But no children forked yet

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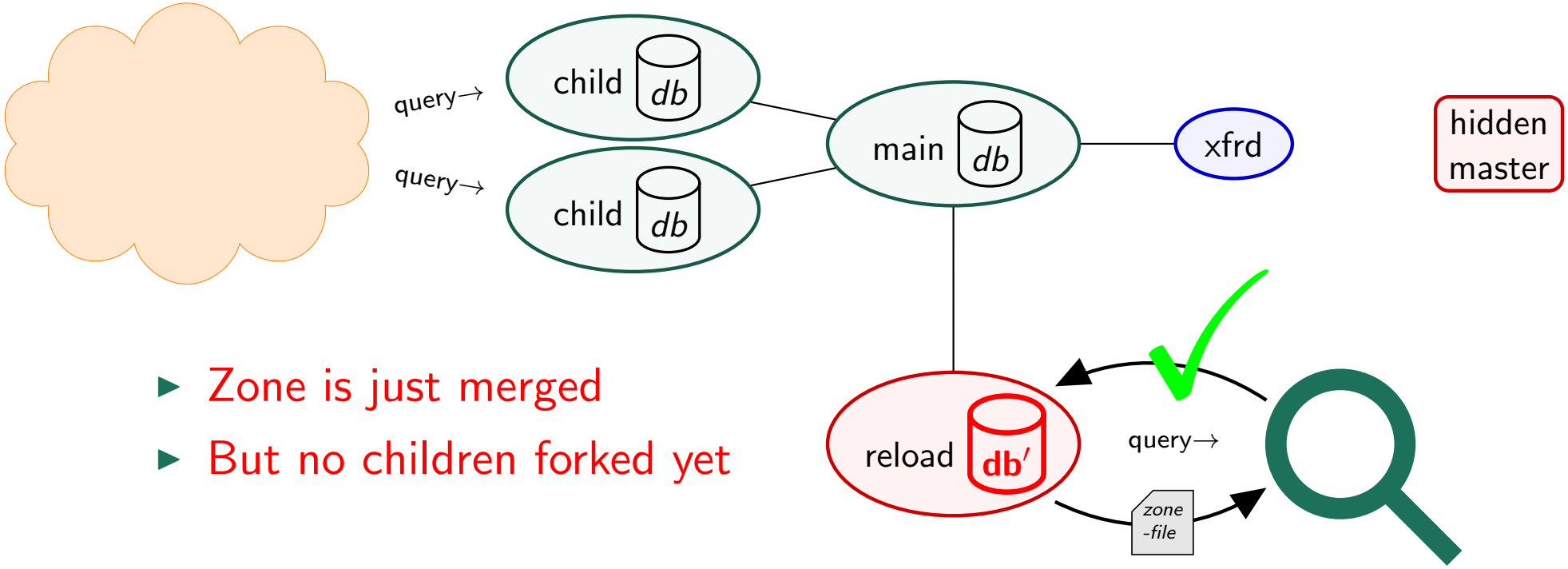

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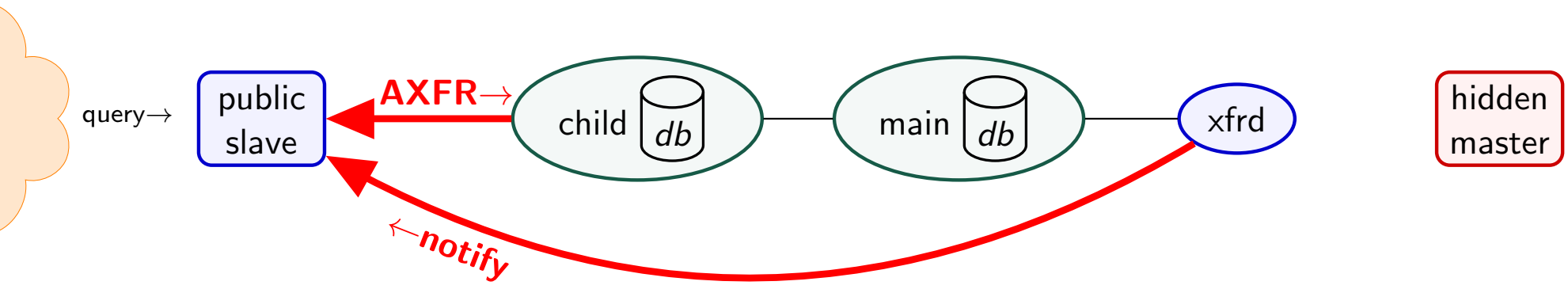
– No incremental transfers out



Configuring dnSSexy

server:

zone:

name: <domain name>

allow-notify: <ip-spec> <key-name | NOKEY | BLOCKED>

request-xfr: [AXFR|UDP] <ip-address> <key-name | NOKEY>

verifier: <program with arguments>

- For example: `ldns-verify-zone`

VERIFY_ZONE name of the changed zone

Configuring dnS2exy

```
server:
    verifier-count:  <# concurrently running verifiers>
```

```
zone:
    name:  <domain name>
    allow-notify:  <ip-spec> <key-name | NOKEY | BLOCKED>
    request-xfr:  [AXFR|UDP] <ip-address> <key-name | NOKEY>
    verifier:  <program with arguments>
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VERIFY_ZONE	name of the changed zone

Configuring dnS2exy

```
server:
    verifier-count:  <# concurrently running verifiers>
    verifier-timeout:  <# seconds>
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```
zone:
    name:  <domain name>
    allow-notify:  <ip-spec> <key-name | NOKEY | BLOCKED>
    request-xfr:  [AXFR|UDP] <ip-address> <key-name | NOKEY>
    verifier:  <program with arguments>
    verifier-timeout:  <# seconds | inherit>
```

VERIFY_ZONE	name of the changed zone

Configuring dnSSexy

```
server:
    verifier-count:  <# concurrently running verifiers>
    verifier-timeout:  <# seconds>
    verify-ip-address:  <ip4 or ip6>[@port]
```

- Needs to be set for verifiers that need to query
- Can be given multiple times

```
    verify-port:  <number>
```

- defaults to 5347, because: 5ℰ⅋

```
zone:
    verifier:  <program with arguments>
    verifier-timeout:  <# seconds | inherit>
```

VERIFY_ZONE	name of the changed zone	
VERIFY_IP_ADDRESSES	list of <address@port> values	
VERIFY_IP_ADDRESS	first ip address in the list	VERIFY_PORT
VERIFY_IP4_ADDRESS	first ip4 address in the list	VERIFY_IP4_PORT
VERIFY_IP6_ADDRESS	first ip6 address in the list	VERIFY_IP6_PORT

Configuring dnSSexy

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server:
    verifier-count:  <# concurrently running verifiers>
    verifier-timeout:  <# seconds>
    verify-ip-address:  <ip4 or ip6>[@port]
    verify-port:  <number>
    verify-feed-zone:  <yes or no>


zone:
    verifier:  <program with arguments>
    verifier-timeout:  <# seconds | inherit>
    verifier-feed-zone:  <yes, no or inherit>
```

VERIFY_ZONE	name of the changed zone	
VERIFY_IP_ADDRESSES	list of <address@port> values	
VERIFY_IP_ADDRESS	first ip address in the list	VERIFY_PORT
VERIFY_IP4_ADDRESS	first ip4 address in the list	VERIFY_IP4_PORT
VERIFY_IP6_ADDRESS	first ip6 address in the list	VERIFY_IP6_PORT
VERIFY_ZONE_ON_STDIN	yes or not set	

Operational details

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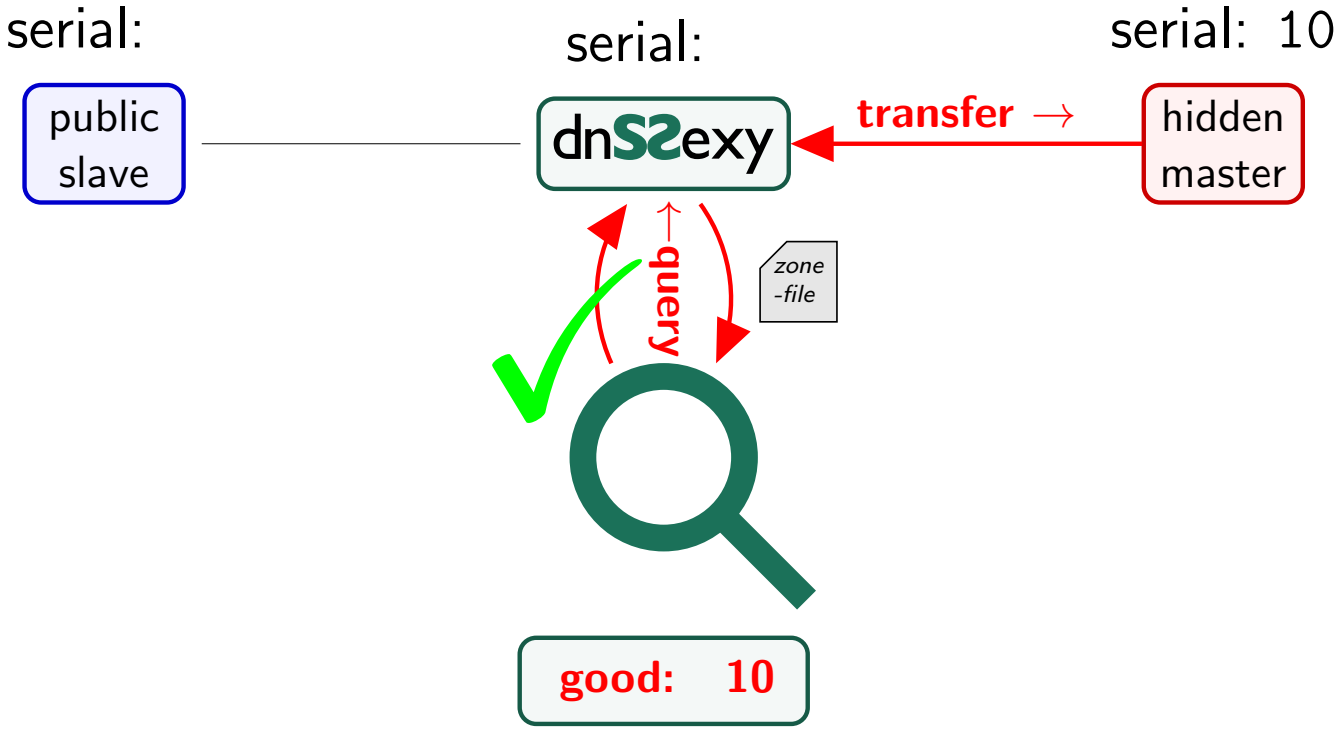

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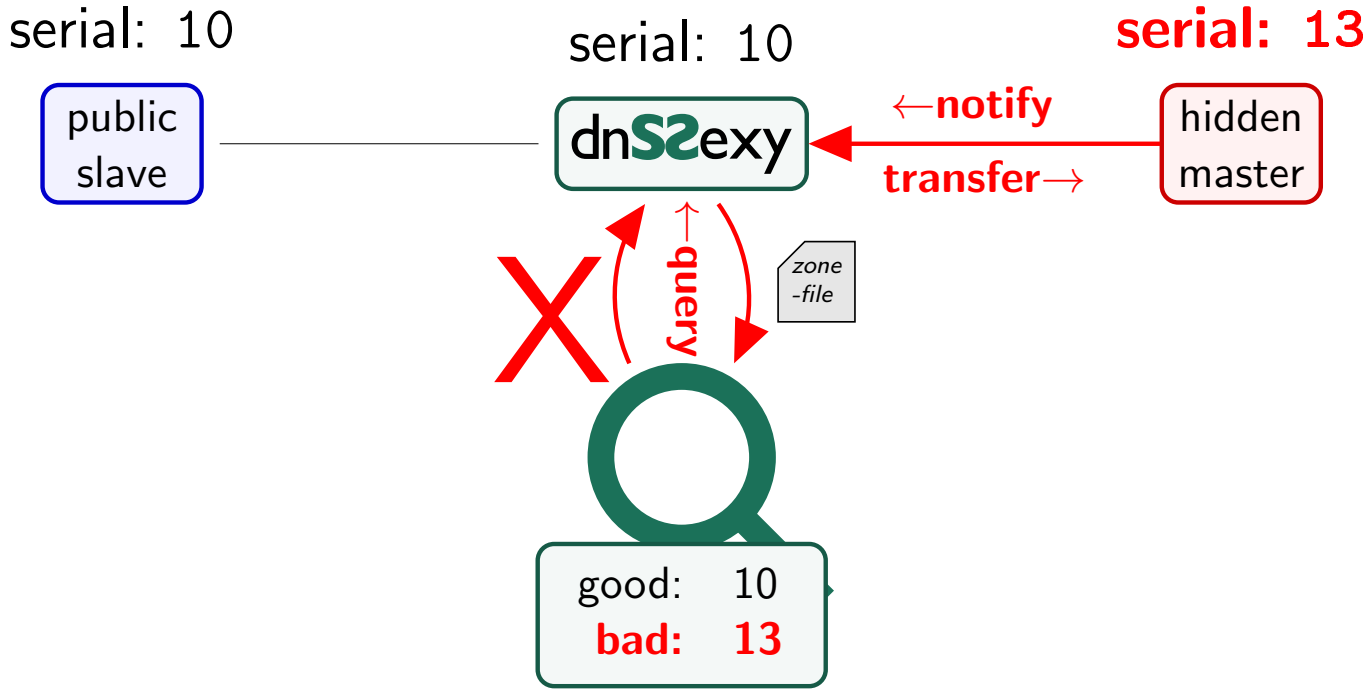
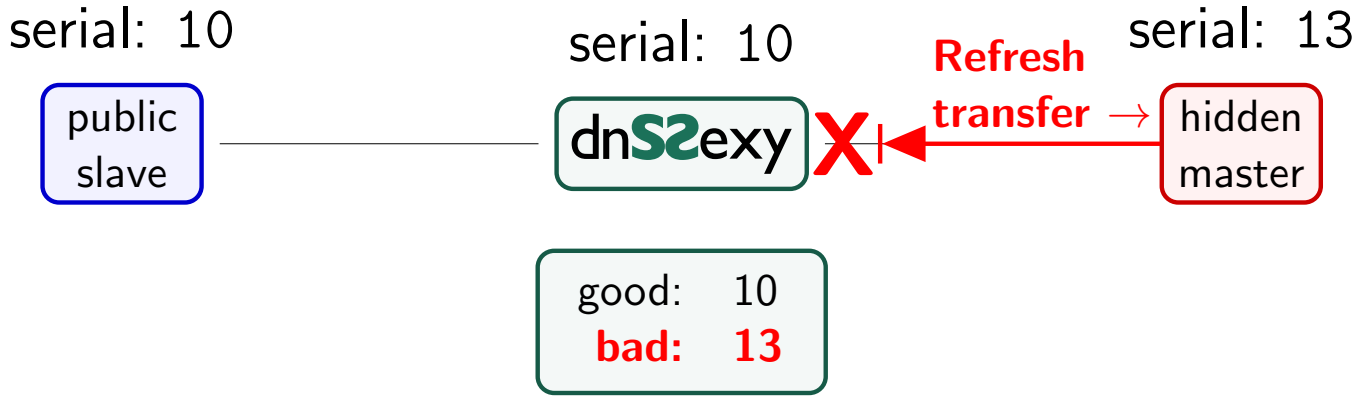


Operational details

- Bad serials will not be transfered again ...



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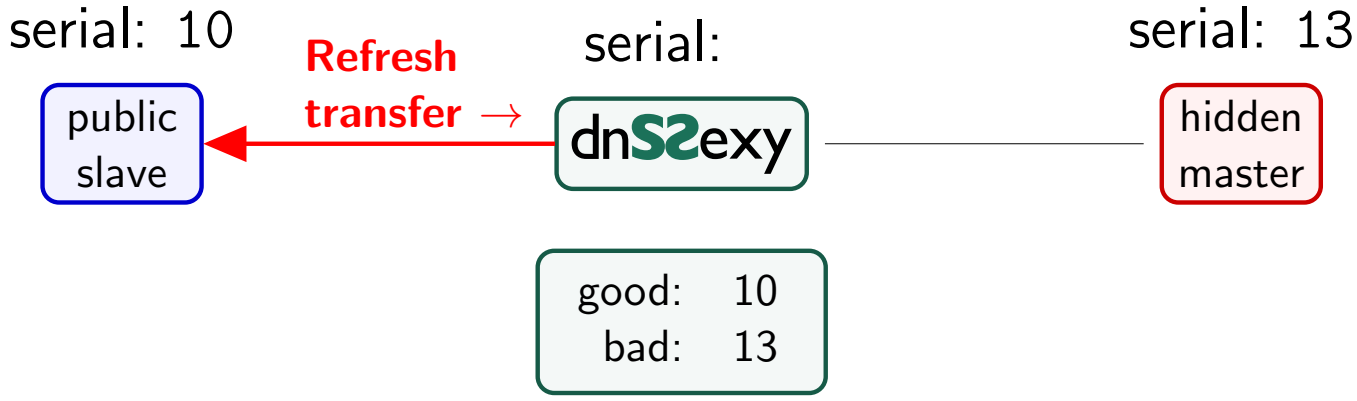
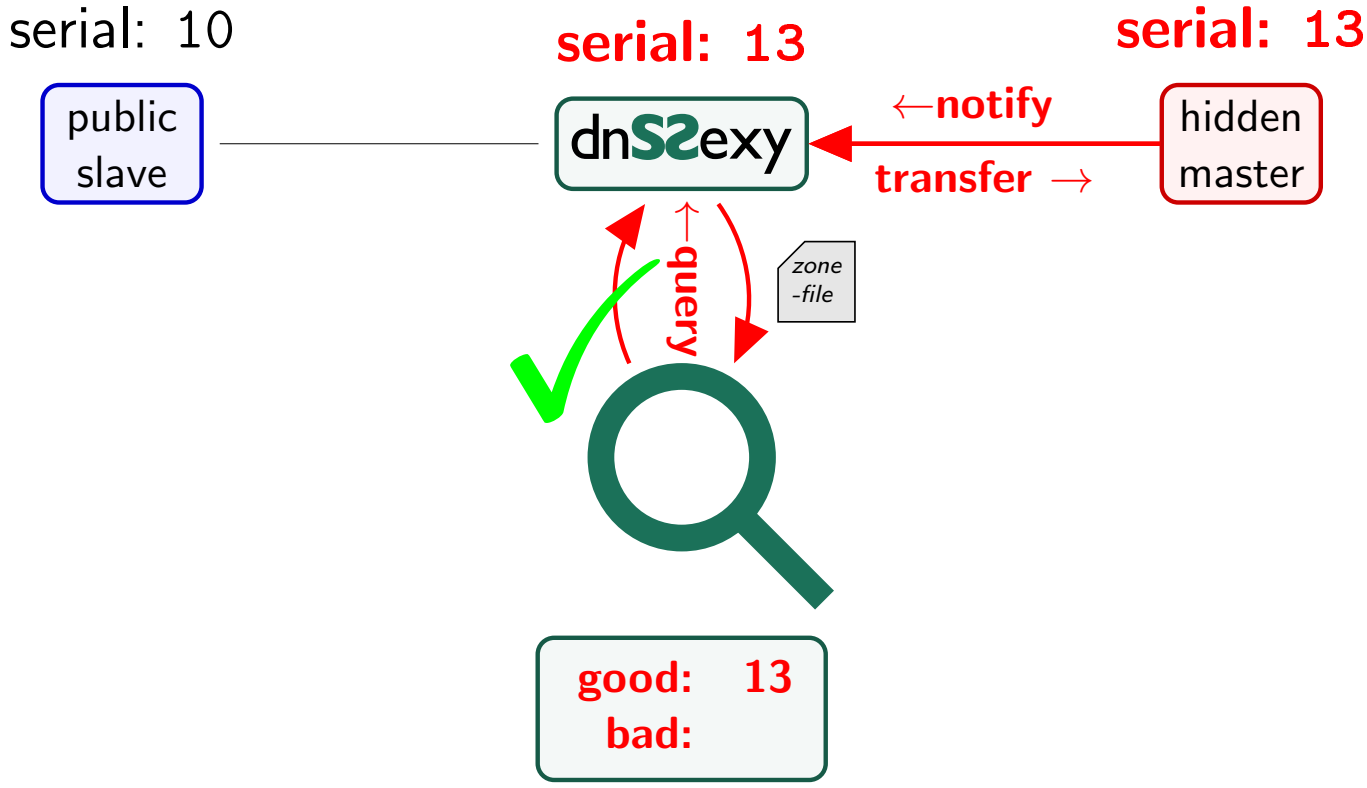
- dnS2exy provides transfer for expired zones (already in NSD).
  - add option **provide-xfr-when-expired:** `<yes or no>`
  - add option **serve-when-expired:** `<yes or no>`



Operational details

- Bad serials will not be transfered again ...
  - RRSIGs may become valid in the future
- ... unless notified by master



Status

- dnSSexy has just been code-reviewed within NLnet Labs
- Beta release candidate will follow shortly ...
- ... with the beta release one week later if all is well
- Subscribe to the mailinglist:
  `https://www.NLnetLabs.nl/mailman/listinfo/dnssexy`
- Spot on the web will (probably) become:
  `https://www.NLnetLabs.nl/project/dnssexy`
- Or try from the subversion repository:
  svn co `https://www.NLnetLabs.nl/svn/nsd/branches/NSD_3_2_SEXY`

Trying out dnSSexy

- `branches/NSD_3_2_SEXY/tpkg/dnssexy-setup`
- Used by the unit tests
- Configure either in `dnssexy-setup` directory,
  or in another subdirectory of `tpkg`
  or have dnSSexy installed
- Demo?

Future improvements

- dnS2exy on the side

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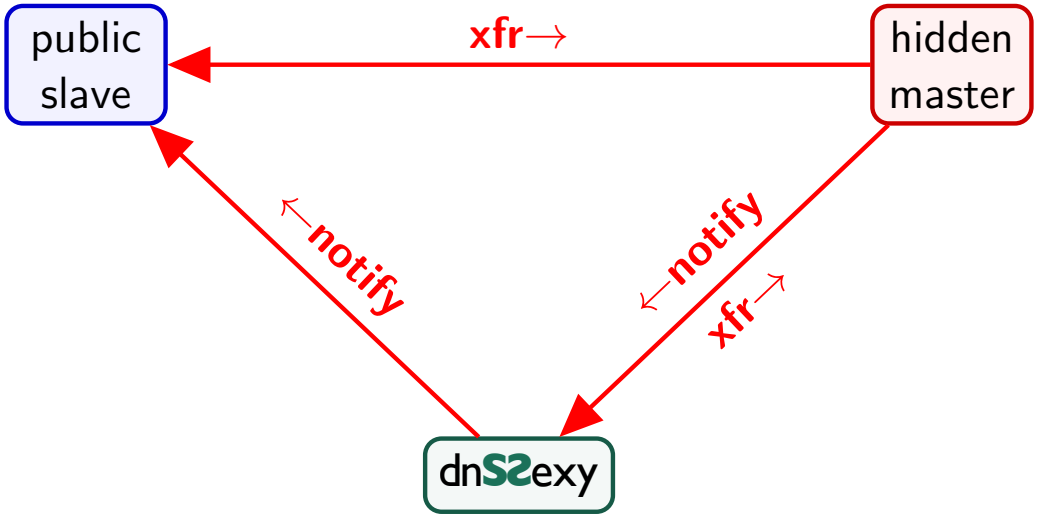
- dnSSexy on the side
  - NSD has no support for IXFR out
  - Verifiers could trash the proxy
  - Notifies and transfers are configured independently with NSD

in:	`allow-notify:`	`request-xfr:`
out:	`notify:`	`provide-xfr:`

`allow-notify:` dnSSexy
`request-xfr:` master

`notify:` dnSSexy
`provide-xfr:` dnSSexy
`provide-xfr:` slave



`notify:` slave

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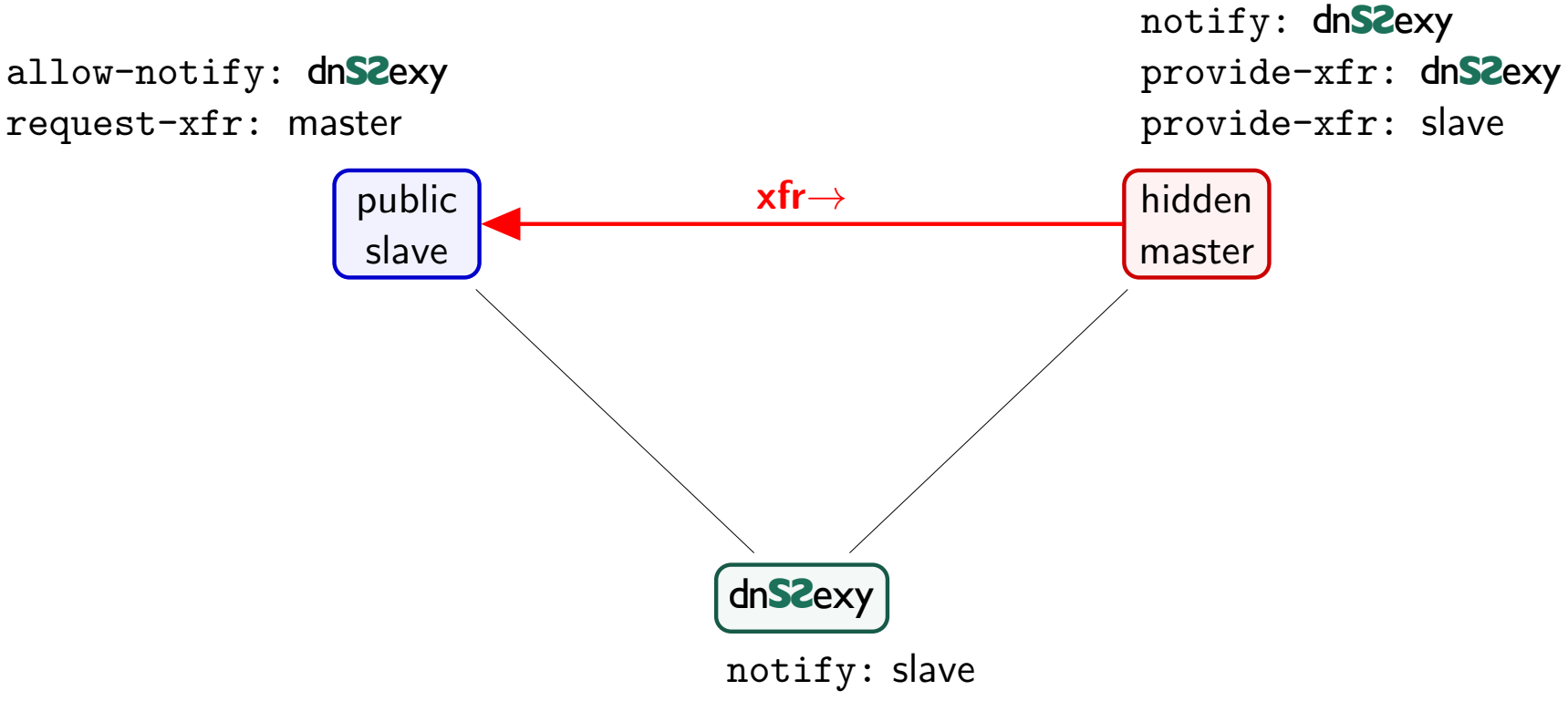
- dnS2exy on the side
  - Slave could transfer bad zones on Refresh and Retry!



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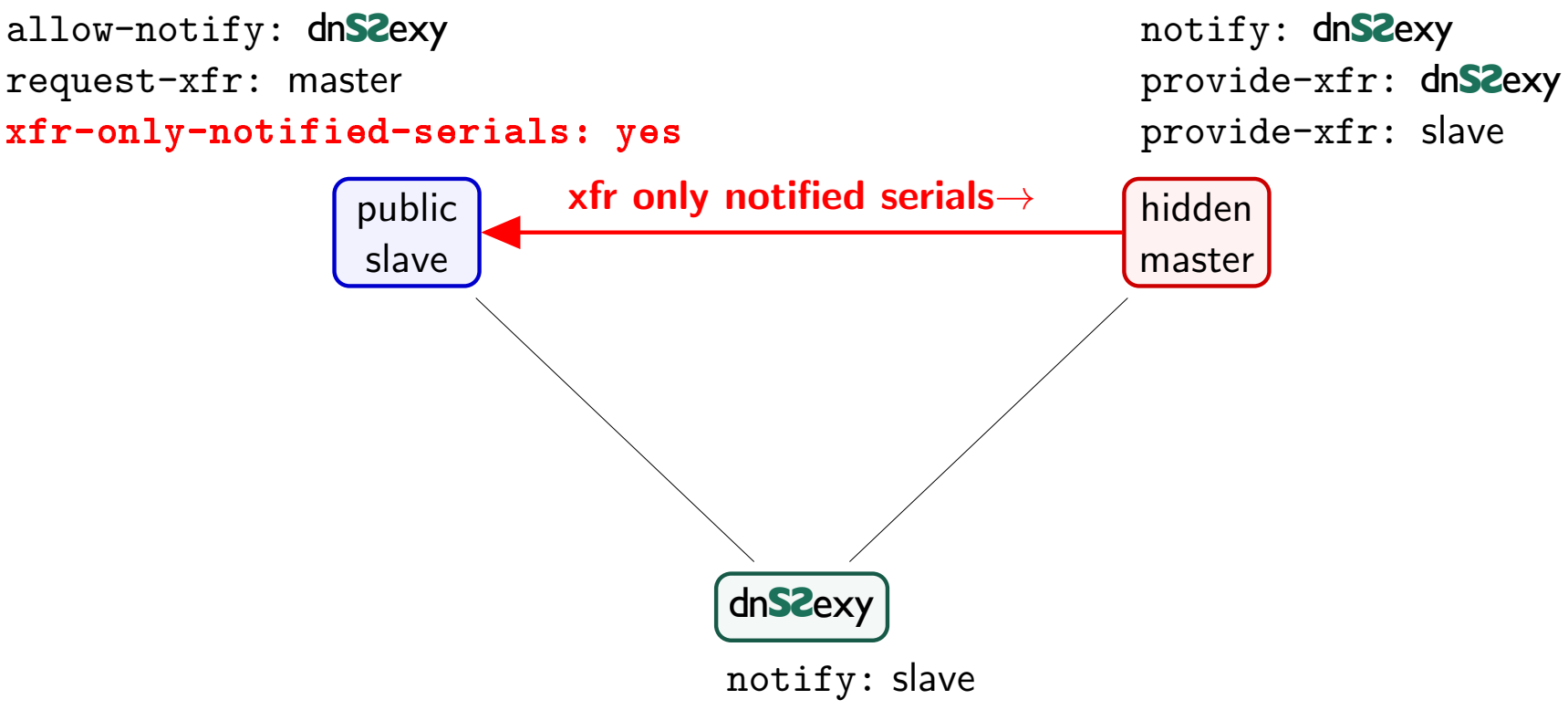
  - Slave could transfer bad zones on Refresh and Retry!
    - `xfr-only-notified-serials: <yes or no>`

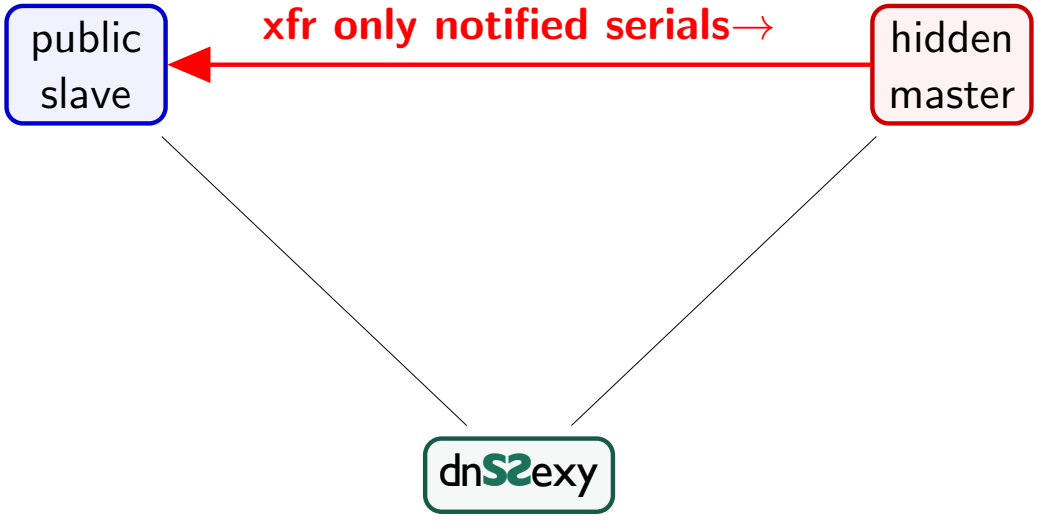


Future improvements

- dnS2exy on the side
  - Slave could transfer bad zones on Refresh and Retry!
    - `xfr-only-notified-serials: <yes or no>`
  - Bootstrap problem!

```
allow-notify: dnS2exy
request-xfr: master
xfr-only-notified-serials: yes
```

```
notify: dnS2exy
provide-xfr: dnS2exy
provide-xfr: slave
```



Future improvements

- dnS2exy on the side
  - Slave could transfer bad zones on Refresh and Retry!
    - `xfr-only-notified-serials: <yes or no>`
  - Bootstrap problem!
    - `without-serial-request-xfr: <ip> <key | NOKEY>`

```
allow-notify: dnS2exy
request-xfr: master
xfr-only-notified-serials: yes
without-serial-request-xfr: dnS2exy
```

```
notify: dnS2exy
provide-xfr: dnS2exy
provide-xfr: slave
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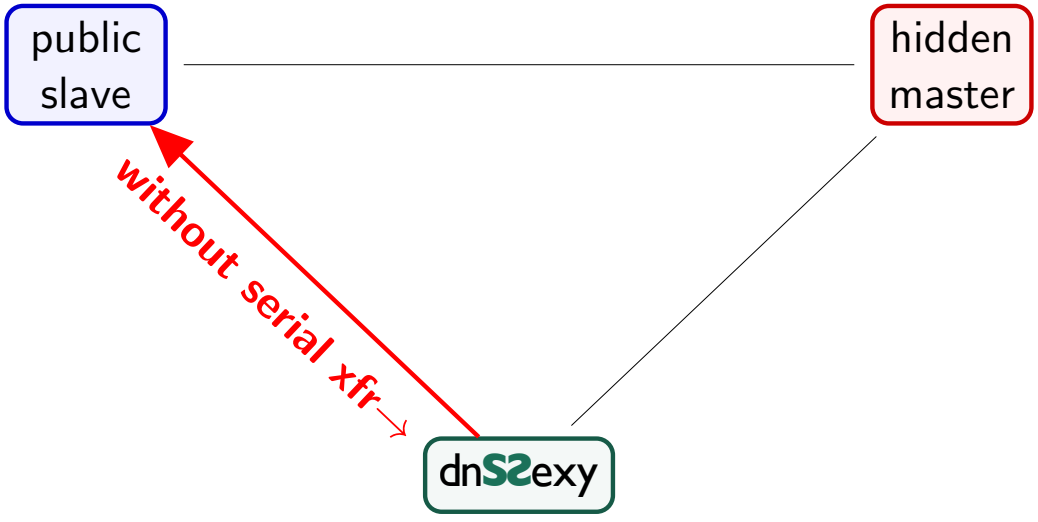


```
notify: slave
provide-xfr: slave
```

Future improvements

- dnSSexy on the side
  - **xfr-only-notified-serials:** <yes or no>
  - **without-serial-request-xfr:** <ip> <key | NOKEY>
- dnSSexy is authoritative for valid zones
  - **provide-xfr-when-expired:** <**yes** or no>
  - **serve-when-expired:** <yes or **no**>
- Verifiers could query the master directly
  - Environment variable with the master from which the xfr came
    VERIFY_XFR_RECEIVED_FROM="<ip@port>"
- Feeding the verifier with changed part only
  - **verifier-feed-zone:** <yes, **incremental** or no>
- Verify zones loaded from zone files too

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- Verify zones loaded from zone files too
- Suggestions?

Summary

subversion	`https://www.NLnetLabs.nl/svn/nsd/branches/NSD_3_2_SEXY`
mailing-list	`https://www.NLnetLabs.nl/mailman/listinfo/dnssexy`
web	`https://www.NLnetLabs.nl/project/dnssexy`
me	`mailto:Willem@NLnetLabs.nl`

What is dnSSexy

- A building block for fortifying DNSSEC
- A hook opening up new possibilities in provisioning strategies

Question

Who is more authoritative? The master or the validator?

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