DNSSEC-Tools

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DNSSEC-Tools

- SPARTA has developed a number of tools and libraries for DNSSEC
  - http://www.dnssec-tools.org
- Effort is sponsored by US DHS
- Components:
  - Infrastructure: DNSSEC Libraries, Perl Modules, ...
  - Tools for managing DNSSEC Zones
  - Demonstration Applications, Utilities, ETC
  - Educational Materials

DNSSEC-Tools Support

- Core Libraries and Modules
- Zone Management Tools
- Resolver Management Tools
- Developer Tools
- DNSSEC-Aware Application Patches
- DNSSEC Debugging Tools
- Documentation

DNSSEC-Tools: Libraries

- DNSSEC validator library
  - Verifies DNS(SEC) data at the library layer
  - Portable-ish (getting more so)
  - Based on libbind
  - Thread-safe
  - Reentrant
  - Can pull data directly or from a local caching resolver
  - BSD Licensed
- Net::DNS::SEC::Validator
  - Perl module that wraps around libval

Libval_shim

- LD_PRELOAD-based approach for adding DNSSEC capability to existing applications
- The shim library implements most of the commonly-used resolver functions
  - Applications that use these functions can automatically become DNSSEC-capable if they run within an LD_PRELOAD environment with libval_shim.
  - Many applications (including Firefox) are known to work out of the box with libval_shim

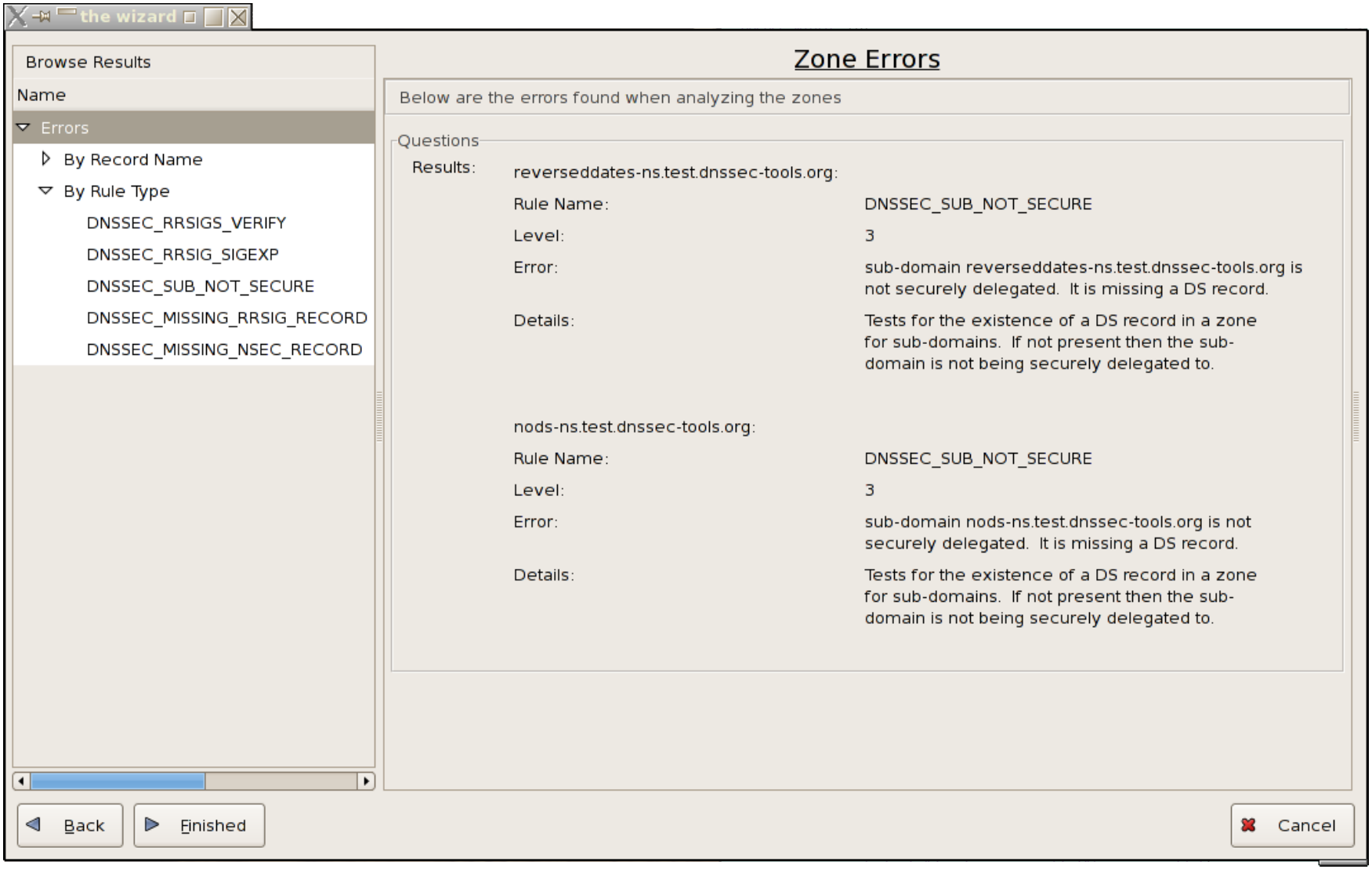
Validation Library API

- draft-hayatnagarkar-dnsext-validator-api-06.txt
  - Defines an API for interfacing with a validation library
  - Allows clients to state their policy
  - Allows clients to get DNS and validation results
    - High-level: val_gethostbyname and friends
    - Low-level: val_resolve_and_check and friends
    - Policy: val_create_context and friends
  - Implemented in DNSSEC-Tool's libval
- Not yet an IETF Working Group document

Zone Management Tools

- Zonesigner
  - Signs zones in one step
  - Wrapper around BIND zone signing utilities
  - Defaults do the “right thing”
- Rollerd
  - Automatic key-rollover and signing daemon
  - Regular scheduled calls to zonesigner
- Donuts
  - DNS Zonefile extensible error checker
- Mapper
  - Graphical map generator of zone data

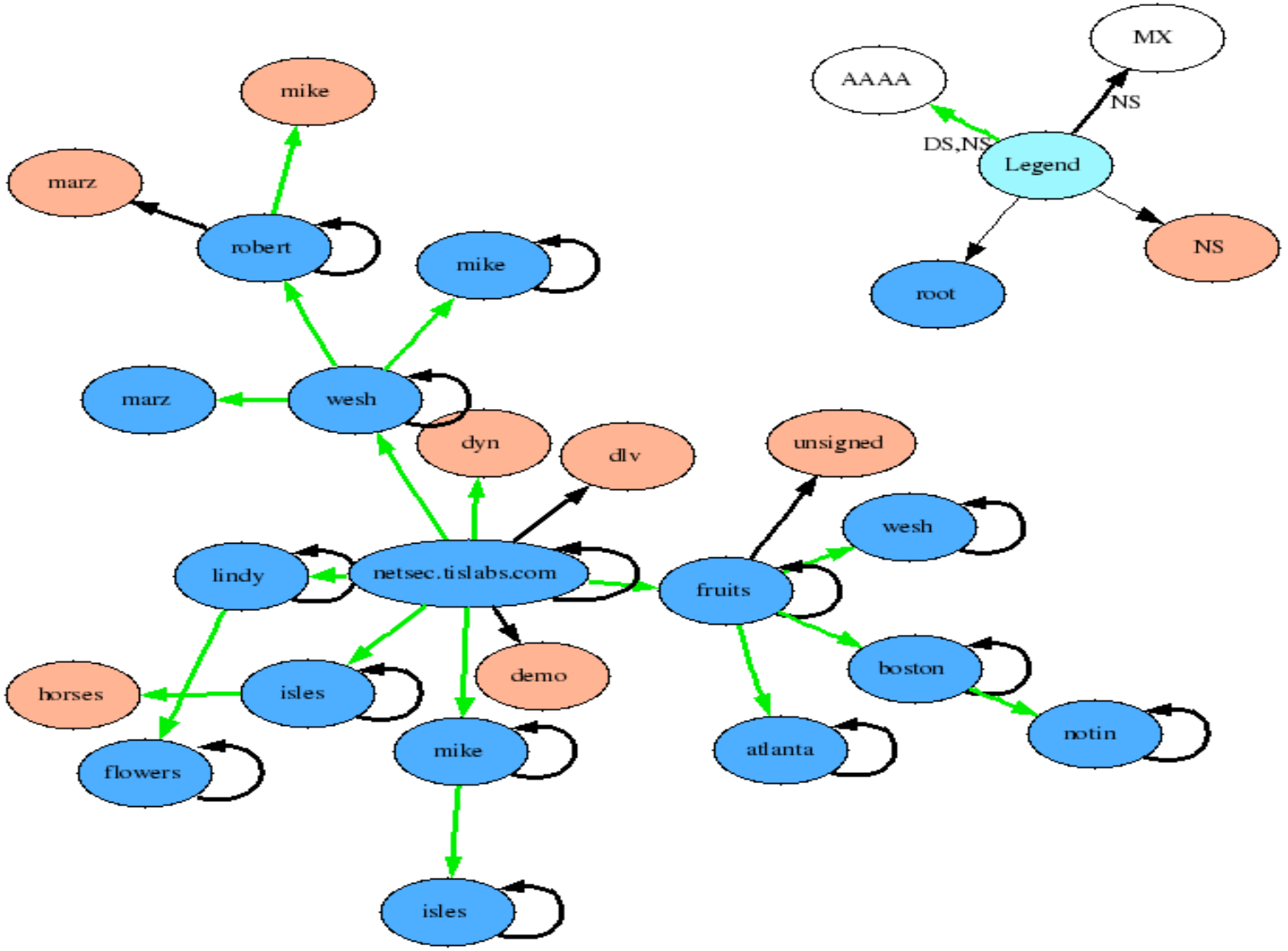
Check Your Zonefile: DoNutS



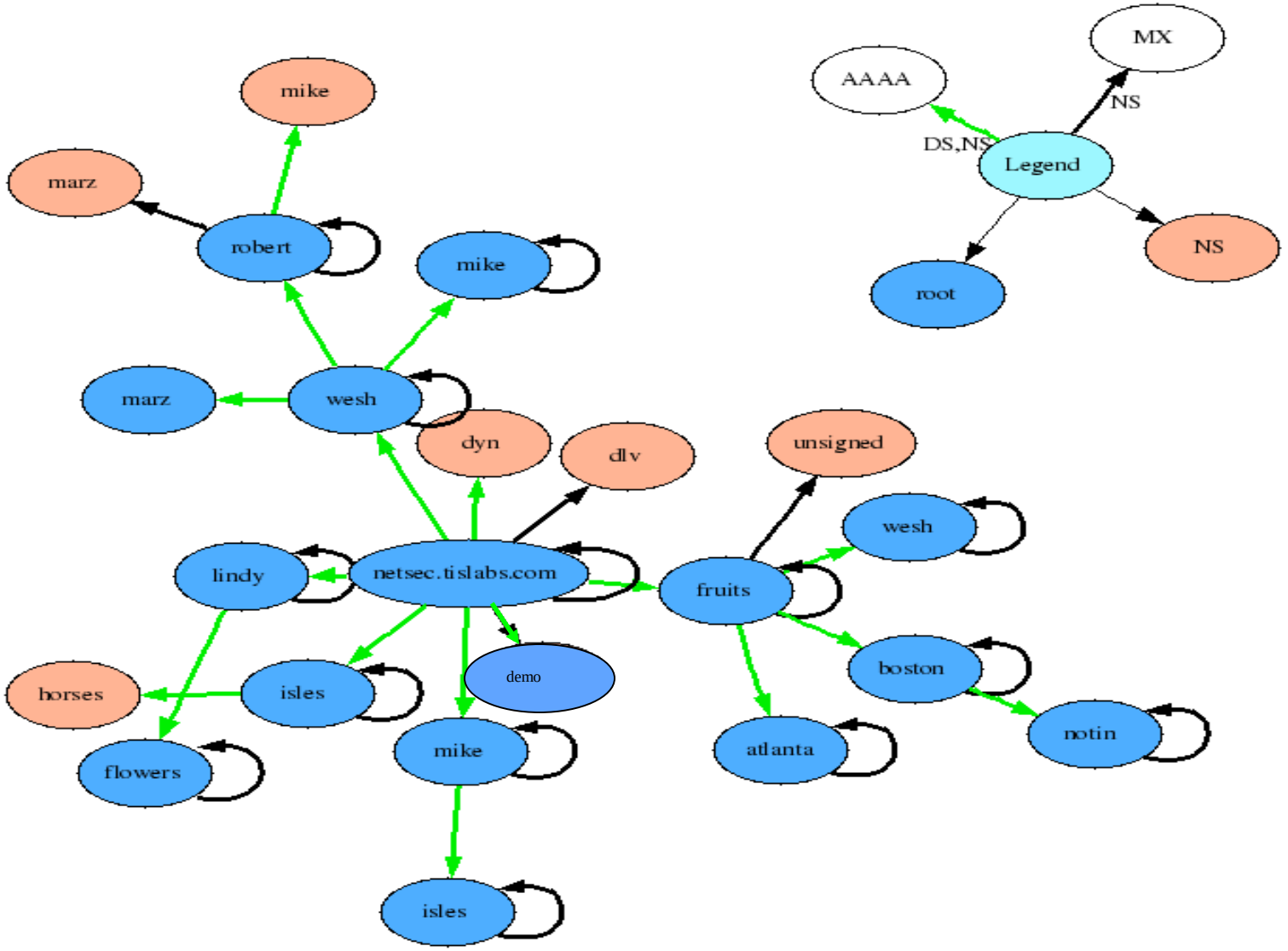
Check Your Zonefile: DoNutS

```
# donuts --level 8 -v example.com.signed example.com

--- loading rule file /usr/share/donuts/rules/dnssec.rules.txt
    rules: DNSSEC_RRSIG_TTL_MATCH_ORGTTL DNSSEC_MEMORIZE_NS_RECORDS DNSSEC_MISSING_NSEC_RECORD
DNSSEC_MISSING_RRSIG_RECORD DNSSEC_RRSIG_NOT_SIGNING_RRSIG DNSSEC_RRSIG_FOR_NS_GLUE_RECORD
DNSSEC_NSEC_FOR_NS_GLUE_RECORD DNSSEC_RRSIG_SIGEXP DNSSEC_NSEC_TTL DNSSEC_DNSKEY_MUST_HAVE_SAME_NAME
DNSSEC_DNSKEY_PROTOCOL_MUST_BE_3 DNSSEC_BOGUS_NS_MEMORIZE DNSSEC_MISSING_RRSIG_RECORD
DNSSEC_RRSIG_TTL_MUST_MATCH_RECORD DNSSEC_MISSING_NSEC_RECORD DNSSEC_RRSIG_SIGNER_NAME_MATCHES
DNSSEC_NSEC_RRSEC_MUST_NOT_BE_ALONE DNSSEC_RRSIGS_MUST_NOT_BE_SIGNED DNSSEC_MEMORIZE_KEYS DNSSEC_RRSIGS_VERIFY
--- loading rule file /usr/share/donuts/rules/parent_child.rules.txt
    rules: DNS_MULTIPLE_NS DNSSEC_SUB_NOT_SECURE DNSSEC_DNSKEY_PARENT_HAS_VALID_DS DNSSEC_DS_CHILD_HAS_MATCHING_DNSKEY
--- loading rule file /usr/share/donuts/rules/parent_child_temp.txt
    rules: DNSSEC_SUB_NS_MISMATCH
--- loading rule file /usr/share/donuts/rules/recommendations.rules.txt
    rules: DNS_REASONABLE_TTLS DNS_SOA_REQUIRED DNS_NO_DOMAIN_MX_RECORDS
--- Analyzing individual records in example.com.signed
--- Analyzing records for each name in example.com.signed
example.com:
  Rule Name:   DNS_NO_DOMAIN_MX_RECORDS
  Level:       8
  Warning:     At least one MX record for example.com is suggested

sub2.example.com:
  Rule Name:   DNSSEC_SUB_NOT_SECURE
  Level:       3
  Error:       sub-domain sub2.example.com is not securely delegated.  It
                 is missing a DS record.

results on testing example.com.signed:
  rules considered:          28
  rules tested:              25
  records analyzed:          52
  names analyzed: 8
  errors found:              2
```

Use Mapper to view zone status (before)



Use Mapper to view zone status (after)



Resolver Management Tools

- Trustman
  - Trust Anchor Management Daemon
  - Detects key-rollovers of configured trust anchors
  - Implements RFC5011 for proper rollover
- Logwatch
  - Monitors system logs for bind DNSSEC errors
  - Patch integrated into the latest version of logwatch

Logfile checking: Logwatch

```
################### LogWatch 6.0.2 (04/25/05) ####################
        Processing Initiated: Thu Jul  7 10:13:34 2005
        Date Range Processed: all
       Detail Level of Output: 10
             Type of Output: unformatted
           Logfiles for Host: host.example.com
  ##################################################################

 ---------- DNSSEC Begin ------------------------

 No Valid Signature received 6 times

 Detail >= 5 log messages:
    Marking as secure 97 times
    Verified rdataset succeeded 97 times
    Attempted positive response validation 96 times
    Nonexistence proof found 20 times
    Attempted negative response validation 18 times
    Validation OK 2 times

 ---------- DNSSEC End --------------------------


 ---------- Resolver Begin ------------------------


    Received validation completion event  171 times
    Validation OK  125 times
    Nonexistence validation OK received  46 times

 ---------- Resolver End --------------------------

 ###################### LogWatch End #########################
```

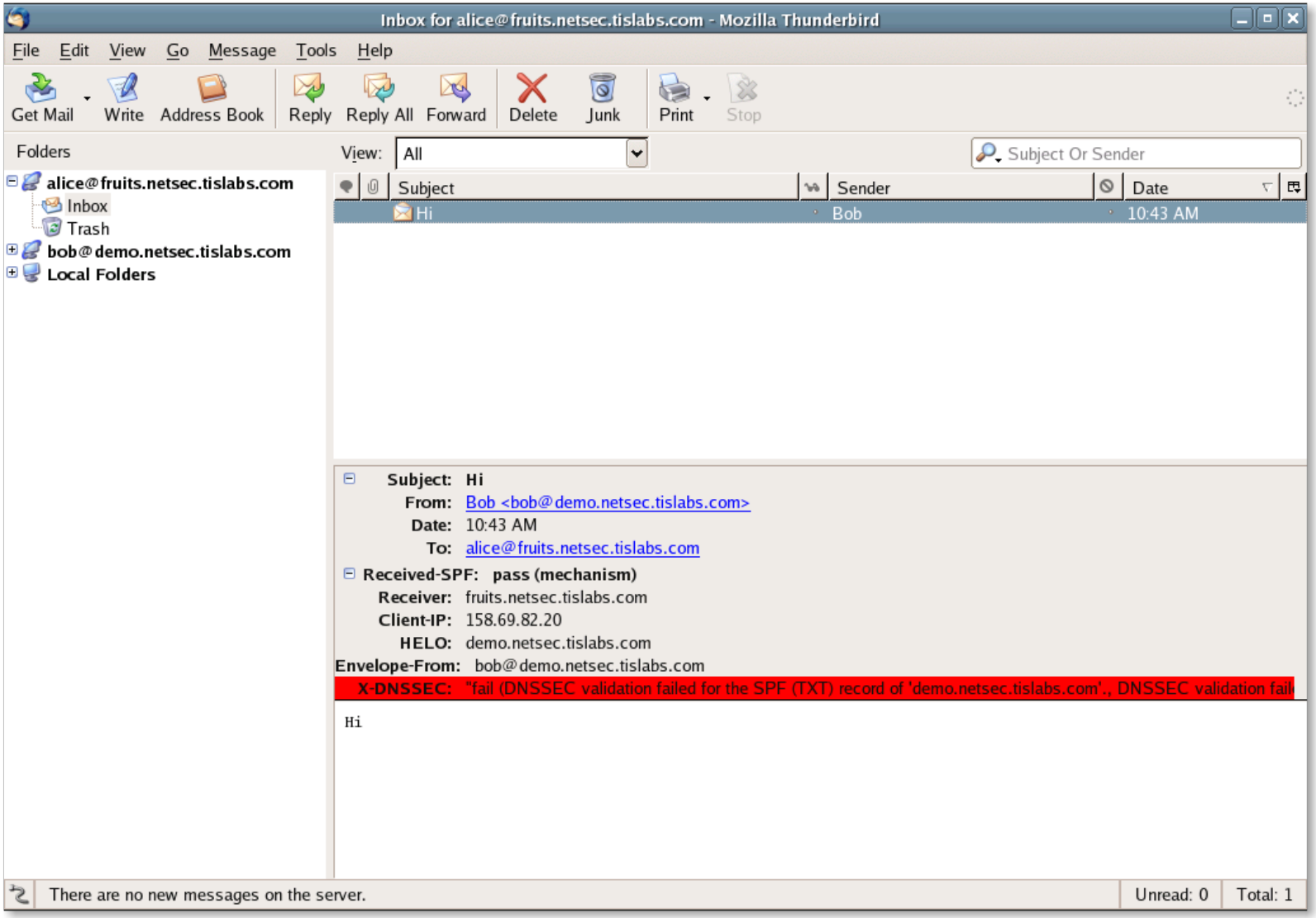
DNSSEC-Aware Applications

- DNSSEC-Tools contains patches to:
  - Firefox
  - Thunderbird
  - Postfix, Sendmail, LibSPF
  - wget, lftp, ncftp
  - OpenSSH
  - OpenSWAN (opportunistic encryption)
  - Jabberd
- More details about DNSSEC applications later

DNSSEC Capable Firefox

DNSSEC Status

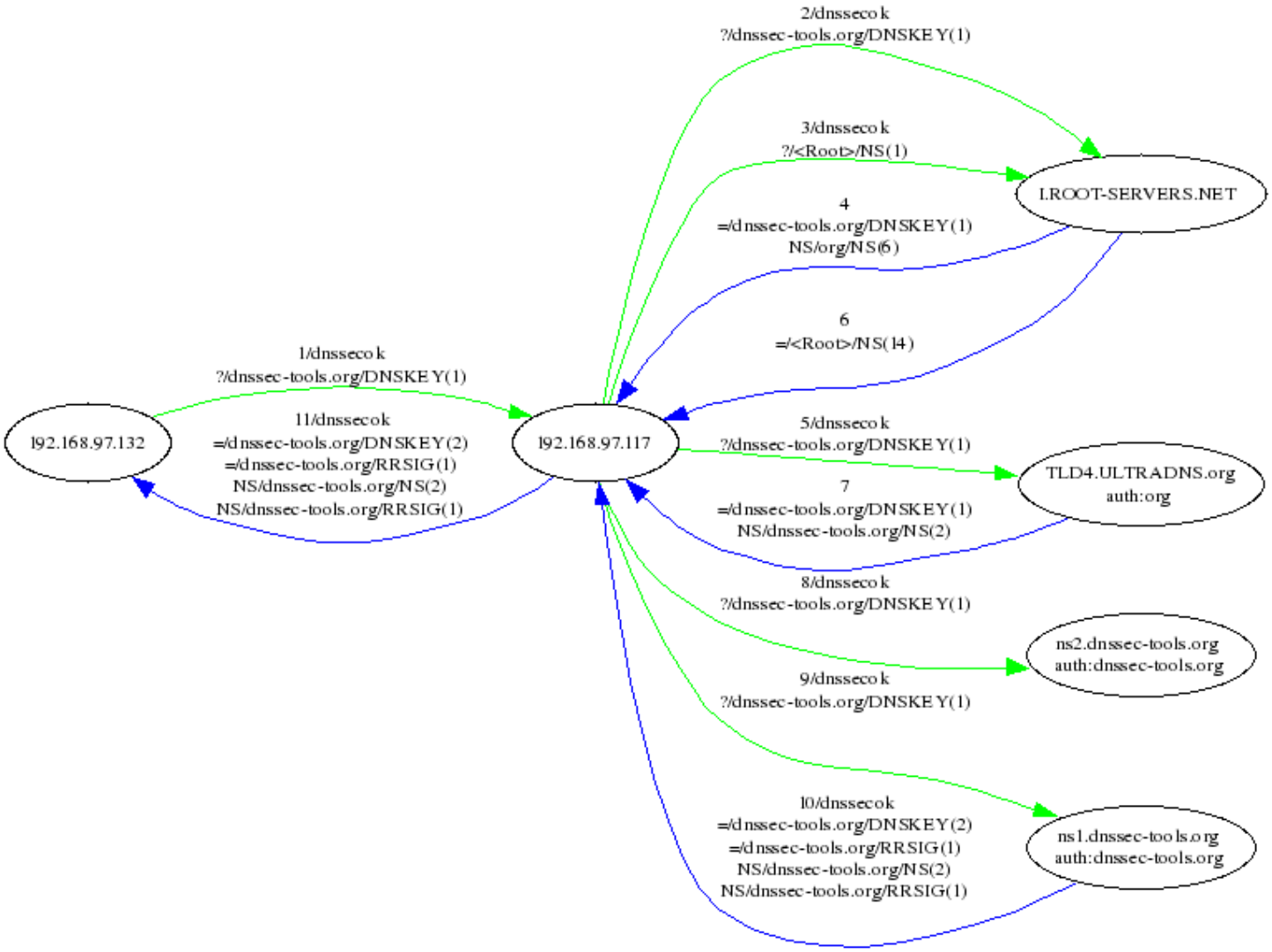
DNSSEC Capable libspf2



DNSSEC Debugging Tools

- Dnspktflow
  - Graphical DNS data flow tracing
- Donuts
  - DNS Zone-file error checker (discussed previously)

Trace your queries: dnspktFlow



Documentation

- Available on project webpage http://www.dnssec-tools.org
- Step-by-step guide for DNSSEC operation using DNSSEC-Tools
- Step-by-step guide for DNSSEC operation using BIND tools
- Manual pages
- User Documentation
- Tutorials tailored towards the needs of particular types of adopters