ZoneCheck II

RIPE 45, 2003/05/12-16

Stéphane D'Alu
sdalu@nic.fr

AFNIC
afnic@afnic.fr
http://www.afnic.fr/

Agenda

- Purpose
- Using ZoneCheck
- Inside ZoneCheck
- Adding new tests
- Roadmap / Summary

Purpose

Improving the Internet

- DNS is a critical resource
  - needed by every network application
- DNS robustness has its cost
  - latency
  - consistency
- New pitfall emerging
  - use of IPv6 addresses with IPv4-only services

➔Need to check for correct configuration

  - of all the involved name servers
  - all the time

ZoneCheck

- Checking the zone configuration
  - checking DNS records
    - SOA, NS, A, AAAA, MX, …
  - consistency between nameservers
    - content, serial number
  - flags
    - rec, aa
- Many other tests included

➔Modular enough to fit everyone needs
(=> make it an RFC compliant checking tool)
The configuration file is the policy

Practical usage

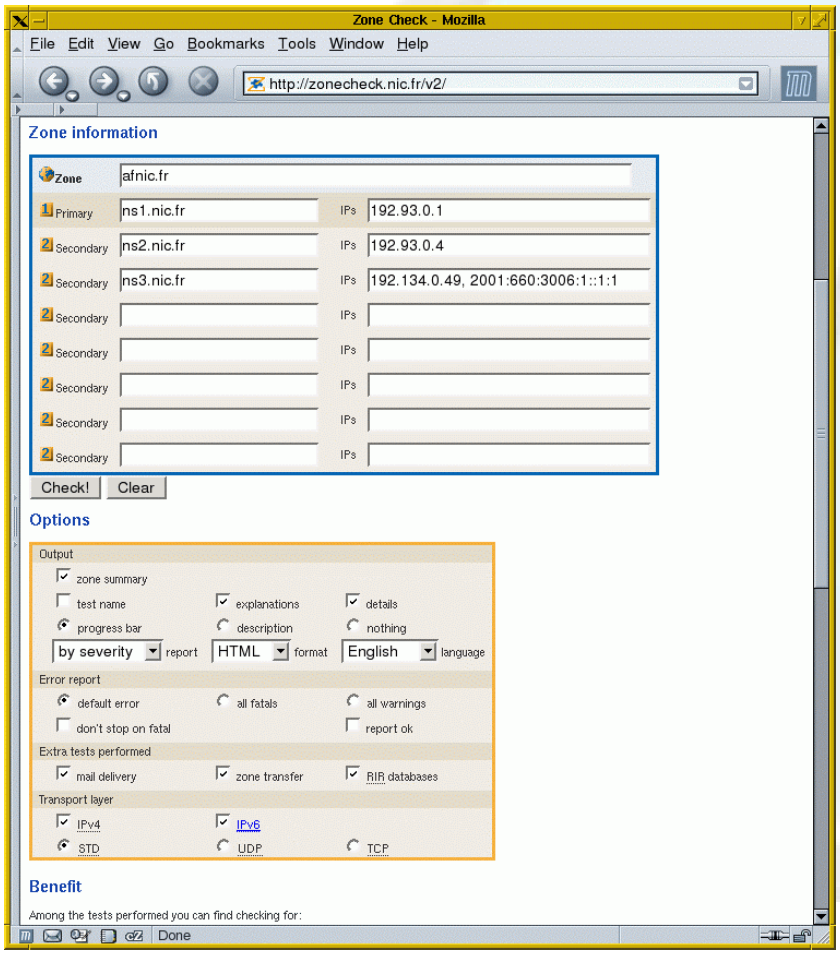
- Deciding of the delegation on technical criteria
  - validating domain delegations under .fr/.re
    (the policies are reflected only in the configuration file)
  - periodic verification
- Monitoring domain name or TLD
  - mon (http://tac.eureg.org/mon/)
- Using it as debugging/verification tool
  - CLI or inside scripts, GUI

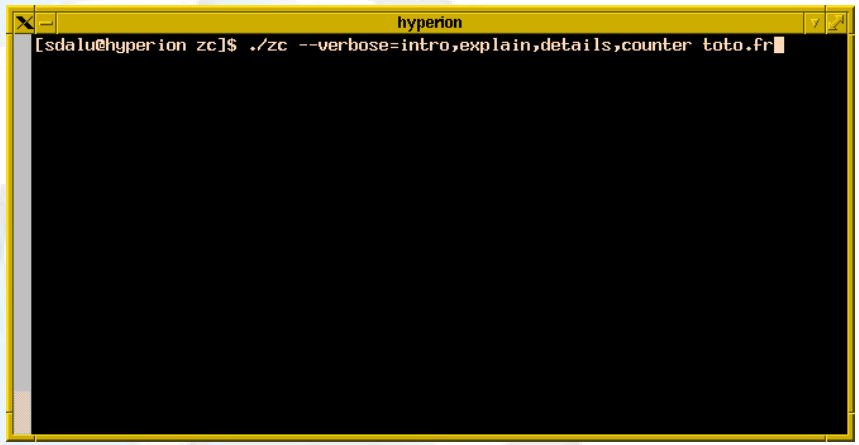
Differences with v1

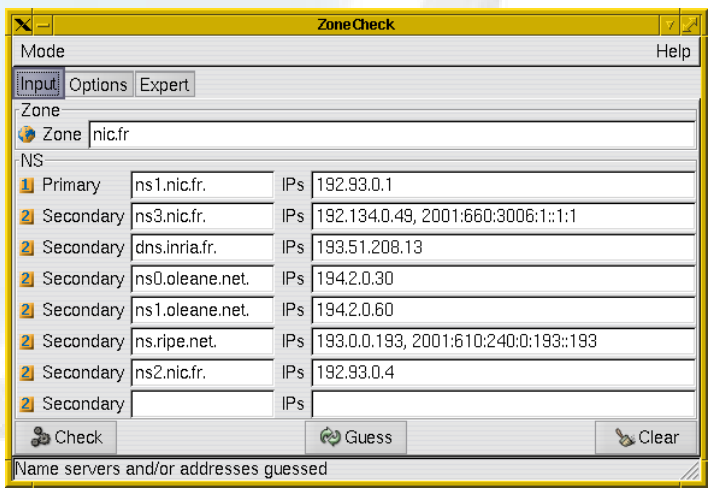
- Full support of IPv6 (connectivity and AAAA)
- Easily customisable for other TLD zones
  - adding/selecting tests
  - changing test severity warning/fatal
- Implementation of different policies
  - fr, com/net/org, arpa
- Multiple and improved interfaces
  - cli / gui / web
- Better localisation support

Using ZoneCheck

Three possible interfaces







Special enhancement

- CLI
  - support for TTY interface
  - dedicated mode for use inside shell scripts
- Web
  - choice between text/plain and text/html
  - use of stylesheets
    (easy integration in existing web site)
  - special support for javascript aware browser

➔If you don’t have them, it still works fine

Runtime behaviour selection

- Processing mode
  - one domain
  - batch

- Configuration parameters
  - network: IPv4 / IPv6; UDP / TCP / STD
  - error: all warning/fatal, stop on first
  - verbose: summary, explanation, details, progress bar
  - format: html/text/…, English/French/…
  - test selection: mail, dns:soa, connectivity, …

Inside ZoneCheck

Choices

- Tests
  - check only a precise point (ex: chk_rec)
  - classified by goals (connectivity, soa, ns, …)
- Conditional statement
  - only performs test matching some criteria (ex: tst_mail_by_mx_or_a)
- Automatic choice of configurations for different zones
  - *.fr., *.in-addr.arpa., *.ip6.arpa., …

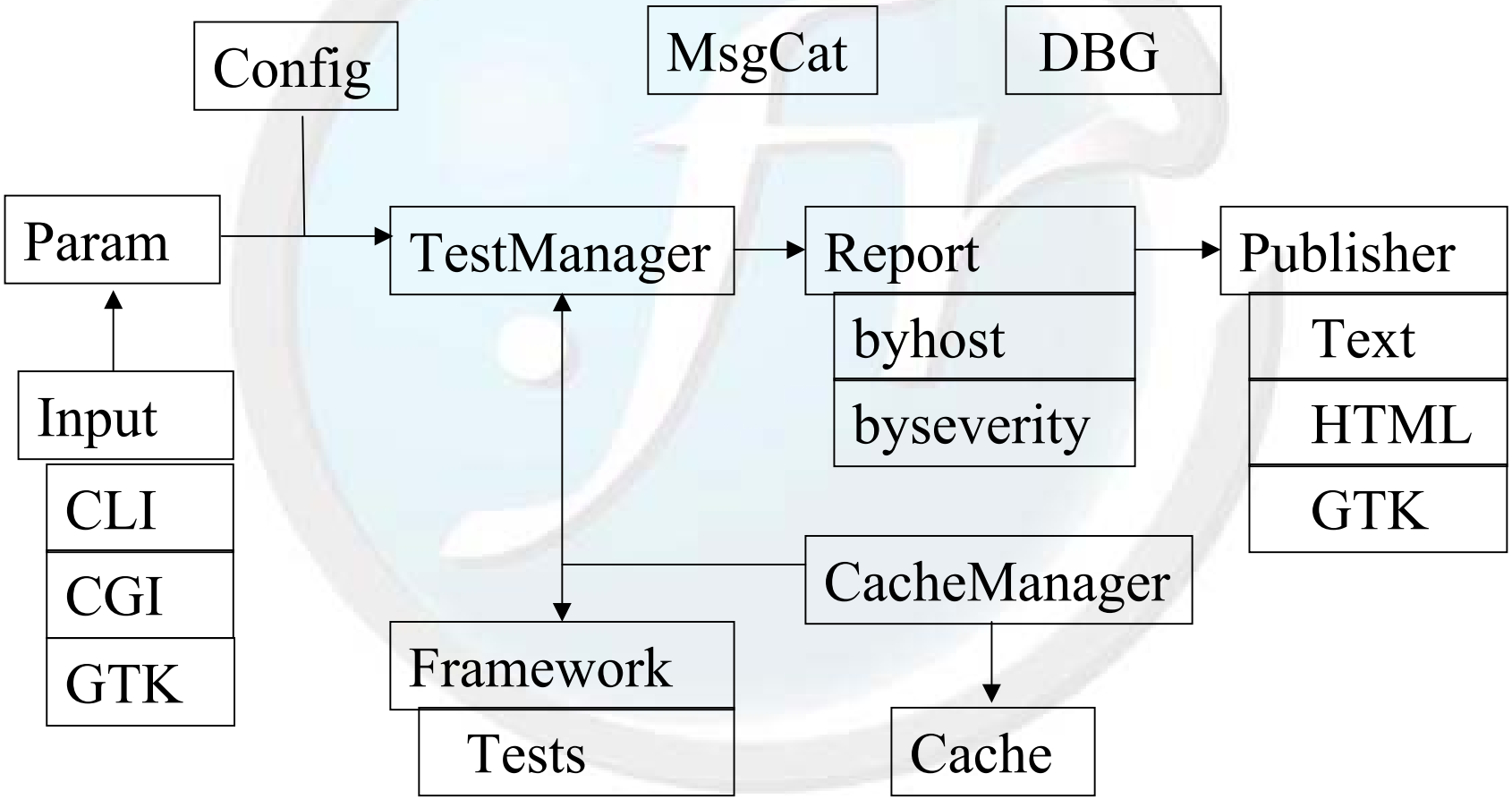
Choices

- Language: Ruby
  - IPv6 support
  - object oriented
  - I like it ;)
- Frontend/backend
  - easy writing/adding of new input/output interfaces
- I18N
  - all strings are UTF-8 encoded

Strength

- Multi-threads
  - simultaneous query of different nameservers
- Caching of information (DNS record, …)
  - greatly simplifies test writing
  - improves processing of batch data (generally sharing the same name servers)
- Exceptions mechanism
  - avoids dealing with all possible error cases
- Extensible / Modular

Architecture overview



Adding new tests

Steps

- Test
  - selecting the test family:
    generic, nameserver, address, extra
  - writing the corresponding test
- Configuration file
  - test name, severity, category
- I18N/L10N
  - error messages, explanation, details, …

Writing the test

- Example : test on SOA retry/refresh
  - true/false : succes/failure
  - exception : error

```
# ZCTEST 1.0
require 'framework'
module CheckNetworkAddress
    class SOA < Test
        def chk_soa_retry_refresh(ns, ip)
            soa(ip).retry < soa(ip).refresh
        end
    end
end
```

Writing the configuration

- Example : zc.conf.fr
  - powerful text based configuration file
  - test scheduling / severity

```
testseq "address" {
    case tst_recursive_server
    when true
        # Root servers
        chk_root_servers                f   dns:root;
        chk_root_servers_ns_vs_icann    f   dns:root;
        chk_root_servers_ip_vs_icann    w   dns:root;
    end
};
```

Roadmap / Summary

Before final release

- 2.0.0 (current beta release)
  - Implementing AXFR
  - Final stage of beta testing
  - Further documentation
  - Translation in other languages

➔Final release expected in a few weeks

Further work

- 2.1.x
  - IDN support
  - support for Authority and Additional Sections
- 3.x.x
  - stand alone ruby resolver library
  - EDNS support
  - DNSsec support

Summary

- New features
  - Powerful configuration file
  - Full IPv6 support
- Testing / Downloading
  - URL : http://zonecheck.nic.fr/v2/
  - Contact: zonecheck@nic.fr
- License (=> *it's free software*)
  - NResolv: Ruby License (MIT-*like*)
  - ZoneCheck: GPL (or MIT-*like*, see AFNIC for agreement)
- Help welcome for translation/references/new tests