FRED – open source registry solution

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Agenda

- FRED overview

- Deployments

- Data model

- Interfaces

- Features

FRED

- FRED – Free Registry for ENUM and Domains

- Set of open source tools for managing domain registry

- Platform: C/C++/Python + Linux + PostgreSQL

- Available at http://fred.nic.cz/

  - Download page with installation instructions

FRED

- FRED scope

  - Management of domain registrations in multiple zones via set of interfaces

  - Generation of DNS zonefiles for all zones

- Registry-Registrar-Registrant model (3R)

  - Registry has no direct connection to registrants (with a few exceptions)

  - Registrars are responsible for the data in registry

Deployments

- 2006 – 0.2.4.164.arpa

- 2007 – CZ, CO.CZ

- 2008 – IT.AO, CO.AO

- 2009 – TZ

- 2010 – FO, CR, EE

- 2013 – AL

- 2014 – MK

Deployments

- 2R registries

  - CR, FO

  - Web frontend build on top of FRED

- 3R registries

  - All others

  - Many modifications (EE – identity document in EPP, AL – billing contacts, TZ – credit management)
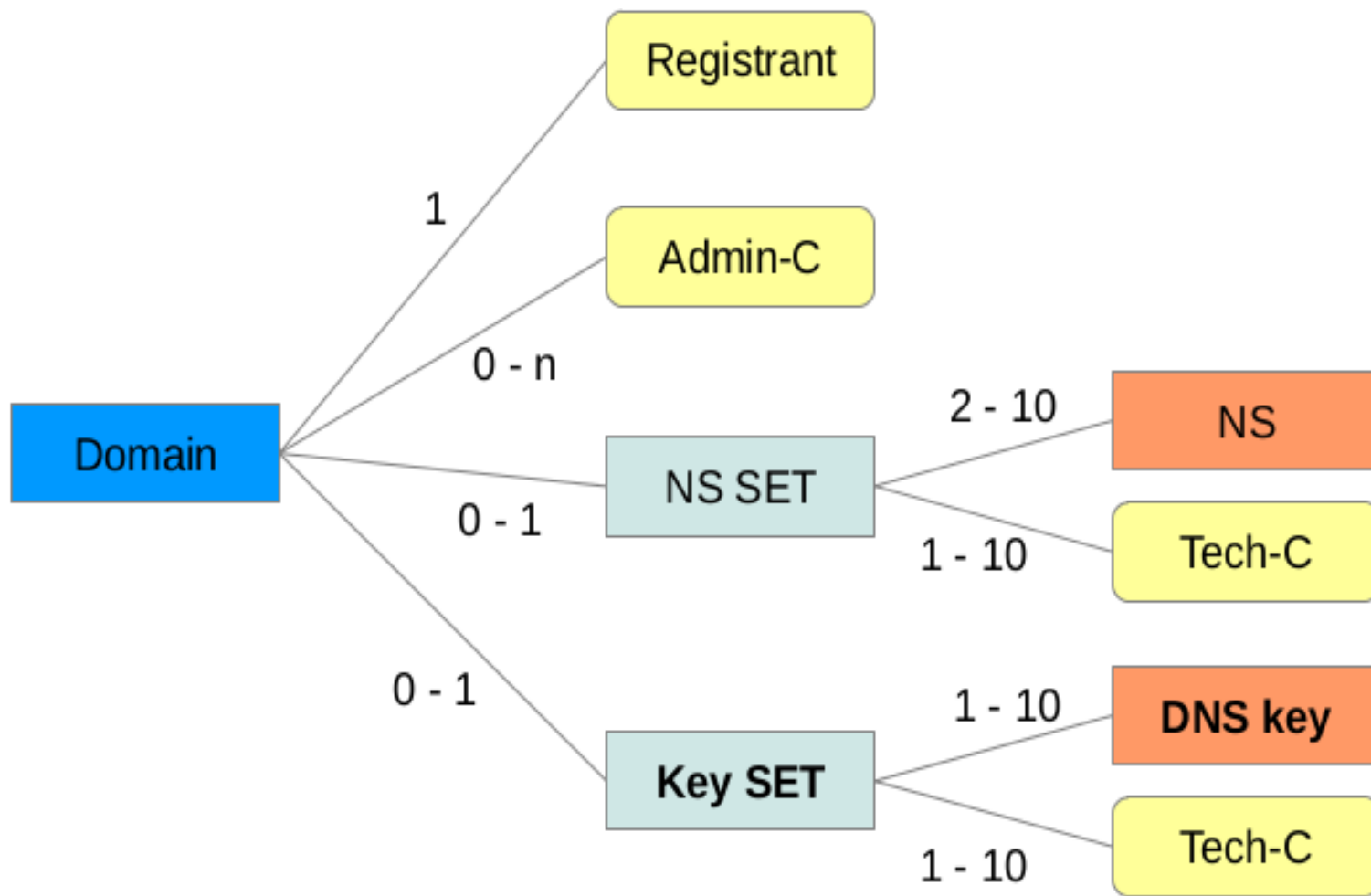
Data model

- Primary objects

  - **Contact** - contact information, registrants, admin contacts, tech contacts

  - **NSSet** - collection of DNS hosts

  - **KeySet** - collection DNSKEY data for DNSSEC

  - **Domain**

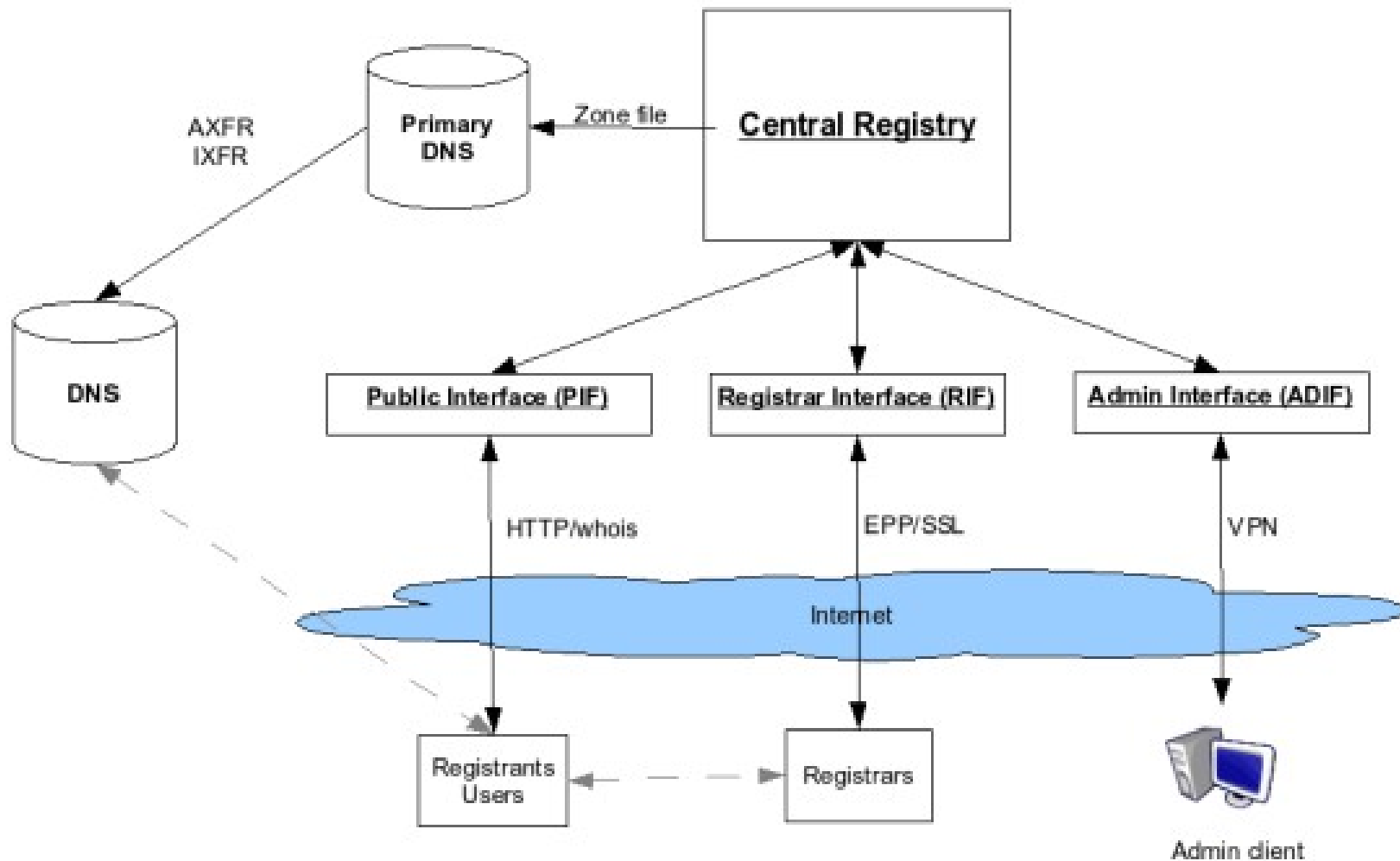- Objects can be shared

Data model

Data model

- All objects have "sponsoring" registrar and only this registrar can do changes

- All registrars can see the data of all objects except of secret transfer code called "authinfo"

- Users may decide to change registrar by providing authinfo to new registrar

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Interfaces

Interfaces - EPP

- Few extensions

  - New objects NSSets and KeySets

  - Contact has new fields for identification purposes

  - Bulk info operations, credit discovery, authinfo requests, invocation of technical checks

- Python library and cmdline client (fred-client)

Interfaces - WHOIS

- Lookup in all objects

- Privacy concerns – disclose flags interpretation

- Three forms:

  - Port 43 - reverse search

  - Web WHOIS – web form and result page with hyperlinks to linked objects

  - RDAP – only lookup queries

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Interfaces – Web administration

- Lookups

  - history of all objects

  - all interface transactions

  - client communication

- Registrar administration

- Domain activation/deactivation

- Contact validation

Interfaces – CLI administration

- CLI scripts

- All regular operations

  - Notifications about expired domains

  - Deleting of expired domains

  - Processing bank transactions

- Periodical invocation is handled by Cron tool

Interfaces – Zonefile generation

- CLI script – genzone

- Produce zonefiles for all configured domains

- Output is plain unsigned zonefile

- Post processing scripts not included

  - Zonefile correctness checking

  - Checking of number of changes

  - DNSSEC signing

Features - DNSSEC

- KeySet object with DNSKEY records

- KeySets can be shared among many domains

- Generation of DS records during zone file generation

- Signing is out of scope, you can use anything you want (Bind, OpenDNSSEC, Knot DNS)

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Features - ENUM

- Storing phone numbers as domains in DNS

- Arbitrary number of labels in domain

- Validation date as a mean of verification of number ownership

- Not actively promoted project in .CZ

Features - IDN

- Strong opposition against IDN in .CZ

- Configuration option that may be turned on

- Limitations

    - No character sets checking
    - No bindings with non-IDN domains

Features - Billing

- Charging is aimed to registrars

- Both prepaid and postpaid models supported

- Flat price lists – one price per zone per operation

- EPP registrations and renewals are charged

- EPP transactions over limit are charged

Features – Contact notification

- Via email

  - When there are changes in data

  - Important events (expiration, deactivation)

  - Once a year sending reminder email with all contact data

- Sending a snail mail letter after domain deactivation

Features – Registry locks

- Direct channel between Registrar and Registry

- Website with form with request for locking domain

- Request must be followed by electronically signed email or officially signed letter

- Request must be processed manually by staff after checking authentication

- Unlocking is the same process

Features – Delegation checks

- Only informational – no influence on delegations

- Reachability, proper delegation, DNSSEC functionality,...

- Technical contacts are informed via email

- Automated periodical invocation

- Registrars can invoice checks via EPP

Features – Contact validation

- Contacts are randomly selected for validation

- Automated controls checks syntactical correctness, address check with street registry, etc..

- In case of problems manual checks by staff follows and communication with contact starts

- When there is no response, domain is deleted

Requirements

- Depends on expected traffic

    - Because of modular design, it can be one server or six servers

    - Disk storage based on how long you want to store audit records

Adoption

- Installation – easy on Ubuntu or Fedora

- Configuration – parameters in config files

- Customization – email and web templates

- Migration of data – via EPP + SQL

- Distribution of EPP access to registrars

  - Or implementation of registrar interface
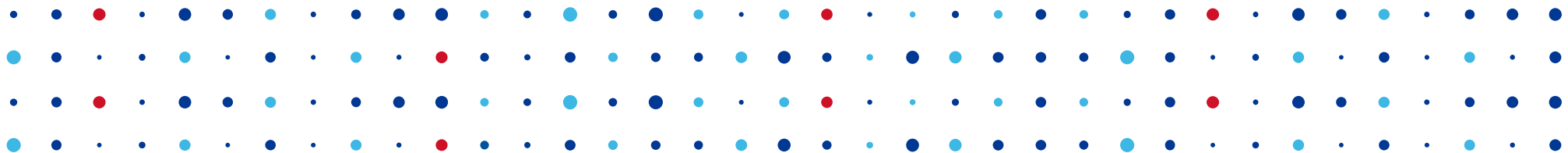
Thank You

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