e-IANA System

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Agenda

- NASK: who we are?
- e-IANA System: requirements
- Development plan
- Architecture
- Implementation
- Example: modify Primary NS
- Future plans
NASK: who we are?
NASK background

- Established in 1991
- Research & Development public entity
- Supervised by Ministry of Science and Information Society Technologies
- Registry for .PL, and +48 (ENUM project)
NASK background

- 280 employees (total) including
- 40 employees in DNS Division including 5 employees in IT Projects Team
- Member of ITU, CENTR, RIPE, etc.
- Collaboration with ICANN, ENISA etc.
NASK background

- Business activity:
  - domains’ registration
  - hosting,
  - Internet access (including WiMAX: 3,6 – 3,8 GHz radio)
  - IP Transit,
  - corporate networks,
  - videoconference,
  - VoIP services,
  - biometrics.
e-IANA System: requirements
Requirements: functionality

- Described in: „Requirements for Automated Management of TLD IANA database“ ver. 1.11
- Processes defined in the document cover almost all IANA functions including:
  - Replace TLD Manager, Technical and Administrative Contact
  - Modify Primary and Secondary Name Servers
  - Modify Whois Server, TLD Manager attributes, Check the status of a TLD
  - Modify Administrative and Technical Contact attributes, URL for registration services
### Requirements: attributes

- **Document defines attributes of the „actors“ (see example below)**

<table>
<thead>
<tr>
<th>Attribute Name of „TLD“ Actor</th>
<th>Data Type</th>
<th>Req?</th>
<th>Mult?</th>
<th>Public?</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLD Name</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>TLD Manager</td>
<td>Contact</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Address</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Phone Number</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Fax Number</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Email Address</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Administrative Contact</td>
<td>Contact</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Technical Contact</td>
<td>Contact</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Primary Name Server</td>
<td>Name Server</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Secondary Name Server</td>
<td>Name Server</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>URL for Registration Services</td>
<td>Text</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Whois Server</td>
<td>Text</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
Requirements: Processes

- Based on the „Requirements for Automated Management of TLD IANA database” NASK has prepared graphic representation of the processes according to ISO 9001:2000:
  
  `IANA.dns.pl/process_definition.html`

- Current process definition requires modifications
Requirements: Authentication

- Neither document „Requirements...” nor the working system determine the Authentication method.
- It’s possible to use different authentication models or the combination of the authentication models of including inter alia:
  - PGP
  - Passwords
  - One time passwords (popular in home-banking systems)
  - DNSsec
Development Plan
Development Plan

- Start: Aug. 3, 2005
- 1st Release: Sep. 7, 2005
- Ready in 5 weeks!
- Project Team:
  - 4 Full-Time Developers
  - 1 Full-Time DNS Expert
  - 1 Part-Time Quality Assurance Officer
Development Priorities

High

Reliability

Security

Availability

Flexibility

Extensibility

Maintenance

Performance

Low
Development Platform

- J2EE
  - Proven industry standard
  - Write once run anywhere
  - Reliable
- Rational Unified Process
  - Proven development process
  - To develop
    - High quality software
    - On time and under budget
- ISO 12207
Architecture
Architecture Overview

- JBoss jBPM
  - Business Process Management
  - Workflow engine

- Hibernate
  - Object/Relational Mapping tool

- JBoss AS
  - J2EE-based application server

- PostgreSQL
  - Database engine
  - Easily replaceable thanks to the use of hibernate
- e-IANA and jBPM components are deployed into JBoss AS
- e-IANA and jBPM use hibernate to communicate with PostgreSQL database
jBPM as Workflow Engine

- Configurable business process
  - State management
  - Transition management
  - Pluggable actions
  - Tasks assignments
  - Process versioning
- Full audit-logs
- Scheduler
- Automated actions
  - Time-outs
  - Reminders
Architecturally Significant Components

- Presentation
  - eiana-mail-ui
  - eiana-web-ui

- Application
  - eiana-services

- Business
  - eiana-bpm
  - jBPM

- Data
  - hibernate
  - eiana-db
  - eiana-objects
Implementation
<task-node name='PENDING_IANA_CONFIRMATION'>
  <task>
    <assignment class="pl.nask.eiana.processes.assignment.RoleAssignment" >
      <roles>iana,manager,admin,tech</roles>
    </assignment>
    <controller class='pl.nask.jbpm.controller.TemplateBasedTCHandler' config="">
      <templateName>modify-secondary-name-servers,signature</templateName>
      <initHandler>pl.nask.eiana.bpm.pgp.SignatureInitializationHandler</initHandler>
      [...]
    </controller>
  </task>
  <transition name='withdraw' to='WITHDRAWN'></transition>
  <transition name='ok' to='PENDING_IANA_APPROVAL'>
    <action class='pl.nask.eiana.processes.pgp.SignatureValidationActionHandler' [...]
  </transition>
  <timer name='time-out' duedate='7 days' transition='withdraw'></timer>
</task-node>
Flow Configuration

- **Nodes**
  - Tasks, states, decisions
- **Transitions**
  - Time-outs
- **Task templates**
  - Templates as a base for UI
    - Mail parser based on template definition
    - Web-form generation based on template definition
Template Configuration

- Regular expressions
- Set of pre-defined validators
- Pluggable validation framework
- Exemplary configuration:

```xml
<template name="modify-secondary-name-servers" label="Modify Secondary Name Servers">
  <field name="name" label="Top-Level Domain Name" regex="\p{Alpha}{1,64}"/>
  <list>
    <section name="secondaryNameServers" label="Secondary Name Server">
      <field name="name" label="Secondary Server Hostname">
        <validator class="pl.nask.eiana.bpm.validators.HostNameValidationHandle"/>
      </field>
    </section>
    <list>
      <field name="address" label="Secondary Server Netaddress">
        <validator class="pl.nask.eiana.bpm.validators.IpValidationHandle"/>
      </field>
    </list>
  </list>
</template>
```
PGP Authentication

- OpenPGP
- RFC 2440
- Java Cryptography Extension (JCE)
- Cryptix
  - Implements OpenPGP
  - Provides JCE
PGP Authentication

e-IANA supports *inter alia*:

- DSA,
- ElGamal,
- IDEA, TripleDES, CAST5, Blowfish, Twofish
- MD5,
- SHA-1,
- RIPEMD160,
- MD2,
- Tiger
Example:
modify Primary NS
Tasklist

Task Form Link Process

Start New Process Execution

Process Link
- Replace TLD Manager
- Replace Administrative Contact
- Replace Technical Contact
- Modify Primary Name Server
- Modify Secondary Name Servers
- Modify URL for Registration Services
- Modify Whois Servers
- Modify TLD Manager Attributes
Example: modify Primary NS

logged as Manager-PL

Task: Modify Primary Name Server

modify-primary-name-server

Top-Level Domain Name: pl

Primary Name Server

Primary Server Hostname: ns1.registry.pl

Primary Server Netaddress: 123.123.123.123

Task Actions: fetch data ok

Cancel
modify Primary NS

Logged as Manager-PL
modify Primary NS

logged as IANA

Task: PENDING_IANA_APPROVAL

modify-primary-name-server
Top-Level Domain Name: pl [no change]
Primary Name Server
Primary Server Hostname: ns1.registry.pl [no change]
123.123.123.123
Primary Server Netaddress: [replace [239.189.130.215]]

Task Actions: reject ok verify

Cancel
modify Primary NS

logged as USGov DoC

Task: PENDING_USDoC_APPROVAL

modify-primary-name-server

Top-Level Domain Name: pl [no change]

Primary Name Server

Primary Server Hostname: ns1.registry.pl [no change]

Primary Server Netaddress: 123.123.123.123 [replace [239.189.130.215]]

Task Actions: reject ok withdraw

Cancel
modify Primary NS

logged as IANA

modify-primary-name-server
Top-Level Domain Name: pl [no change]
Primary Name Server
Primary Server Hostname: ns1.registry.pl [no change]
Primary Server Netaddress: 123.123.123.123
[replace [239.189.130.215]]

Save And Close

Cancel

INITIAL IANA_CONFIRMATION IANA_APPROVAL USDoC_APPROVAL DATABASE_UPDATE
modify Primary NS

logged as VeriSign

Task: PENDING_ZONE_UPDATE

modify-primary-name-server
Top-Level Domain Name: pl [no change]
Primary Name Server
Primary Server Hostname: ns1.registry.pl [no change]
123.123.123.123
Primary Server Netaddress: [replace [239.189.130.215]]

Save And Close

Cancel
Future plans
Plans

- Testing (in progress):
  - September 9 - October 21, 2005
  - testbed@wwtld.org for bug reporting/suggestions etc.
  - Code review for interested parties (NDA required)

- Final release:
  - October 31, 2005

- Licence transfer to ICANN:
  - At the request of ICANN
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