

e-IANA System

***Andrzej Bartosiewicz
Patrycja Węgrzynowicz
CENTR, October 2005, Moscow***



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' registation
 - hosting,
 - Internet acces (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)

Attribute Name of „TLD“ Actor	Data Type	Req?	Mult?	Public?
TLD Name	Text	Y	N	Y
TLD Manager	Contact	Y	N	Y
Address	Text	Y	N	Y
Phone Number	Text	Y	N	Y
Fax Number	Text	Y	N	Y
Email Address	Text	Y	N	Y
Administrative Contact	Contact	Y	N	Y
Technical Contact	Contact	Y	N	Y
Primary Name Server	Name Server	Y	N	Y
Secondary Name Server	Name Server	Y	Y	Y
URL for Registration Services	Text	Y	N	Y
Whois Server	Text	N	Y	Y

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

Availability

Reliability

Security

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



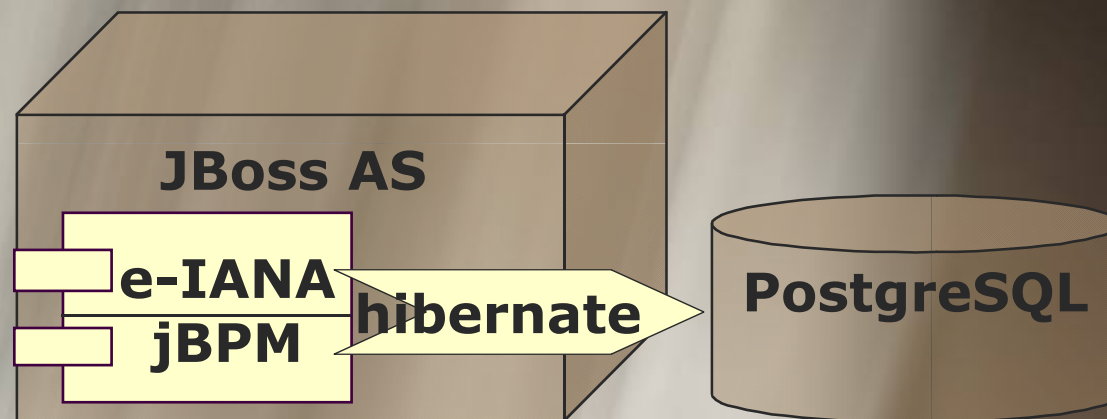
Architecture

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

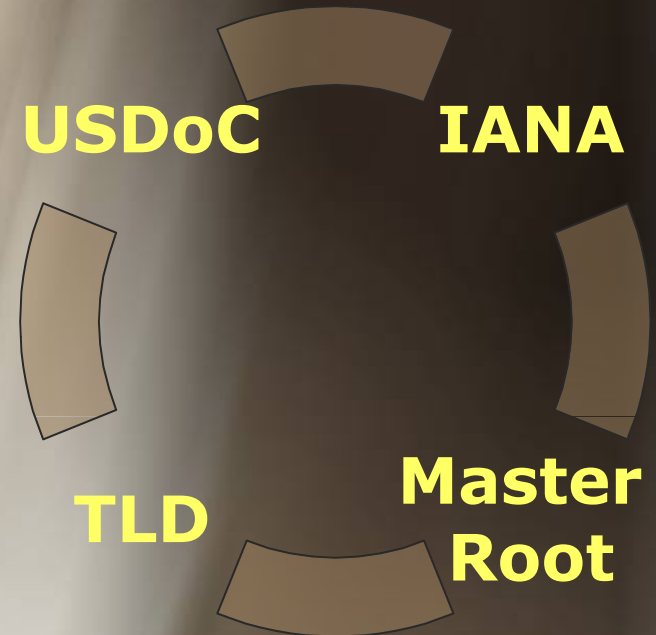
Architecture Diagram

- **e-IANA** and **jBPM** components are deployed into **JBoss AS**
- **e-IANA** and **jBPM** use **hibernate** to communicate with **PostgreSQL** database

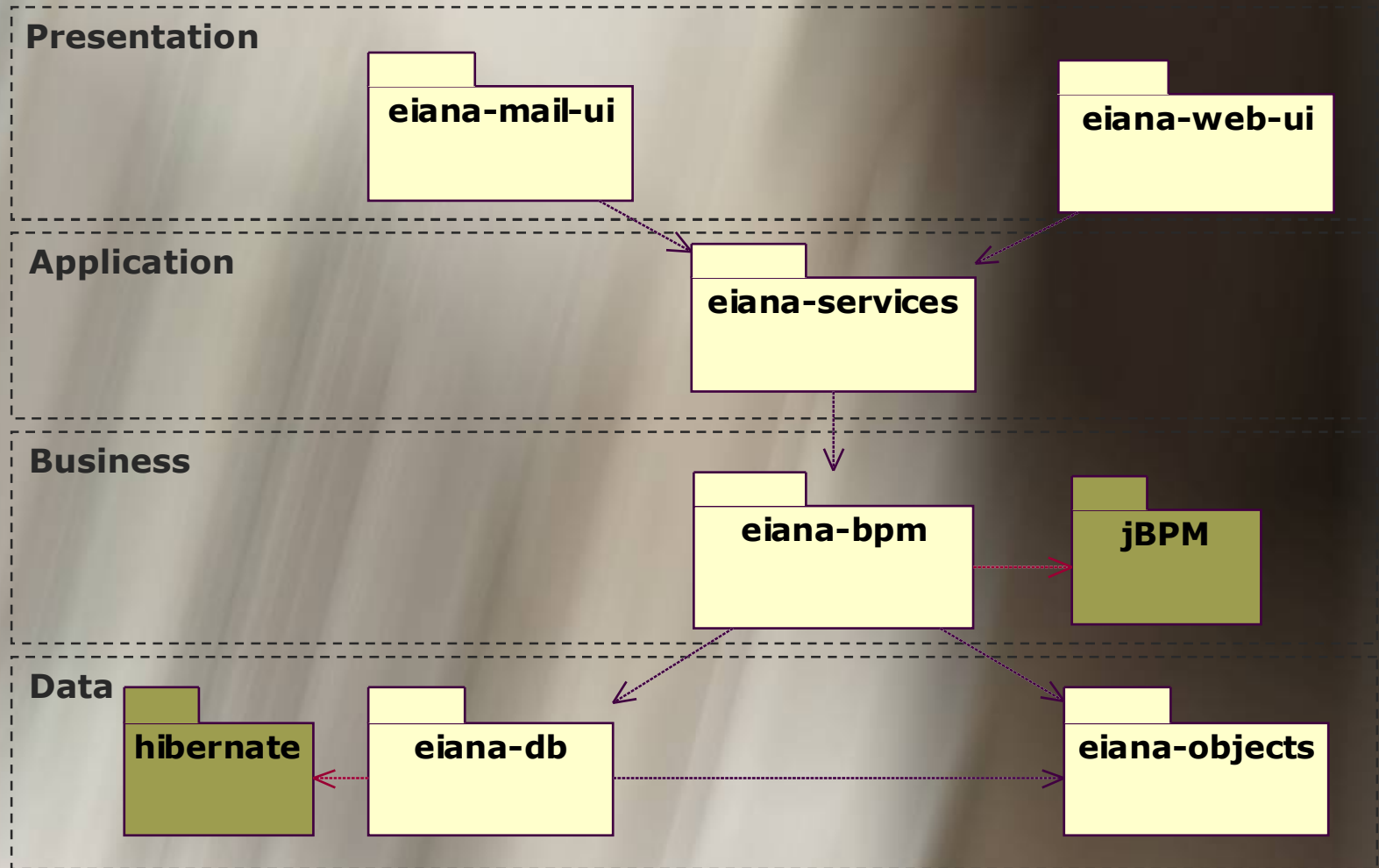


jBPM as Workflow Engine

- 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





Implementation

Business Process Definition

■ XML file

```
| <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</i
|         [...]
|     </controller>
|   </task>
|   <transition name='withdraw' to='WITHDRAWN'></transition>
|   <transition name='ok' to='PENDING_IANA_APPROVAL'>
|     <action class='pl.nask.eiana.processes.pgp.SignatureValidationActionHand
|       [...]
|     </action>
|   </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:

```
} <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.HostNameValidationHand
} </field>
} </list>
} <field name="address" label="Secondary Server Netaddress">
  <validator class="pl.nask.eiana.bpm.validators.IpValidationHandle
} </field>
```


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**

ccTLD – Main menu

logged as Manager-PL



You are logged in as manager-pl [Logout](#)

MENU

Home

- ◆ [Home](#)
- ◆ [TLD Status](#)
- ◆ [Notifications](#)
- ◆ [Administration](#)
- ◆ [Monitoring](#)

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](#)

NASK Research and Academic Computer Network

© Copyright by  2005, 

Example:modify Primary NS

logged as Manager-PL

You are logged in as manager-pl

Task: Modify Primary Name Server

modify-primary-name-server

Top-Level Domain Name:

Primary Name Server

Primary Server Hostname:

Primary Server Netaddress:

Task Actions:

INITIAL

IANA_CONFIRMATION

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

modify Primary NS

You are logged in as manager-pl

Task: PENDING_IANA_CONFIRMATION

Modify Primary Name Server

Top-Level Domain Name: [no change]

Primary Name Server

Primary Server Hostname: [no change]

Primary Server Netaddress:

[replace [243.224.106.28]]

Signature

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 [243.224.106.28]]

Message:

Signature:

Task Actions:

*logged as
Manager-
PL*

INITIAL

IANA_CONFIRMATION

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

modify Primary NS

logged as IANA

You are logged in as IANA

Task: PENDING_IANA_APPROVAL

modify-primary-name-server

Top-Level Domain Name: [no change]

Primary Name Server

Primary Server Hostname: [no change]

Primary Server Netaddress:
[replace [239.189.130.215]]

Task Actions:

INITIAL

IANA_CONFIRMATION

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

modify Primary NS

logged as USGov DoC

You are logged in as USDoC

Task: PENDING_USDoC_APPROVAL

modify-primary-name-server

Top-Level Domain Name: [no change]

Primary Name Server

Primary Server Hostname: [no change]

Primary Server Netaddress:
[replace [239.189.130.215]]

Task Actions:

INITIAL

IANA_CONFIRMATION

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

modify Primary NS

logged as IANA

You are logged in as IANA

Task: PENDING_DATABASE_UPDATE

modify-primary-name-server

Top-Level Domain Name: [no change]

Primary Name Server

Primary Server Hostname: [no change]

Primary Server Netaddress: [replace [239.189.130.215]]

Save And Close

Cancel

INITIAL

IANA_CONFIRMATION

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

modify Primary NS

logged as VeriSign

You are logged in as VeriSign

Task: PENDING_ZONE_UPDATE

modify-primary-name-server

Top-Level Domain Name: [no change]

Primary Name Server

Primary Server Hostname: [no change]

Primary Server Netaddress:
[replace [239.189.130.215]]

Save And Close

Cancel

IANA_CONF

IANA_APPROVAL

USDoC_APPROVAL

DATABASE_UPDATE

ZONE_UPDATE



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



Contact:

Patrycja.Wegrzynowicz@NASK.pl

Andrzej.Bartosiewicz@NASK.pl