Business Process Management with @enterprise

Groiss Informatics, March 2010

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@enterprise - Course material, March 2010

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Outline

- Introduction
 - motivation, terms
- Process modeling
 - the organization
 - process structure
 - data modeling
- Process execution
 - the @enterprise user interface
 - GUI Customization
- Process monitoring
- Implementing a Workflow Application
 - setting up a project
 - the HTTP server
 - the workflow engine
 - customizing the user interface
 - communication
 - utilities
- System administration
 - Installation
 - configuration, operating

1.

Introduction to Business Process Management

The process-oriented organization

The processes are the main elements in structuring the organization

Example: APQC Process Framework



Goals of the process-oriented organization

increase productivity

- throughput
- minimize transport and idle time
- integration of different software products
- automate steps
- increase quality
 - comply with process requirements
 - provide process documentation
- increase agility

Workflow Management Systems



- modeling
- execution
- documentation
- monitoring



Terms



from WfMC, Terminology and Glossary

Process Instance

- An individual business transaction
 - also: Process, Workflow-Instance
 - created at runtime
- started by a user
- Example:
 - Vaction-Application: Mr. Miller, July 4-16, 2004
 - Vaction-Application : Ms. Watson, August 3-6, 2004

Activity

- single action in a workflow
 - manual activity with user-interaction, e.g. fill in a form
 - system activity no user-interaction
- composite action
 - subprocess
- manual actions are assigned to agents

Agent

- executes activities
- kinds of agents
 - Person *executes manual activities*
 - Machine *executes batch activities*
 - Role group of users

Organizational Unit

- Elements of the organization structure
- functional or logical structure
- often tree-structured
- Example:



Role

- Roles define groups of participants exhibiting a specific set of attributes, qualifications and/orskills.
- Example:
 - Secretary, french-speaking
- 3 Kinds of Roles
 - Local Role assigned within an org.unit
 - Hierarchic Role assigned within an org.unit and the sub org.units
 - Global Role
- not assigned within an org.unit.

Kinds of Roles



Workflow-Management-System

- Software system, which
 - supports the modeling of workflow specifications
 - Process definition
 - Organizational structure
 - controls the execution of workflow instances
 - automatic routing of a process instance to the next responsible agent according to a process definition
 - provides information about running processes
 - Monitoring Where ist my process instance now?
 - automatically documents the processes
 - History who executed that activity?

Workflow-Management-System *Example: Vacation Application*



Process Modeling

Process Modeling

- Define the organizational data
 - Users
 - their roles
 - the structure of the organization
- Modeling the data
 - Classes and their relationships
 - masks for data input

Process definition

- tasks
- task succession (flows)
- flow conditions
- data visibility
- agent assignment

1. Organizational Structure

- Users
- Organizational Units
- Organization Hierarchy
- Roles

User

Attributes:

- Id: unique, used for login
- First name, surname, title
- Description: multi-line description
- Email: used for notification emails
- Language: one of the languages defined in the configuration
- Server
- Active/inactive
- Password settings

other tabs:

- roles
- rights
- substitutions

🕗 Users: Smi	ith John john - @enter	prise - Mozilla Fir	efox					
General	Role Assignments	Substitutions	History Access	Permissions	All Permissions	Permission-History	Settings	
ld:	john							
Surname	e: Smith							
First Nam	ne: John							
Title:								
Descriptic	an:							
E-Mail:								
Phone Nu	imher:							
Server: Languag Active Order Attr	ribute:	I States 💌						
Password Date of th Passwort-	d: ne last password char -Policy:	nge: Passwor Has to cl Cannot c	d never expires hange password at hange password	next login				
Apply cha	anges at:							
Delet	te					Ok	Cancel	Apply
Done								

Substitutions

- Three kinds:
 - 1. Personal substitute for all tasks received personally
 - 2. Personal substitution including all roles
 - 3. Substitute for a role
- The substitute receives the rights of the substituted person.
- Substitutions can be confined to a time interval
- user may change his own substitutes
- adminstrator can edit all substitutions

🕙 User Substitutes: New - @enterprise - Mozilla Firefox							
General	History						
User:	John Smith						
Substitute:	Huber Fritz huber						
From: To:	Substitution incl. Roles 13-10-2009 13:31 13-10-2009 13:31						
Delete	Ok Cancel Apply	y					
Done							

Organizational Unit

Attributes:

- Id: short name
- Name: long name
- Description: multi-line description
- extern organization: cannot receive process instances
- organization class

Organizationa	l Units: Management	- @enterprise - Mozilla I	Firefox			
General s	uper Organizational (Jnit Roles History	Access Reference	d By		
ld:	management					
Name:	Management					
Description:	Management department used by the demo application.					
	· ·	2				
E-Mail:						
TelNr.:						
Address:						
External OU						
Denendent:						
Bontorprico	inctalled: 🔽					
Organization						
Activo:						
Fallow Oth	I.	_				
Order Attribu	te:					
Apply chang	es at:					
Delete		Ok	Cancel	Apply		

Organization Class

Classifying organizational units

- for example in an university: departments, schools, institute, ...
- no special semantics for @enterprise

Attributes:

- Id: short name
- Name: long name
- Description: multi-line description

Organization Hierarchy

build a tree of organizational units

- more than one hierarchy can be defined
- specify the hierarchy which is used in your application

🕙 Organization Hierarchy: Default - @enterprise - Mozilla Firefox						
General	Organizatio	n Hierarchy	History	Access	Referenced By	
		~				
🛛 🖕 GI						
🖃 Mai	nagement					
•	Production					
•	Purchasing					
•	Staff and Fina	nce				
Del	lete	Ok		Cano	cel	Apply
Done						

@enterprise Application

groups all information of a workflow application

- Application object in the database
 - Id, name, org.hierarchy, description
 - application class: see below
 - application directory: location of the code and resources in the file system
 - version: defines the version installed
 - startup position: string for ordering the application startup
- application dependent objects
 - process definitions
 - forms
 - tasks
 - functions
 - roles
 - rights
 - object classes
 - function groups
 - GUI configurations

@enterprise Application

- Resource bundle for text strings and error messages
- Application parameters
 - Configuration parameters for the application
- User parameters
 - application specific parameters for each user
- Structure of the application directory
 - classes directory: is added to the classpath
 - lib directory: jar files are added to the classpath
 - files in application root
 - appl.prop: the application configuration file
 - properties.xml: description of the configuration (types, labels, defaults)

Roles

Grouping of persons or properties of skills of persons for example: secretary, manager, french_speaking

Attributes:

- Id: short name
- Name: long name
- Description: multi-line description
- Application: to which the role belongs to
- Type:
 - local
 - global
 - hierarchic

Predefined Roles

- all: global role for all users
- home: local role for specifying home department of a user
- sys: global role for manipulating master data

Reference Roles

- Problem: different rights for users but same role in process definition.
- Solution in @enterprise: "variants" of roles: roles can have a reference role

Example:

in process definition: sec for secretary
user has role sec or sec_fewer_rights

- sec is a reference role
- sec_fewer_rights is a variant of sec

Rights

Define a right for some action or to access something

- rights are assigned to users directly or via roles:
- with roles a profile of rights can be composed

Attributes:

- Id: short name
- Name: long name
- Description: multi-line description

Standard Rights

- create: create an object
- delete: delete objects
- edit: update objects
- edit-acl: update the access
- view: view the object
- execute: execute (a function)
- conf: configure @enterprise
- admin: enter the administration
- proc_inst: manage process instances
- stat: using the extended search

Application defined rights have no predefined semantics

Permission System

defines what a user can do or see in the system

the base relation is the **Permission:**

- who has which right on which object
- who: a user, a role or a role in an organizational unit
- right: a predefined right like view, edit, execute
- object: can be a single object or an abstraction
 - an object
 - an object class: permission is valid for all instances of this class
 - all objects
 - org.unit: permission is valid for all objects belonging to the org.unit
 - role org.unit: permission is valid for all objects belonging to the org.unit where the user has the role defined in the agent field.
 - access can be allowed or denied

Permission System (2)

- if two permissions overlap and one is positive (allowed), one negative (denied) the negative permission overrules the positive
- View and edit permissions from both sides (subject and object)
 - Agent: User or Role: tab Permissions
 - Target Object: tab Access
- Permission overview for users: tab All Permissions

Permission-Lists

- Permission-lists are aggregations of permissions.
- none of these permissions have a target object defined.
- Example
 - role sys has edit right
 - role all has view right
- Attaching the permission-list to an object makes the contained permissions valid for the attached object as target.
- A permission list can be reused (attached to multiple objects)

Owner

- Some objects have an owner attribute.
- It denotes the user who currently owns the object.
- object x has owner o is equivalent to the following permissions:
 - o has right edit on x
 - o has right view on x
 - o has right delete on x
- The owner concept is designed to limit the number of permission entries and is used for example in the DMS.

Object Classes

- Not all rights make do make sense on every kind of objects
- The class "Object class" allows to specify this restriction.
 - the classname defines which class is described
 - in the tab rights a list of applicable rights can be maintained
- In the Access tab of objects, where permissions can be attached, we restrict the list of rights that can be selected there.
- In the default application, the object classes for @enterprise master data are defined.
What right is needed for an action?

@enterprise 8.0 Permission	Overview	
Heer A wente to	Diabt	Townet
User A wants to	Right	larget
insert an object	create	all objects or object class
update an object	edit	the object, the object class, all objects or
		if the object belongs to an org.unit: the objects of the org.unit
delete an object	delete	as edit
update an org.unit	dept_edit	the org.unit (or object class or all objects)
entering Administration	admin	all objects
changing the configuration	conf	all objects
view log	admin	all objects
insert, update, delete a	edit_acl and execute	edit_acl on target, target class or all objects,
permission		and execute on the right to be assigned
insert, update, delete a role	edit and execute	edit on user (object, object class or all),
assignment		and execute on the role to be assigned
execute a function	execute	the function (or object class or all)
abort a process instance	proc_inst	all objects or all OUs or the OU where the process resides
change agent when I am not	proc_inst or set_ager	as proc_inst
the current agent		
find a process instance in a	view or	as proc_inst
search	proc_inst	
create reports	stat	all objects
execute stored reports	execute	the report (or object class or all objects)

2. Process Definition

- graphical definition in process editor
- texual definition with script language WDL

Process properties

- ld 🔹
- Name
- Version
- Instance Id: normally a natural number, but an expression can be defined: for example: IT-{nn}/{yy}

the following placeholders are allowed:

n....next number (global)

nn....next number for this process

ny....next number per year

nny...next number for this process for this year

y..... last 2 digits of year

yy....year (4 digits)

ou....organizational unit id

Process Properties (2)

 Subject: also an expression consisting of text and placeolders, the placeholders reference form fields
 Example:

```
{form_timereport.employee} / {form_timereport.project}
{form_timereport.period}
```

Active: only active processes can be started

Elementary Steps - Task

The elementary - manual - steps of a process:

- postconditions ensure a defined state after task execution
- preprocessing can set form values before user interaction begins
- compensation procedures ensure a consistent state when going back to a previous step
- the forms of a process can be selectively attached to the steps
- the fields of the forms can be set invisible, read-only, or read-write
- agent(s)

Agent definition

User

normally not used directly in a process definition

Role

represents a group of users

- Role in Organizational Unit members of a role in an org. unit
- Agent of a previous activity the user that executed a previous task in this process instance
- Agent from form field

content can be a user, role or role in org.unit

agent from method

result of Java method must be a user or role

for each task a list of agents can be specified, they receive the task consecutively, thereby implicitely defining a sequence

Elementary Steps – System and Batch Step

- system step
 - a Java method is executed / no user interaction
- batch step
 - asynchronous execution of a Java method

Control Structures - Sequence

graphical notation: BPMN (Business Process Modeling Notation)

role1 task1(); role2 task2();



Control Structures – Alternative (1)

IF

if (f.x = 1) then
 role1 task1();
else
 role2 task2();
end;



elsif:

graphically: add an if in the empty else branch

Control Structures – Alternative (2)



Each path has a name and an optional condition.

At run-time the paths without a condition and the paths where the condition evaluated to true are available to the user for selection

Control Structures - Loops

3 kinds of loops: while, repeat, and loop

```
while (f.x > 0) do
role1 task1();
role2 task2();
end;
```

```
repeat
role3 task3();
until (f.x = 0);
```

general loop: loop *stmts* exit when *condition stmts* end;

Yes $f_X > 0$ role1 task1 No role2 task2 role3 task3 No. fx = 0Yes

Control Structures – Parallelism (1)



• **ANDPAR**: process is continued, when all paths are finished.

 ORPAR: process is continued when one path is finished, the others are aborted.

Control Structures - Parallelism (2)

Parfor :Parallel execution where the number of branches is determined at run time

Two variants:

- iterate over subforms
- define a Java method as iterator

parallel for review in mainform.1 do
 review.reviewer task1(review);
end;



Control Structures - Parallelism (3)

Branch Split a path that has its own end node

branch role1 task1(); end;



Control Structures - Goto

Jump to another point in the process can lead to corrupt process instances, use with care

<a_label> role1 task1(); goto a_label;



Control Structures - Subprocess

Call another process

call sub1(f);



Control Structures - Events



Graphical Representation in @enterprise

current version does not yet use BPMN, but slightly different symbols



Graphical Representation in @enterprise (2)



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Conditions

appear in process: if, choice, loops and in postconditions of Tasks

three possibilities

- a Java method: return type boolean, 0 to n string parameters
- WDL expression: boolean expressions combining form fields comparisons and Java methods

XPath expression: use prefix xpath:

can use variables:

- ai: the activity instance
- pi: the process instance
- form_formid: a form of the process with the given form id
- user: current user
- configuration: the system configuration

Example: \$form_f/finished = true()

3. Modeling the data

We distinguish

- process data: data that belong to a process instance
- process-relevant data: data that are used by the process but are shared between process instances
- structured data: objects with defined attributes
 - in @enterprise represented as forms
- unstructured data: objects like word document, images
 - in @enterprise: documents and notes

Forms

Use the form wizard to define formtypes the system will generate

- a database table for storing the data
- a Java class for accessing the data
- a HTML mask containing the layout for data entry

Form Wizard

Id and version are used to name the database table and Java class:

```
table: form_<id>_<version>
class:
```

```
com.dec.avw.appl.<id>_<version>
```

Type:

- process forms for structured data
- document forms for storing unstructured data together with some metadata
- folder form: folder which can contair documents

New Form	Form Definition	1 2 3 4
ld:	person	
Name:	person	
Version:	1	
Application:	Default 🗾	
Versioning:	not automatically	
Гуре:	● Process Form ○ Document Form ○ Folder Form	1
Jsable in DMS:		
Description:		
con:		
EventHandler:		
OMS TableHandler:		
Base Form:		

Form Wizard (2)

You can load a HTML form or Xform. Alternatively use the wizard to create one.

🕙 @enterprise: Form /							
http://bogota:8099,	ML 😭						
Load Form	Load Form Form Definition						
Form-Id: person	Name: person	Version: 1					
Template type: File:							
If no file is specified	d you can create	the form in the r	iext step.				
		Next	Back	Cancel			
Done							

Form Wizard (3)

- Define the database fields of the form.
- The label is used for the headers in a tabular layout of the table data.

	Mozilla Fire	fox				
http://bogota:8	8099/wf/servl	let.method/com.grois	is.avw.html.HTMLFormBu	uilder.doLoadHtml		
Edit Formtyp	1 2	3 4				
Form-Id: persor	n Name:	person Versi	on: 1			
Form Fields	Layout	Table View				
Name		Label	Туре		Length	_1
firstname		FirstName	string		- 40	_^
surname		Surname	string	•	• 40	
age		Age	int	•	-	

Form Wizard (4)

In the layout tab the layout of the mask can be defined.

The third tab defines which columns are shown in tabular layouts.

Edit Formtype - Mozilla Firefox						
🗟 http://bogota	:8099/wf/servlet.method/	/com.groiss.avw.html.HTN	1LFormBuilder.doLoadHt 🏠			
Edit Formty	pe Form	Definition	12 <mark>3</mark> 45			
Form-Id: perso	on Name: person	Version: 1				
Form Fields	Layout Table Vie	ew				
+ 🗡 X 🔶	₽					
person						
First Name						
Suname						
Age						
	Next	Back	Cancel			

Form Wizard (5)

The next screen shows a summary containing the table and class definition.

In the table definition placeholders are used for some types, for example %OIDTYPE% for a 64bit-integer.

When the table is created this is translated to the SQL dialect of the database.

🥹 @enterprise: Form Assistent - Mozilla Firefox 📃 🗌 🔀								
http://bogota:8099/wf/servlet.method/com.groiss.avw.html.HTMLFormBuilder.createOrUpdateForm								
Table DefinitionForm Definition1 2 3 4 5								
Form-Id: person	Name: perso	n Version:	1					
Order by:	oid					P		
Name Attribute:	firstname					P		
Table:	create table form oid %OIDTYP task %OIDTYP acl %OIDTYP awwcreatedBy awwcreatedAt awwchangedBy awwchangedAt xformsinvalid I firstname VAR surname VAR	n_person_1(E% not null pr PE%, %OIDTYPE%, %OIDTYPE% %DATE%, %OIDTYPE% %OATE%, %DATE%, DECIMAL(1), %CHAR(40),	imary key, ', %,					
Class:	Fieldname		Туре]		
	firstname		java.lang.St	ring				
	surname		java.lang.St	ring				
	age		int					
		Finish		Back		Cancel		
Done								

Standard Form Types

- Standard document
- Standard folder
- Value list and value
- Note
- News
- Weblink
- XMLForm

Formtype Properties

🕹 Forms: hr_applicant (Applicant 1) - @enterprise - Mozilla Firefox								_O×		
http://bogota:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin.formtype&foreignKey=application&application=com.dec.avw.core 🏠										
General	Java-(Class	Database-Table	Rights	Standard-permissions	History	Access	Preview	Folder Settings	Referenced By
ld:	Id: hr_applicant									
Name:	Name: applicant I18n: Applicant									n: Applicant
Version:		1								
Applicati	on:	Staff F	Processes 💌							
Type:		Proce	ss Form 💌							
Template	e type:	XFOR	MS 🔽							
Descriptio	on:									
Active:		•								
Usable in	DMS:									
Versioning	g:	accord	ling to configuration	n 💌						
Order Attr	ribute:	oid	<u> </u>							
Name Attr	ribute: {	(surnar	ne} {firstname}							
lcon:	Ī									
EventHan	dler:									Image: A state of the state
Base Forr	m:									
XHTML-Fi	le: I	hrforms	/applicant.xhtml							
Width:	(כ								
Height:	(כ								
									[Download HTML
Delet	te						Ok		Cancel	Apply
Done										1.

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Formtype Properties (2)

- Usable in DMS
- Order Attribute
- Name Attribute
- Icon
- Event Handler
- Width and Height: if opened in own window

XForms

W3C Recommendation http://www.w3.org/TR/xforms/

- MVC
- declarative, less scripting
- XML standards
- strong typing
- multiple device support

XForms Example

Data in XML:

```
<xforms:model>
<xforms:instance>
<commerce xmlns="">Select Payment Method: © Cash O Credit
Credit Card Number:
<cmethod/>
<method/>
<cmethod/>
<cexpiry/>
</ecommerce>
</xforms:instance>
<xforms:submission action="http://example.com/submit"
method="post" id="submit"/>
</xforms:model>
```

Controls in HTML Body

<select1 ref="method"><label>Select Payment Method:</label>
<item><label>Cash</label><value>cash</value></item>
<item><label>Credit</label><value>cc</value> </item></select1>
<input ref="number"> <label>Credit Card Number:</label></input>
<input ref="expiry"> <label>Expiration Date:</label> </input>
<submit submission="submit"> <label>Submit</label></submit>

XForms Core Module

- model
- instance
- submission
- bind

```
<xforms:bind nodeset="/my:payment/my:expiry"
    relevant="/my:payment/@method = 'cc'"
    required="true()"
    type="xsd:gYearMonth"/>
```

- readonly
- relevant
- required
- calculate
- constraint

XPath is used for expressions

XForms Model of @enterprise Forms

<xf:model> <xf:instance> <data xmlns=""> <form object="com.dec.avw.appl.wiztest 1:102" txid="73"task="1000074417"> <avwcreatedby>herbert groiss</avwcreatedby> <avwcreatedat>2009-04-06T07:05:22Z</avwcreatedat> <avwchangedby>herbert groiss</avwchangedby> <avwchangedat>2009-04-07T08:28:22Z</avwchangedat> <name>a</name> <country>GB</country> <amount>40011</amount> </form> <context> <viewmode>view text</viewmode>\ <activityinstance oid="1000042420">Prozess 158</activityinstance>\ <processinstance oid="1000042417">158</processinstance>\</processinstance>\ <task oid="1000000185" id="businesstrip_request">Anfordern</task>\ <processdefinition oid="100000090"</pre> id="hr_businesstrip">Dienstreise</processdefinition> </context></data></xf:instance> © Groiss Informatics GmbH, 2010

XForms Model of @enterprise Forms (2)

<xf:bind nodeset="/data/form/name" required="false()" type="string" />
<xf:bind nodeset="/data/form/country" required="false()" type="string" />
<xf:bind nodeset="/data/form/amount" required="false()" type="decimal" />
<xf:submission .../>
</xf:model>

XPath Examples

relevant: showing a field depending on the value of another field
 <xf:bind nodeset="/data/form/transpmisc"
 relevant="/data/form/transporttype = 'misc'"/>

required: the field must not be empty
<xf:bind nodeset="/data/form/notapprovedreason"
required="/data/form/approved = 'no'"/>

calculate: the value of a field is the result of a computation <xf:bind nodeset="/data/form/amount" calculate="/data/form/timesum * /data/form/rate"/>

constraint: restrict the allowed values
<xf:bind constraint="/data/form/days > 0"/>

Form Relationships

Forms can be used to define complex relationships

- 1 to n relation:
 - reference the key of the object for independent objects: for example store the reference of the customer in an order.
 - Subforms: definition of dependent objects, for example items of an order or addresses of a company.
 Use the form wizard to add subforms to a form.
 - one entity is a folder, the others are contained in the folder. This can be used for heterogenous relations and hierarchical relations
- n to m relation:
 - define a relation object. This can be a subform of one of the entities and contains a reference to the second entity.
Data Modeling Exercise

Example: CRM

- customers
 - have addresses, contact, services
 - documents related to customers: quotes, invoices, etc.
- articles
 - referenced in quotes and invoices

Process Execution

Login

- a Browser is used as client
- Browser features used:
 - Cookies, Popup-Windows, JavaScript
 - Java plugin for Process editor (developers only)
- Proxies between browser and @enterprise should not cache anything

800	enterp	orise Lo	gin Page	- Mozilla Fir	efox			- 🗆 🗵
Eile	<u>E</u> dit	⊻iew	Hi <u>s</u> tory	<u>B</u> ookmarks	<u>T</u> ools	<u>H</u> elp		
							enter- prise	
						Jser-Id:		
					Pa	ssword:		
-								
				Copyrig	ht © 20	J1 - 200	9 Groiss Informatics GmbH. All Rights Reserved.	

The User Interface



Working Area: content depends on what is selected in the navigation

Navigation - Tasks

- Worklists
 - Personal worklist tasks for the user, sent to him directly or taken from the role worklist
 - Role worklist

tasks belonging to a role (a group of users)

Suspension list

personal tasks that have been "suspended" (see worklist functions below)

Role suspension list suspension list for activities from the role worklist

Navigation - Tasks / Start Process

Link "Start Process" in navigation

- Select a process
 - double click one
 - or select one and click the start icon in the toolbar



Navigation - Tasks / Start Process (2)

Process start mask

- Select an org. unit
- optionally enter deadline and priority
- and process instance description
- Click Ok to start the process: The process appears in the woklist which is shown next.

🥹@enterprise - Herbert Groi	ss - Mozilla Firefox					
<u>Eile Edit View History B</u> a	ookmarks <u>T</u> ools <u>H</u> elp					
enter-	@enterprise			demo-Lo	ogged in: Herber	t Groiss
(O) prise						? 👌 🖹 🗈
Tasks	Start process					
Role-Worklist (0)	Name: Business T	rip Version: 1				
Suspension List (0)						
Role Suspension List (0)	Organizational Unit:	GI				
	Due at:					
Start process	Priority:	0				
^{L.} Functions	Description:					
	Show Form					
	Ok	Cancel				
Documents						
Calendar						
Search						
Extras						

Navigation - Tasks / Functions

- List of functions
 - not applied to a specific process instance ("global functions")
- Click the function name to start it

🕙 @enterprise - Herbert Grois	ss - Mozilla Firefox	
<u>File Edit View History Bo</u>	okmarks <u>T</u> ools <u>H</u> elp	
enter-	@enterprise	demo - Logged in: Herbert Groiss
(prise		ê 📥 🔁 💽
Tasks Worklist (1)	Functions	
Role-Worklist (0)	Staff Processes	
Suspension List (0)	Add Vacation Days	You can add vacation days for one user and a specific year with this function. The value will be used for calculating remaining vacation days.
Role Suspension List (0)	Overview of Absences	This function generates an overview of all absences for all employees or the employees of a specific organizational unit.
Start process Functions	Show User Vacations	Shows a vacation overview for one specific user. It generates a listing of all vacations the user had, and it displays the number of left vacation days.
	Time Recording	Start/stop functions for recording work and project time.
	Work Time Overview	Shows a worktime overview for a user.
	Change Private Key Password	
	Generate keys	
	Process Note	
Documents		
Calendar		
Search		
Extras		

Worklist – Overall Structure

- tabular view of activity instances, one per line
 - new items are bold

Columns in worklists

- selection column: Select an activity instance to apply a toolbar function later on
- Role (in role worklist): name of role the activity is assigned to
- Id: unique id of the process instance
- OU: the organizational unit where the activity belongs
- Process: The name of the process, is a link to process instance history
- Task: Name of the activity, also a link to the history
- Subject: process instance subject text

Worklist of John Smith									Filter		
	Id	οU	Process	Task	[‡] Subject	Priority	Functions	Documents	Received	Due at	C.
	2	GI	Business Trip	Request	John Smith, vienna, 12-10-2009 - 20-10-2009	0	\$	🖹 Business Trip 🗀	19-10-2009 16:10		

Worklist – Overall Structure (2)

- Columns in worklists (cont.)
 - priority
 - functions: selection of functions applicable to this activity instance
 - received: timestamp of arrival in the worklist
 - due at: the deadline for this activity

Worklist of John Smith								Filter			
	Id	00	Process	Task	[‡] Subject	Priority	Functions	Documents	Received	Due at	Cô
) 2	GI	Business Trip	Request	John Smith, vienna, 12-10-2009 - 20-10-2009	0	Ф	🖹 Business Trip 🗀	19-10-2009 16:10		

Work Item Detail

Tabs for

- the forms of the process instance that are visible in this step
- documents
- notes
- process instance history
- process image highlighting the current step

🕙 @enterprise - John Smith	- Mozilla Firefox					
<u>File E</u> dit <u>V</u> iew Hi <u>s</u> tory	<u>B</u> ookmarks <u>T</u> ools <u>H</u> elp					
enter-	@enterprise				demo - Logga	ed in: John Smith
@ prise	🖷 🔿 🧳 🤉 😋 🦉	5 🖸 🖄 🐴 🗳				? 合 🖻 🕼
Tasks Worklist (1)	Process: Busin 12-10-2009 - 20	ess Trip Id: 2 10-2009	Task: Request	Subject:	John Smith, vienna	••
	Business Trip	Documents	Jotes History	Process		
Role Suspension List (0)						
Start process	Business Trip					a ^
^{L.,} Functions	OU: Employee:	GI John Smith	▼			
	Reason:					
Documents						
Calendar	Start:	12-10-2009 16	:10 📑 Frontier E	xit:		
Search	End:	20-10-2009-16	10 Tal Frontier F	ntrance:		•
Extras						

Work Item Detail (2)

some tabs provide specific functions via an "inner" toolbar:

- forms
 - save
 - save and complete
- history
 - change duedate and process priority
 - abort process
- documents
 - functions for attached documents: add, delete, replace content, version, ...
- notes
 - add and edit notes

Worklist Actions

- personal worklist
 - Give back (n)
 - Complete (n)
 - Complete and Assign (1)
 - Go back (1)
 - Suspend (n)
 - Make Version (1)
 - Reassign (n)
 - New Folder (0)
 - Cut (n)
 - Paste (0)
- role worklist
 - Take (n)
 - Suspend (n)
- suspension list
 - recall (n)
- role suspension list
 - recall (n)

— recall and take (n) © Groiss Informatics GmbH, 2010

Take and give back

Take: in the role worklist



- click the take icon in the toolbar
- the selected items are removed from all role-worklist
- the work item appears in the personal worklist
- the forms of the activities are editable
- Give back: in the personal worklist



- and reappear in the role-worklists of the users having the role of the work item
- the forms of the activities are not editable

86

8



Complete / Complete and Assign

• Complete:



- @enterprise finishs the activity and sends the process instance to the next agent(s) according to the process definition
- Finish and Select:



 after finishing and if the next steps agent is a role, the user can select one member of the role.

Go Back

Go Back

- P
- in the detail window you can select one of the previous activities in the process and add a comment
- the current activity is aborted and the "old" one reactivated.
- It is not always possible to perform this action, for example it is not possible to jump out of a parallelism.

🕗 @enterprise - John Smith	- Mozilla Firefox								
<u>File E</u> dit <u>V</u> iew Hi <u>s</u> tory <u>B</u>	<u>B</u> ookmarks <u>T</u> ools <u>H</u> elp								
enter-	@enterprise		demo	- Logged in: John Smitl					
@ prise				8 🖨 🔁 I					
Tasks	Go Back								
Role-Worklist (0)	ld: 2 Task: Appro	ld: 2 Task: Approve, Subject: John Smith, vienna, 12-10-2009 - 20-10-2009							
- Suspension List (0)	Agente in reverse order:								
Role Suspension List (0)	Agent	Task	Received at	Finished at					
	 John Smith 	Request	21-10-2009 11:00	21-10-2009 11:00					
Start process	O John Smith	Request	21-10-2009 10:45	21-10-2009 10:56					
Functions	C John Smith	Request	19-10-2009 16:10	21-10-2009 10:45					
Comment: add reason									
Documents									
Calendar	-								
Search	Ok	Back							
Extras									

Suspend

Suspend: Put activitie(s) into the suspension list



- specify a date or
- a number of working days
- and a comment
- After clicking Ok, the activities are removed from the worklist and appear in the suspension list.

0	🕘 @enterprise - John Smith - Mozilla Firefox								
Eile	<u>E</u> dit	⊻iew	Hi <u>s</u> tory	<u>B</u> ookmarks	<u>T</u> ools	<u>H</u> elp			
		ente	r-	@ente	erpris	е	demo - Logged in: John Smith		
	() prise						g 合 🔁 🗈		
± ~₩	/orklis	Tasks t (1)	3	🔷 Put	into S	usper	nsion List		
R	ole-W	orklist	(0)	ld: 2	Task:	Approv	ve Subject: John Smith, vienna, 12-10-2009 - 20-10-2009		
Si Ri Si Fi	Suspension Role Susper Start proces Functions	sion Li spensi ocess ns	on List (0) ension List (0) ess) © un O W Co	ıtil: 'orking l omment	[Days: [::	22-10-2009 11:12		
	C	ocume Calend Searcl Extras	nts ar h	-	Ok		Cancel		

Recall / Recall and Take

Recall



RG

- Items in the suspension list return to the worklist automatically at the specified time
- With the function recall it is possible to return them at any time
- Recall and take
 - Function in the role-suspension list
 - combines the actions *recall* and *take*

Make Version

The function makes a new history entry



- a comment can be entered
- the activity remains in the worklist
- a version of every form and document of the process is created.

Reassign

Send the activity to another agent (user or role)

ø

- Select the agent
- write a comment
- After clicking "Ok" the activity is transferred to the specified agent

Reassign									
ld: 2 Task: Approve Subject: John Smith, vienna, 12-10-2009 - 20-10-2009									
User Role									
Search for:	P >>								
Surname	First Name	Id							
Berger	Rudolf	berger							
Groiss	Herbert	herb							
Huber	Fritz	huber							
Schmied	Stefan	schmied							
Smith	John	john							
Steiner	Hans	steiner							
Number of entries: 6 1 selected Comment to this Agent:	1								
please check this									
Ok	Cancel								

Folder operations

The worklist can be organized in folders

- Use function "New folder" to create a folder
- select activities and click "Cut"
- open the destination folder and click "Paste"



X

Further Functions in the Worklist

Not configured in standard worklist

Add parfor steps:

for steps parallel to a parfor, start new parfor branch after a subform has been added

Add process relation

add a relation between processes

Copy to

send a read-only copy to another agent

Into Clipboard

copy the process into the clipboard, you can then paste the process in a DMS folder, this creates a link to the process

Process Note

add a note to the process

Set duedate

set process and task duedate

Set read/Unread

toggle the read status of the activity

GUI Customization

Change the appearance of the end-user client

- the links in the navigation area
- the columns in the worklist
- the available functions
- the labels and images used in @enterprise
- the colors and fonts

GUI Configuration

Defines the layout of the client in an xml file

- two standard definitions:
 - $-\,$ standard is the default client configuration
 - standard_mobile is the default for mobile devices
- define your own
 - create a new entry in the gui configuration table
 Application x -> GUI Configuration -> New
 - or copy the standard configuration
 Application Default -> GUI Configuration -> select standard, click copy in toolbar change id, name and application and click Ok.

GUI Configuration (2)

Use a configuration:

- Edit the url, add the id parameter http://host:8000/wf/servlet.method/com.dec.avw.html.HTMLGui.showFrames?id=confid
- or define Assignments

Assign an agent (user, role or role in org.unit) to a configuration

More than one assignment can exist, the one with the highest priority is selected.

Example:

gui-conf	role	priority		
standard	all	10		
extended	manager	20		

A user with roles *manager* and *all* will see the extended configuration as default when logging in

Gui Configuration – Node Types

- Text: a text
- Link: a hyperlink

subclasses of link:

- Start process: a link for starting processes
- Function list: the list of functions
- Function: call a function
- Report: execute a report
- Worklist: a list of activities
 - User Folder
- DMS: link to the document hierarchy
- Table: table of objects (usually forms)

Gui Configuration – Node Attributes

all Nodes

- Label: how it appears in the tree
 - either a text or
 - if XML is checked, a correct HTML
 - check localize if the label string should be translated
- Clickable: the subtree where this node is the root can be expanded by mouse clicks
- Refresh button: show a tree-refresh button next to the link
- Access: restrict access to this node
 - if the list is empty, the link is visible for everybody.
 - otherwise the link is visible for everybody that has at least one of the roles in the list.
- Id: id unique in the configuration
- CSS class: for rendering the text or link

Gui Configuration – Node Attributes (2)

Links:

- default: The linked page is shown in the working frame when the user logs in.
- target window: name of link target frame or window, working frame (right) is used by default
- URI: the href attribute of the link

Process Start

- application: restrict processes to the selected applications
- worklist-id: id of worklist shown after process start

Function List:

application: restrict processes to the selected applications

Function and Report:

the function resp. the report

Gui Configuration – Node Attributes (3)

Worklist:

- worklist adapter: Java class for customizing the worklist (see below)
- type: types of work items shown in this list
- columns (see below)
- functions (see below)

DMS

- columns
- functions
- forms: white or black list of allowed/disallowed form types

Table

- classname: name of a form class
- columns
- functions
- Detail Window Properties: properties for the window.open call

Gui Configuration – Columns

Worklist, DMS and Table:

- Columns: List of table columns
 - Id: the unique id for the column, if @enterprise recognizes the id, the column is filled with the appropriate values, otherwise tte table handler (see programming part) must create the value
 - Name: the label in the header
 - if an icon is specified, the icon is used for the header and the name is the tooltip define the url portion after the context root, for example images/view.gif
 - visible: if not checked the column is not visible but can be added during run-time using the column picker

Gui Configuration – Columns for Worklist Node

Ids for worklist columns:

- id: Process-Id
- dept: org.unit
- process: name of process definiton, link to history
- task: task name, link to history
- role: agent
- subject: process subject
- documents: forms and documents
- functions: link to the function sub-menu
- received: received timestamp
- finish_till: due date
- put_back_until: in the suspension list until...
- currentEditor: the current editor in autotake mode
- priority: process priority
- origin: symbolizes, if user sees the instance via substitution or not
- task-form0: task name with a link to the first form
- process-form0: process name with a link to the first form

Gui Configuration – Columns for Worklist Node (2)

Form field columns: allows to display different form values depending on process definition

Syntax for the id field:

Example:

bp:hr_businesstrip:1:form_businesstrip.destination

Gui Configuration – Columns for DMS and Table Nodes

Ids of columns for DMS:

- name: document name and link to document content
- form: link for editing the form
- type: form type
- size: file size
- changed: timestamp of last change
- status: locked or not
- info: link to document info
- versions: link to document version
- attachedNotes: link to attached notes

Columns for Tables:

id is name of a form field

Gui Configuration – Functions

Possibility 1: refer a function

Possibility 2: define an action:

Syntax:

[configuration_id "."] action_id If configuration id is omitted "admin." is assumed

There is no GUI for defining actions, you must edit the xml file:

```
<Actions>
```

```
<Node id="billPaid" name="@@@paid@@">

<Attrib key="href" value="com.groiss.demo.dms.DMSDemo.billPaid" />

<Attrib key="iconpath" value="../images/paid.gif"/>

<Attrib key="apply" value="MULTI"/>

</Node>
```

</Actions>

Attributes

- id: for referencing it
- name and optional iconpath for displaying the link
- href: the function
- apply: MULTI for multi selection, SINGLE for single selection, NONE for functions without a selection

Internationalization

Define a ResourceBundle for the strings and error messages of the application Configure it: System administration -> Applications -> Tab Properties Use it:

- process names, form names, etc: use the resource key
- Resources loaded by FileServlet (images, scripts, HTML Pages):
 - loaded from allangs directory in classpath
 - use placeholders in text: @@@key@@
 - loaded from language specific directory
- Resources loaded by @enterprise: Forms, GUI-Configuration placeholders in text: @@@key@@

Java Code

- get the application resource

```
ApplicationAdapter applclass =
  (ApplicationAdapter)ServiceLocator.getOrgData().getById(
 Application.class,"staffprocs"). getApplicationClass();
Resource res = applclass.getResource();
```

- translate keys, load HTMLPage

```
res.getString("key");
```

```
HTMLPage p = new HTMLPage("hrmasks/info vacation added.html", res);
```

@enterprise Resource Bundles

- Resource bundle com.dec.avw.resource.Strings: labels and messages
- Resource bundle com.dec.avw.resource.Errors: error messages
- language specific files for English, French, German, Italian English is default

Overwrite translations

```
    use country specific files
        for example for USA:
            property file Strings_en_US.properties
            contains the line:
            go_back=Go to previous step
```

put the files into the directory classes/com/dec/avw/resource
Changing Style and Logos

Changing the logos

- create a directory lang/default/images in the classes directory of @enterprise
- a file named enterprise.gif in this folder will be used in the login page
- a file enterprise_medium.gif appears in the left upper corner in the client gui.

Style

- the style file used in @enterprise is avwbasic.css in the ep.jar file.
- Colors and font-sizes are defined in the file style.prop
- You can overwrite one of these files by putting customized files in you classes directory.

lcons

- Icons are referenced with the path /wf/images/subdir/filename
- They reside in the classpath under the path lang/default/images (and lang/fa/images for some right-to-left icons)
- overwrite the default by using a more specific directory, for example lang/en, lang/fa_IR

Reporting

Roles

- Creator of the report
 - knows data structures and system
 - creates and saves reports with paramters
 - assigns execute right to selected roles or users
 - configures link to report in GUI
 - link in navigation
 - dashboard window
 - link in reports list
- Report executer
 - dont needs to know the schema
 - enters report parameters

Search Mask

¢		የ 🚖 🕵 🖪
	Reporting	
	Neue Anfrage	
	Tabellen Attribute Anzeige Spaltentitel Startmonat Prozessinstanz Id Derzeit bei Bedingung Aggregation Image: Comparison of the startmonat Aktivitätsinstanz Derzeit bei Bedingung Aggregation Image: Comparison of the startmonat Image: Comparison of the startm	
	Prozess Relation Invers Akteur Erweitert	
	Task Status Woche Organisationseinheit Gestartet Monat Rolle Dauer Dauer Rollenzuordnung Fälligkeit Ok	
ľ	Anzeigefelder Bedingungen	-
	+ Anzahl(ld) Startmonat	▲ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
ļ		<u> </u>
	Zeitintervall in Stunden 🔽 Berechnungsmodell volles Zeitintervall 🔽 🗖 Zeilennummer anzeigen 🗖 nur unterschiedliche Datensätze 🗖 inkl. Archiv-Schema	
	Ausführen	

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Search Mask

- Tables and attributes that can be used in reports (A)
 - in table columns and conditions
 - options depend on attribute type
- Area B shows the current report
 - left the table columns, right the conditions
- Display options (C)
 - attributes and conditions can be reordered, edited and deleted
 - conditions elements can be composed to boolean expressions
- Toolbar (D)
 - export options, save, ..

Query Result

💸 💕 썓 🖬 📾 📊	D
Reporting	
Neue Anfrage	
Bedingungen	Nur Prozesse der Testapplikation
Berechnungsmodell	volles Zeitintervall
Zeitintervall in	Stunden
Durchführungszeitpunk	kt 05-02-2008 08:06
Zeilen	6
inkl. Archiv-Schema	Nein
1 Annald Damage	
Anzani Prozesse	
2	
2	
4	
0 7	

Jänner 2008

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Toolbar

- Execute Report
- View query XML (in result mask the SQL statement is shown too)

Edit report

- Export options
- Open saved report
- New report
- 👌 Refresh result
- Save report
- View/Hide header

Entities and Attributes

- Process Instance (e.g.: Id, current agent, started, finished, duration...)
- Activity Instance (e.g.: Parent-Id,..., duration, agent, time in suspension list)
- Master data (Task, Process definition, Role, User, Application)
- Forms (and Subforms)
 - form fields
 - system data (created at, created by, changed at, changed by)
 - link to form

Defining a table column

- Aggregation
 - count, minimum, maximum, average, sum
- aggregation of processes and tasks independent of version
- groupins is done automatically if one attribute is aggregated
 - equal lines are aggregated to one group (= line in result)
- date format settings can be used to group date values
 - for example: date format month causes grouping per month (number of processes x per month)

Tabellen	Attribute		
Prozessinstanz Aktivitätsinstanz Prozess Applikation Prozess Relation Prozess Relation Invers Schritt Task Organisationseinheit Rolle Benutzer Rollenzuordnung	ld Derzeit bei Betreff Applikation Prozess Akteur Organisationseinheit Status Gestartet Beendet Dauer Fälligkeit	Anzeige Bedingung	Spaltentitel Anzahl gestartete Prozesse Aggregation Anzahl Erweitert >>>
			Ok

Defining a condition

Number

- number comparators
 - $\bigl(<,\,<=,\,=,\,<>,\,>=,\,>\bigr)$

String

- exact compare or compare with LIKE,
- ignore case or not
- Master data objects
 - select from list and compare with IN or NOT IN
 - agent: current agent can be used in query
 - org-units: it is possible to include sub org.units
- Date
 - fixed data (for example started < 2. 2. 2008)
 - relative to execution date (for example started in the last month)

Forms

querying by filling the form

Beschreibung:		
ld	=	
		Groß/Kleinschreibung ignorieren
Tabellenalias:	wie	
	nicht wie	
	ist leer	
	ist nicht leer	
	{PARAM}	

Conditions with parameters

- implicit parameters
 - paramters are taken from context
 - not entered by user
 - current date
 - current user
- explicit parameters
 - specify the condition: click the checkbox "parameter at execution" instead of providing a value
 - when the report is executed the user is asked for the value
 - the operator can also be set
 - it is possible to specify no value, then this part of the condition is set to true (replaced with the sql expression 1=1)
 - a description can be defined that is visible in the parameter mask

Conditions with parameters

- Example: Report with parameters at execution shows the following mask for entering
 - Process instance Id (String)
 - Process instance process type (master data object)
 - Process instance agent (master data object)

Ausführen

) <i>F</i>			
Reporting			
Eingabe beim Ausführer	ı		
Prozessinstanz:Id	= 🗸		
Prozessinstanz:Prozess	in 💌		* ×
Akteur beim Ausführen	in 💌	Benutzer 💌	+ ×
		Groß/Kleinschreibung ignorierer	ſ

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Joins

- Attributes from different entities must be joined
- the schema description contains known join pathes
- the user can selected on of the possible paths or define a new one
- Example: add an attribute of the entity user to a query that contains already the entity process instance (pi):

Auswählen des Joinweges für Entität: Benutzer								
	Ziel							
	Prozessinstanz pi							
	Pfad							
O Prozessakteur ist Benutzer								
]							
O Taskakteur ist Benutzer, Prozessschritt								
+	Aktivitätsinstanz ai							
0	Benut	zerdefinierter Join						
Benutzer: Join mit pi 💌 🗖 Outer Join								
Hinzufügen Abbrechen								

Exporter

I

- HTML Exporter
 - shows result in browser as HTML table
 - HTML Page can be configured (must contain placeholders)
- Delimeter Separated Value Exporter
 - delimeter can be configured
- Excel Exporter
 - creates binary excel format
 - correct formating of types (date,...)
- XML Exporter
 - creates XML
 - configure a stylesheet
- Charts
 - create chart images
 - Bar, Bar3D, PieChart, MultiplePie Chart, PieChart3D

Extensibility / Configuration

- Edit the XML configuration
 - change the names of entities or attributes
 - add joins
 - extend/restrict the schema
- Customize implementation of:
 - exporter
 - chart types
 - time model
 - data types
 - aggregations

Implementing a Workflow Application

Application Integration

Workflow management is application integration



Elements of a workflow application

flow of control

- conditions in ifs, loops
- postconditions of steps
- other hooks for process state change

user interface

- customize @enterprise user interface: tables, navigation,...
- support data entry in forms
- create own pages
- communication with other systems
 - receiving and sending mails
 - user authorization
 - synchronization with directory service
 - calling and providing Web-services

1. Setting up a Project

Example using Eclipse

- Create a Java project
- define a project name
- select "Create project from existing source"

🛑 New Java Project 📃 🗌 🗙
Create a Java project Create a Java project in the workspace or in an external location.
Project name: javaproj
Contents
C Create new project in workspace
Create project from existing source
Directory: C:\herb\demo\demo80_2\demoproject Browse
JRE Configure default IRE (Competite Kent C.O. 020)
Configure derault
C Use a project specific JRE: jre1.6.0_03
C Use an execution environment JRE: JavaSE-1.6
Project layout
C Use project folder as root for sources and class files
€ Greate separate folders for sources and class files Configure default
Working sets
Add project to working sets
Working sets: Select
The wizard will automatically configure the JRE and the project layout based on the specified existing source.
< Back Next > Einish Cancel

Setting up a Project (2)

- add a java folder for the sources
- check "Allow output folders for source folders"
- set default output folder to projectname/classes

🖶 New Java Project	
Java Settings Define the Java build settings.	
😕 Source 🔀 Projects 🛋 Libraries 🚱 Orc	ler and Export
☞ # # # 参・	la 🗳 🔓 🕐
□ 🔁 javaproj ■ 🖅 java	
▼ Details	
Create new source folder: use this if you way project.	ant to add a new source folder to your 🔺
Link additional source: use this if you have a used as additional source folder.	folder in the file system that should be
Configure inclusion and exclusion filters: spe exclusion filters instead of including and exclusion	cify patterns to the inclusion and ulique ach folder or file manually.
Configure Output Folder Properties : choose Allow output folders for source folders	different location for the output folder. 🗾
Defaul <u>t</u> output folder:	
javaproj/classes	Browse
? <u>Sack</u>	Next > Einish Cancel

Setting up a Project (3)

- add the libraries from the @enterprise lib directory
- click Finish



Setting up a Project (4)

- Create a Java class
- in directory java
- package com.groiss.demo
- class name Test
- click Finish

Add the method

🚝 New Java Class						
Java Class Create a new Java	class.		C			
Source fol <u>d</u> er:	demoproject/java		Browse			
Enclosing type:			Browse			
Na <u>m</u> e: Modifiers:	Test ⊙ gublic O defaylt O priyate O □ abstract □ final □ statig) pro <u>t</u> ected				
<u>S</u> uperclass:	java.lang.Object		Brows <u>e</u>			
Interfaces:			<u>A</u> dd <u>R</u> emove			
Which method stubs would you like to create?						
(?)		<u>F</u> inish	Cancel			

public void showDate(HttpServletRequest req, HttpServletResponse res)

```
throws IOException {
```

```
res.getWriter().println("<html>"+ new Date()+"</html>");
```

```
}
```

Setting up a Project (5)

in @enterprise:

- add an application
 - with the eclipse project directory as application directory
- restart
- Test the method
 - http://localhost:8000/wf/servlet.method/com.groiss.demo.Test.showDate

2. The HTTP Server

 FileServlet is the default servlet in the @enterprise context root (normally /wf) requested resources are searched for in the elements of the classpath http://host:port/wf/somedir/somefile

Example: locale is de_AT_gi

resources are searched in the following paths:

- 1. lang/de_AT_gi/somedir/somefile
- 2. lang/de_AT/somedir/somefile
- 3. lang/de/somedir/somefile
- 4. lang/default/somedir/somefile
- 5. alllangs/somedir/somefile

In case 5 placeholders in the fike with the syntax @@@key@@ are translated to the strings of the current locale.

Don't place images in allangs!

Dispatcher

- requests to http://host:port/wf/servlet.method/classname.methodname are handled by the Dispatcher servlet
- the path is interpreted as Java method: full qualified class name "." methodname
- method must have one of the following signatures

public Page method(HttpServletRequest req) throws Exception;

How the Dispatcher works

- parses the URL-path and loads the class
- create a new instance of the class using the default constructor
- checks whether the class has a method with a correct signature

sets the environment

- if a session exists (user logged in), the user is set in the ThreadContext
- the locale is set
- a transaction is started

the method is called

- If an error occured, it is written into the log file and the error page is sent to the browser and the transaction is completed with a rollback
- else the transaction is completed with commit
- and the resulting (HTML-)Page is sent to the browser.

ThreadContext

- the Dispatcher sets context information, com.groiss.util.ThreadContext can be used to access them:
- current User static Principal getThreadPrincipal()
 language of this session
 - static Locale getThreadLocale()
- current request
 static HttpServletRequest getThreadRequest()
- set and get further context information static void setAttribute(String key, Object o) static Object getAttribute(String key)

HTMLPage

Write pages to the browser using a template, patterns starting and ending with % can be replaced. Example:

Mask:

<html>

```
Date in language %language% in %format%:<br>%date%
```

Java-Code:

```
public Page showNLSDate2(HttpServletRequest req) throws Exception {
   String language = req.getParameter("language");
   String format = req.getParameter("format");
   Locale l = new Locale(language,language);
   HTMLPage p = new HTMLPage("com/groiss/demo/Date.html");
   SimpleDateFormat df = new SimpleDateFormat(
    ("long".equals(format) ? "EEEE, MMMM dd, yyyy" :
        "EEE, MMM dd, yyyy"),l);
   p.substitute("format", format );
   p.substitute("language", language );
   p.substitute("date", df.format(new Date()));
   return p;
   }
}
```

3. API Callbacks in Workflow Execution



API Callbacks in Workflow Execution (2)

- preprocessing, system steps
- conditions, postcondition
- toolbar functions
- application behaviour
- batch steps
- archiving

The Workflow Engine

interprets the process graph

- Nodes (Steps):
 - task-step
 - system-step
 - if: if, while, exit when
 - nop: begin, end, par
 - andjoin
 - orjoin
 - process
- Edges (Flows):
 - normal (black)
 - then (green): condition in source node is true
 - else (red, small box at start): condition is false



The Workflow Engine (2)

- startProcess
 - creates a ProcessInstance object
 - call step.start with the first step in the process definiton
- Step.start
 - case
 - task-step: execute preprocessing, put in worklist of agent
 - system-step: execute method and call finish
 - if: execute condition and call finish
 - nop: call finish
 - process: call startProcess
 - andjoin: if all predesessors are finished call finish
 - orjoin: if first call finish, abort other branches
 - ...
- ActivityInstance.finish
 - check postcondition
 - find sucessors:
 - if found, call step.start on them
 - else finish parent

Process Instance States



Activity Instance States



Workflow Engine API

- package com.groiss.wf
- main interface is WfEngine
- use ServiceLocator to get an instance
 - _ getWfEngine()
 - _ getOrgData()
 - _ getStore()
 - _ getDMS()
 - _ getAdmin()

WfEngine

find processes

- List getStartableProcesses(Application appl)
- List listProcessDefinitions(Application appl)
- ProcessDefinition getProcessDefinition(String id, int version)
- ProcessDefinition getProcessDefinition(String id)

start a process

- ProcessInstance startProcess(ProcessDefinition p, User u, OrgUnit d, Date duedate, String id)
- ProcessInstance startProcess(ProcessDefinition p, User u, OrgUnit d, Date duedate, String id, DMSForm f)

get the worklist

- List getWorklist(Application a, boolean withRepr)
- List getRoleWorklist(Application a)
- List getSuspensionList(Application a)
- List getRoleSuspensionList(Application a)

et a process instance

- ProcessInstance getProcess(String id)
- ProcessInstance getProcess(long oid)
- ProcessInstance getProcess(DMSForm f)
- List getProcesses(String condition)
WfEngine (2)

get an activity instance

- ActivityInstance getActivityInstance(long oid)
- List getActivityInstances(ProcessInstance process)
- List getActivities(String condition)
- List getActiveTasks(ProcessInstance process)
- List getActiveTasks(ProcessInstance process, User u)

inside preprocessing, postcondition, condition, system step:

— ActivityInstance getContext()

WfEngine (3)

manipulating activity instances

- ActivityInstance take(ActivityInstance ai)
- ActivityInstance untake(ActivityInstance ai)
- void finish (ActivityInstance ai)
- void seeLater (ActivityInstance ai, Date d)
- void seeAgain(ActivityInstance ai)
- ActivityInstance goBack(ActivityInstance ai, ActivityInstance ai2, String comment)
- void gotoTask(ProcessInstance process, String taskid, Agent ag, String comment)
- ActivityInstance copyTo(ActivityInstance ai, User u)
- void setAgent(ActivityInstance ai, Agent a)
- void setOrgUnit(ActivityInstance ai, OrgUnit d)
- void setStepAgent(ActivityInstance ai, Agent u)
- void setDescription(ActivityInstance ai, String descr)
- void setDuedate (ActivityInstance ai, Date d)

WfEngine (4)

- manipulating process instances
 - void abort(ProcessInstance process)
 - void reactivate(ProcessInstance process)
 - void archive(ProcessInstance process)
 - void setSubject(ProcessInstance process)
 - void setSubjectToString(ProcessInstance process, String str)

WfEngine (5)

documents and forms

- DMSForm getForm(ProcessInstance pi, String id)
- void updateForm(DMSForm f)
- List getForms(ProcessInstance pi)
- List getNotes (ProcessInstance pi)
- void addDocument(ProcessInstance pi, DocForm f)
- List getDocuments(ProcessInstance pi)

Preprocessing, System Steps

Description: perform actions in process context

Definition: Method called via reflection, 0 to n String arguments

public void method(String arg1, .., String argn) { ...}

Declaration: System steps in process definition, Preprocessing in Task definition

In Product: com.groiss.wf.SystemStep contains some useful methods

Demos: com.groiss.demo.SystemSteps

Preprocessing, System Steps

Example: Set the activity duedate from a form field

```
public void setDuedate() {
    WfEngine e = ServiceLocator.getWfEngine();
    ActivityInstance ai = e.getContext();
    ActivityInstance pi = ai.getParent();
    DMSForm f = e.getForm((ProcessInstance)pi, "item");
    Date d = f.getField("duedate");
    if (d != null)
        e.setDuedate(ai, d);
}
```

Example: Set a form field to the current agent

```
public void setFieldToAgent(String formfield) {
    WfEngine e = ServiceLocator.getWfEngine();
    ActivityInstance ai = e.getContext();
    ActivityInstance pi = ai.getParent();
    DMSForm f = e.getForm((ProcessInstance)pi,"item");
    f.setField("agent", ThreadContext.getThreadPrincipal());
    e.updateForm(f);
}
```

}

Conditions in a process, Postconditions

Description: With a postcondition you can perform actions after the user has finished the task. Throwing an exception or returning false prevents the completion of the task.

Conditions in process definitions appear in ifs, loops and choices

Definition: Method called via reflection, 0 to n String arguments, returns boolean

public boolean method(String arg1, .., String argn) { ...}

Declaration : in process definition, postcondition in Task definition

In Product: com.groiss.wf.SystemAction contains some useful methods

Demos: com.groiss.demo.SystemSteps

Conditions - Example

Example: postcondition for order: at least one suborder

```
public boolean hasSuborder() {
    WfEngine e = ServiceLocator.getWfEngine();
    ActivityInstance ai = e.getContext();
    DMSForm f = e.getForm(ai.getProcessInstance(), "orderform");
    return ServiceLocator.getDMS().countSubforms(f, 1) > 0;
}
```

Alternatively throw an exception:

if (ServiceLocator.getDMS().countSubforms(f, 1) == 0)
 throw new ApplicationException("At least one suborder!");

Toolbar Functions

Description: function attached to a form, a task or a process

Definition: Method called via reflection, two possible signatures:

the parameter functionTask contains the oid of the current activity instance

Declaration:

Define the function: System Administration -> Your application -> Functions appears in: worklist, history, function list attach to process or task (or all tasks)

In Product: several functions in the default application

Demos: com.groiss.demo.DemoFunctions

Toolbar Functions - Example

Example: approve function, set two fields in a form

```
public Page approve(HttpServletRequest req) throws Exception {
   User u = (User)ThreadContext.getThreadPrincipal();
   WfEngine e = ServiceLocator.getWfEngine();
   ActivityInstance ai =
     e.getActivityInstance(Long.parseLong(req.getParameter("functionTask")));
   DMSForm f = e.getForms(ai.getProcessInstance()).get(0);
   f.setField("approvedBy", u);
   f.setField("approvedDate", new Date());
   e.updateForm(f);
   return new ActionPage("window.close()");
}
```

Application Adapter

Description: customization of various application properties

Definition:

```
public interface ApplicationAdapter {
public String getNewProcessId(ProcessInstance pi);
 public void onSeeLater(ActivityInstance ai);
 public void onSeeAgain(ActivityInstance ai);
public void onChangeAgent(ActivityInstance oldAi, ActivityInstance newAi);
public void onAbort(ProcessInstance pi);
public void onReactivate(ProcessInstance pi);
public void onAddDocument(ProcessInstance pi, DMSFolder f, DMSObject o);
 public void onRemoveDocument(ProcessInstance pi, DMSFolder f, DMSObject o);
 public void notifyUser(User u, ActivityInstance ai);
 public List<Element> getUserProperties(User u);
 public Right getFinishRight(ActivityInstance ai);
 public List<Right> getFinishRights();
public com.groiss.wf.distri.Packer getPacker();
public void modifyDetailLinks(KeyedList<String,Link> links, StringBuilder
  title, ProcessInstance pi, ActivityInstance ai);
 public String getVersion();
 public String upgrade (Application appl) throws Exception ;
```

Adapter Class: DefaultApplicationAdapter

Declaration : Detail mask of application Demos: com.groiss.demo.DemoApplication

Application Adapter - Example

Example: upgrade method and customized notification

```
public String getVersion() {
  return "1.0";
}
public String upgrade(Application appl) throws Exception {
  if ("1.0".equals(appl.getVersion()))
    return "";
  return ServiceLocator.getAdmin().importXML("DemoAppl.xml");
}
public void notifyUser(User u, ActivityInstance ai) {
  String host = Server.getThis().getHostname();
  int port = Server.getThis().getHttpPort();
  String body = "new task for you, <a href=\"http://" + host + ":" + port +
    Dispatcher.getContextPath() +
    "/servlet.method/com.dec.avw.html.HTMLGui.showFrames\">click here</a>";
  Settings.log("Sending notification email to "+ u +" ("+u.getEmail()+")",2);
  MailSender.send(
    u.getEmail(),
    null, null, // take sender and smtp host from defaults
    StringUtil.noNull(ai.getProcessInstance().getSubject()),
    body, "text/html; charset=utf8");
```

Batch Adapter

Description: Execution of a batch step **Definition**:

public interface BatchAdapter {
 public void startup() throws Exception;
 public void afterCreation(BatchJob job) throws Exception;
 public void doStart(BatchJob job) throws Exception;
 public void beforeCompletion(BatchJob job) throws Exception;
 public void afterCompletion(BatchJob job, boolean commit)
 throws Exception;
 public void doCompensate(BatchJob job) throws Exception;

Adapter Class: NullAdapter Declaration: class name in batch step

Demos: DemoBatchAdpater

Batch Adapter - Example

Example: write info to a file, finished by url,

```
public void startup()
  File mainDir = new File(getMainDirName());
  mainDir.mkdir();
public void afterCreation(BatchJob job) {
  File procDir = new File(getMainDirName(),getProcDirName(job.getContext()));
  procDir.mkdir();
public void doStart(BatchJob job) {
  try {
    String procId = job.getContext().getProcessInstance().getId();
    File procDir=new File(getMainDirName(),getProcDirName(job.getContext()));
    File outFile = new File(procDir,procId+".out");
    PrintWriter out = new PrintWriter(new FileWriter(outFile));
    out.println("Output File "+ new java.util.Date());
    DMSForm f =
      ServiceLocator.getWfEngine().getForm(
        job.getContext().getProcessInstance(),"f");
    out.println(f.getField("description"));
    out.println(
     "com.groiss.demo.DemoBatchAdapter.notifyFinish?bjOid="+job.getOid());
    out.close();
  } catch (Exception ex) {
    throw new ApplicationException("doStart", ex);
                                                                            158
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```

Batch Adapter – Example (2)

```
public void notifyFinish(HttpServletRequest req, HttpServletResponse res)
     throws Exception {
  long bj0id = Long.parseLong(reg.getParameter("bj0id"));
  BatchJob bj = ServiceLocator.getStore().get(BatchJob.class, bj0id);
  BatchManager.markJobFinished(bj);
  res.getWriter().println("Done");
}
public void beforeCompletion(BatchJob job) {
  trv {
    String procId = job.getContext().getProcessInstance().getId();
    File procDir = new File(
      getMainDirName(),getProcDirName(job.getContext()));
    File inFile = new File(procDir,procId+".in");
    BufferedReader in = new BufferedReader(new FileReader(inFile));
    String line = in.readLine();
    in.close();
    DMSForm f = ServiceLocator.getWfEngine().getForm(
       job.getContext().getProcessInstance(),"f");
    f.setField("description", line);
    ServiceLocator.getStore().update(f);
   } catch (Exception ex) {
    throw new ApplicationException("beforeCompletion", ex);
```

Archiving

Description: when process instances are removed from the database, move some information to another system.

Definition

```
package com.groiss.wf;
public interface ProcessArchiver {
   public void archive(java.util.List<ProcessInstance>
   processes, User u);
}
```

Declaration : Configuration -> Classes -> Archiving class **Demos**: XMLArchiver, FileArchiver

Archiving Example

Example: Use the XML Export for archiving

```
public void archive(List<ProcessInstance> processes, User u)throws Exception{
  FileOutputStream os = new FileOutputStream("archive.xml");
  try {
    ServiceLocator.getAdmin().exportXML(processes, "procinst_cluster",
    "export for archive", null, os,
    Settings.getLogger().getWriter());
  } finally {
    os.close();
  }
}
```

4. API for GUI Customizing

- Worklist layout
- Forms
- Form tables
- Error messages

Worklist Layout

Description: Implement this interface to change the layout of the worklist, if XML configuration is not powerful enough: showing customized information in the columns, modify the list contents, etc.

The methods are called in the given order.

Definition:

```
package com.groiss.wf.html;
public interface Worklist {
    public void init(HttpServletRequest req, WorklistDescription wl, User u);
    public HTMLPage getHTMLPage();
    public String getTitle();
    public List<ActivityInstance> getList();
    public void getAdditionalData(List<ActivityInstance> instances,
        List<String> splitResult);
    public void modifyColumns(List<ColumnDescription> colDescs);
    public void modifyTableLine(ActivityInstance ai,
        KeyedList<String,Object> line);
    public String lineStyle(ActivityInstance ai, String style);
    public List<Pair<String,String>> listFilters(List<ActivityInstance> lines);
}
```

Adapter Class: WorklistAdapter

Declaration: in Gui-Konfiguration: worklist adapter of worklist node

Worklist Layout (2)

Demos: ColoredWorklist, FilterWorklist, AdditionalProcDataWL

Example: Show the subject in a color depending on process priority

```
public class ColoredWorklist extends WorklistAdapter {
   WfEngine e = ServiceLocator.getWfEngine();

   public void modifyTableLine(ActivityInstance ai,
        KeyedList<String,Object> line) {
        ProcessInstance pi = ai.getProcessInstance();
        int prio = pi.getPriority();
        String color = prio > 50 ? "red" : (prio >30 ? "orange" : null);
        if (color != null) {
            line.set("subject",
                new Element("span").setAttribute("style","color:"+color).
               setText(pi.getSubject()));
        }
    }
}
```

Element: jdom Element from jdom package: www.jdom.org

Form Handler

Description: change the form, hooks for insert, update, delete **Definition**

```
package com.groiss.dms;
public interface XHTMLFormEventHandler {
    public void onInsert(DMSForm f) throws Exception;
    public void onUpdate(DMSForm f) throws Exception;
    public void onDelete(DMSForm f) throws Exception;
    public void beforeShow(DMSForm f, FormContext ctx, HttpServletRequest req)
       throws Exception;
    public void onShow(DMSForm f, FormContext ctx, XHTMLPage p,
       HttpServletRequest req) throws Exception;
    public String getName(DMSForm f) throws Exception;
}
```

Adapter Class: XHTMLFormEventAdapter

Declaration: System administration -> Forms, Attribute Event-Handler

Demos: DemoFormEventHandler

Form Handler - Example

Example: Set the duedate field of the main form to the max of the subform duedates.

```
public class DemoFormEventHandler extends XHTMLFormEventAdapter {
  public void onUpdate(DMSForm f) {
    DMS dms = ServiceLocator.getDMS();
    DMSForm main = dms.getMainForm(f);
    Date subdue = f.getField("duedate");
    Date superdue = main.getField("duedate");
    if (subdue != null && (superdue == null ||
        subdue.after(superdue))) {
      main.setField("duedate", subdue);
      dms.update(main);
  public void onInsert(DMSForm f) {
    onUpdate(f);
```

Form Tables

Description: customize layout of form tables

Definition:

```
package com.groiss.dms;
public interface FormTableHandler {
    public void init(HttpServletRequest req, User u);
    public List<DMSForm> getList(List<DMSForm> list);
    public void modifyColumns(List<ColumnDescription> colDescs);
    public void modifyTableLine(DMSForm f,
        KeyedList<String,Object> line);
    public String lineStyle(DMSForm f, String style);
}
```

Adapter Class: FormTableAdapter Declaration:

subform tables: in form

```
<tablefield class="com.dec.avw.appl.Change_2" id="2" tablehandler="com.groiss.itsm.ReleaseChangeTableHandler"/>
```

form tables configured in XML

Demos: DemoFormTableHandler

Form Tables (2)

Example: Add a progress column and an extra line for description

```
public class DemoFormTableHandler extends FormTableAdapter {
```

```
public void modifyColumns(List<ColumnDescription> cols) {
    cols.add(new ColumnDescription("progress", "Progress"));
}
public void modifyTableLine(DMSForm f, KeyedList<String, Object> line) {
    line.add(ExtraLine.INSTANCE);
    line.add("");
    line.add(new CellValue(f.getField("description"),
        Arrays.asList(new Pair<String,String>("colspan","4"))));
    int progress = (Integer)f.getField("progress");
    line.set("progress",
        new Image(null,"../images/chart/0.gif",progress,10,""+progress+"%"));
}
```

Formatting Error Messages

Description: change format of error messages

Definition:

```
public interface ErrorFormatter {
   public Page format(java.lang.Throwable e);
}
```

Declaration:

- ApplicationException has a method setErrorFormatter
- for the default behaviour: Configuration -> Classes -> Error-Formatter

In Product: com.groiss.gui.DefaultErrorFormatter

Demos: DemoErrorFormatter

ErrorFormatter - Example

Example:

```
public class DemoErrorFormatter implements ErrorFormatter {
    public Page format(Throwable e) {
        HTMLPage p = new HTMLPage();
        p.setPage("<html> Oops, en error occured, this is the message:" +
        e.getMessage() + "<html>");
        return p;
    }
    public Page test(HttpServletRequest req) {
        int i = 0/0;
        return null;
    }
}
```

5. Communication

- Web Services
- Authorization
- File import
- Handle incoming mails
- LDAP

Web Services

- @enterpise uses the Apache Axis2 framework for calling and providing webservices
- @enterprise is WS-Security enabled (e.g. SecureTokenService for repeated conversations)

Call a Web Service

Method 1 - using stubs, created by the Axis2 Code Generator see the Axis2 website for further information on how to use the Code Generator

Code-Example:

```
XEOXKelagWSStub client = new
XEOXKelagWSStub(com.groiss.ws.client.ConfigurationContextFactory.
getClientConfigurationContext(),"http://..."); //create the stub
SendMessageDocument reqdoc = SendMessageDocument.Factory.newInstance();
SendMessage req = reqdoc.addNewSendMessage();
//use setter methods to fill the request doc
req.setField1("the message");
req.setField2("...");
...
SendMessageResponseDocument respdoc = client.sendMessage(reqdoc);
// use getter methods to extract the response data
```

String resp = respdoc.getSendMessageResponse().getResultField1();

• • •

Call a web service (2)

Method 2 - Don't generate stubs, invoke the web service directly using the Apache Axis2 API

Code-Example:

```
ConfigurationContext ctx =
  com.groiss.ws.client.ConfigurationContextFactory.
  getClientConfigurationContext();
ServiceClient client = new ServiceClient(ctx, "http://...");
Options options = new Options();
options.setAction("urn:echo"); // select operation via WS-Addressing
  client.setOptions(options);
//use Apache AXIOM methods to create the payload XML
OMElement payload = ...;
```

OMElement response = client.sendReceive(payload);

```
//use Apache AXIOM methods to extract the response data
response.getChildElement("Field1");
```

Provide a Web Service

- 1. Specify or get the WSDL
- 2. Generate your service skeletons with the Axis2 CLI or Ant-Task [9]
- 3. Compile the generated sources
- 4. Package the generated classes
- 5. Add the new library to your application classpath
- 6. Subclass the service-skeleton and implement your business logic
- 7. Modify the services.xml to change the implementation class. This step is required, because it's not recommended to modify the generated source files.
- 8. Package your services.xml and your WSDL as a Web service archive (.aar)
- Upload the aar file using the wizard at Admin.Tasks -> Communication -> Web Services -> Local Services

Code Example

Subclass the generated Skeleton

```
public class MyService extends DemowsSkeleton {
  @Override
  public MessageRsDocument sendMessage(MessageRgDocument in) {
    MessageRq rq = in.getMessageRq();
    Settings.log("-----"+rg.getSubject(), 1);
    Settings.log("-----"+rg.getText(), 1);
    . . .
    Principal u = ThreadContext.getThreadPrincipal();
    MessageRsDocument doc = MessageRsDocument.Factory.newInstance();
    MessageRs rs = doc.addNewMessageRs();
    rs.setOut("success");
    return doc;
```

Provide a Web Service (2)

- To enable a 'Dispatcher-Like-Behavior' (e.g. auto-commit/rollback, ThreadContext etc.) you have to enable the epcontext-Module which is shipped with @enterprise
- Add the following line to your services.xml (in your .aar file)
 <module ref="epcontext"/>
- If the epcontext-Module is enabled, the request must contain one of the following
 - Username/Password token
 - SAML-Token previously requested from the @enterprise-SecureTokenService

Authorization

Description: customize login **Definition**:

```
package com.groiss.org;
public interface HttpAuth {
    public void sendLoginRequest(HttpServletRequest req,
        HttpServletResponse res) throws Exception;
    public Principal checkUser(String user, String passwd,
        String clientAddr) throws Exception;
}
```

AuthUtil is used for creating the session

Declaration: Configuration -> Classes -> Authorization Class

In Product: PasswdAuth, SSLAuth

Demos: BasicPasswdAuth, ClientCertDemoAuth, WinPasswdAuth

Authorization (2)

Example: Implementation of BasicAuth

```
public class BasicPasswdAuth implements HttpAuth {
public void sendLoginRequest(HttpServletRequest req, HttpServletResponse res)
    throws Exception {
   String auth= req.getHeader("Authorization");
   if (auth != null && auth.startsWith("Basic ")) {
     auth = auth.substring(6);
     auth = new String(Base64.decode(auth));
     String userId = auth.substring(0,auth.indexOf(':'));
     String passwd = auth.substring(auth.indexOf(':')+1);
     try
     User u = (User)checkUser(userId, passwd, req.qetRemoteAddr());
       AuthUtil.authorizeBrowser(req, res, u, req.getReguestURI() +"?"+
         req.getOuervString());
       return;
     } catch (Exception e) {
       com.groiss.util.Settings.logError(e);
   res.setStatus(401);
   res.addHeader("WWW-Authenticate", "Basic realm=\"@enterprise\"");
   res.getWriter().println();
public Principal checkUser(String userId, String passwd, String clientAddr)
    throws Exception {
  return AuthUtil.checkUser(userId,passwd, clientAddr);
```

File Import

Description: import tabular data from a file

Definition:

```
public abstract class ImportHandler {
public Object getKey(Persistent o) {
  return o.getOid(); }
 public void prepareFile(File f) {}
 public boolean beforeImport(Map<String,Object> m, Map<String,Object> ext) {
  return true; }
 public Object getKey(Map<String,Object> map) {
   return null; }
 public Persistent getExistingObject(Object key, Map<String,Object> values,
      Map<Object,Persistent> cache) {
   return cache.get(key);
public boolean beforeInsert(Map<String,Object> m, Persistent o) {
   return true; }
 public boolean beforeUpdate(Map<String,Object> m, Persistent o) {
   return true; }
 public void afterImport(Map<String,Object> m, Persistent o) {}
```

Declaration: Define the importHandler in the import.xml file

Demos: import.xml, UserImporter
File Import (2)

Description:

The Importer does the following:

Read the existing members of the class and store in a memory cache.

The key is either the key field from the configuration or, if none is specified, the getKey method is called.

- Call prepareFile with the selected or configured File
- for each line in the file:
 - Put the columns in a map
 - call beforeImport
 - call getKey with the value map
 - call getExistingObject
 - if the object is in cache call beforeUpdate else beforeInsert
 - perform the database operation
 - call afterImport
- Close the file

File Import Example

```
OrgData orgdata = ServiceLocator.getOrgData();
Role home = orgdata.getRole(Role.HOME);
Map<String, OrgUnit> ous;
public void afterImport(Map<String,Object> m, Persistent o) {
  User u = (User)o;
  OrgUnit ou = orgdata.getHomeOrg(u);
  if (ou == null) {
    ou = getOrg((String)m.get("ou"));
    if (ou != null) {
      UserRole ur = orgdata.createUserRole();
      ur.setUser(u);
      ur.setRole(home);
      ur.setOrgUnit(ou);
      ur.setActive(true);
      orgdata.insert(ur);
private OrgUnit getOrg(String id) {
  if (ous == null) {
    ous = new HashMap<String, OrgUnit>();
    for (OrgUnit ou: orgdata.list(OrgUnit.class, null, null, null)) {
      ous.put(ou.getId(), ou);
  return ous.get(id);
```

Mail Handler

Description: receive a mail Definition

```
package com.groiss.mail;
public interface MailHandler {
   public boolean receive(javax.mail.Message msg) throws
   Exception;
}
```

```
Declaration : Admin-Tasks -> Communication -> Mail-boxes
Demos: MailGetter
```

Mail Handler Example

```
public boolean receive(Message msg) throws Exception {
    Object content = msq.getContent(); // get the content
    String contentstr;
    if (content instanceof Multipart || content instanceof InputStream) {
        InputStream is;
        if (content instanceof Multipart) {
             Part part = ((Multipart)content).getBodyPart(0);
             is = part.getInputStream();
        } else
             is = (InputStream)content;
        contentstr = new String(FileUtil.getBytesFromStream(is));
    } else
        contentstr = content.toString();
    String subject = msq.getSubject();
    String from = msg.getFrom()[0].toString();
    WfEngine e = ServiceLocator.getWfEngine();
    OrgData od = ServiceLocator.getOrgData();
    ProcessDefinition pd = e.getProcessDefinition("jobproc");
    OrgUnit ou = od.getById(OrgUnit.class, "manufactoring");
    ProcessInstance pi = e.startProcess(pd, null, ou, null, null);
    DMSForm form = e.getForms(pi).get(0);
    form.setField("subj", from + ","+ subject);
    form.setField("description", contentstr);
    e.updateForm(form);
    Settings.log("Process started, id:"+pi.getId(),2);
    return true;
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```

LDAP

Description: synchronize users, org.units, etc.

```
Definition
public interface DirectorySyncer {
  public void synchronize(DirectoryServer dirServer,
     DirContext baseContext) throws Exception;
}
```

Declaration : Admin-Tasks -> Communication -> LDAP

Demos: SimpleDirectorySyncer

LDAP (2)

Example: Loading users from LDAP

```
public void synchronize(DirectoryServer ds, DirContext ctx) throws Exception{
    NamingEnumeration<Binding> ne = baseContext.listBindings("");
    while (ne.hasMore()) {
        Binding b = ne.next();
        String rdn = b.getName();
        DirContext objectCtx = (DirContext) b.getObject();
        syncObject(rdn, ds, ctx, objectCtx);
    }
  private void syncObject(String rdn, DirectoryServer ds, DirContext
      baseContext, DirContext objectCtx) throws Exception {
    Attributes attribs = objectCtx.getAttributes("");
    Object ldapKey = attribs.get(LDAPKEYATTNAME).get();
    OrgData od = ServiceLocator.getOrgData();
    User u = od.getById(User.class, (String)ldapKey);
    if (u != null) { // object exists in @enterprise
        // do nothing
    } else { // create user object
        u = od.createUser();
        setFields(u, attribs);
        u.setActive(true);
        od.insert(u);
    }
```

6. Utilities

- Timer
- Logging
- Service
- Holidays
- Calendar integration

Timer

Description: execute recurring actions

Definition

```
package com.groiss.timer;
public interface TimerTask {
    public void run(TimerEntry e, String arg) throws Exception;
    public void abort();
}
```

Declaration: System administration -> Admin.Tasks -> Timer **In Product**: several implementations **Demos**: com.groiss.demo.FileGetter

Timer - Example

Example: Restart the log (for example every day)

```
public class LogTimer implements TimerTask {
   public void run(TimerEntry te, String args) {
     try {
        Settings.getLogger().restart();
     } catch (Exception e) {
        Settings.logError(e);
     }
   }
   public void abort() {}
}
```

Logging

Description: change format and location of log messages **Definition**

```
package com.groiss.log;
public interface ILogger extends Service {
    public void log(String str, int level);
    public void logError(Throwable err);
    public long getExceptionCount();
    public Date getLastExceptionDate();
    public void logError(Throwable err, String errHeader);
    public void logError(Throwable error, String errHeader, int level);
    public File getLogFile() ;
    public File getErrorLogFile() ;
    public PrintWriter getWriter();
    public int getLevel();
    public void restart() ;
}
```

Adapter Class: com.groiss.log.Logger Declaration: Configuration -> Classes -> Logging class In Product: com.groiss.log.Logger

use com.groiss.util.Settings.log for writing log messages

Service

Description: implement hooks on startup and shutdown

Definition

```
public interface Service extends Lifecycle {
   public boolean isRunning();
   public void reconfigure();
}
public interface Lifecycle {
   public void startup();
   public void shutdown();
}
```

Declaration:

- Configuration -> Classes -> Services
- an application adapter may implement the service interface

In Distribution: the configured services

Holidays

Description: implement the holidays for your country

Definition

```
package com.groiss.cal;
public interface Holidays {
    public String isHoliday(com.ibm.icu.util.Calendar d);
}
```

Declaration: Configuration -> Calendar -> Holiday Class

In Product: GermanHolidays, AustrianHolidays

Demos: UKHolidays

Holidays - Example

Example: UKHolidays

```
public String isHoliday(com.ibm.icu.util.Calendar d) {
    if(!(d instanceof GregorianCalendar)) {
        return null;
    }
    GregorianCalendar c = (GregorianCalendar)d;
    int wd = d.get(Calendar.DAY OF WEEK);
    if (wd == Calendar.SATURDAY || wd == Calendar.SUNDAY)
        return null:
    int day = c.get(Calendar.DAY OF YEAR);
    int year = c.get(Calendar.YEAR);
    int easter = CalUtil.easterDay(year);
    if (day == easter - 2) {
        return "Good Friday";
    } else if (day == easter + 1) {
        return "Easter Monday";
    // move to next monday if on saturday or sunday
    if (day == 1 || wd == Calendar.MONDAY && (day == 2 || day == 3) ) {
        return "New Year's Day";
    }
```

```
day -= c.isLeapYear(year) ? 1 : 0;
if (day == 359 || wd == Calendar.MONDAY && (day == 360 || day == 361) ) {
 return "Christmas Day";
} else if (day == 360 || wd == Calendar.TUESDAY && (day==361 || day==362)
     || wd == Calendar.MONDAY && day == 362) {
 return "Boxing Day";
}
if (wd == Calendar.MONDAY) {
 int m = d.get(Calendar.MONTH);
 int md = d.get(Calendar.DAY OF MONTH);
 if (md \ge 1 \& \& md \le 7 \& \& m = Calendar.MAY) {// first monday in may
     return "Early May Bank Holiday";
 }
 // last monday in may
 if (md >= 25 && md <=31 && m == Calendar.MAY) {
     return "Spring Bank Holiday";
 // first monday in august
 if (md >= 25 && md <=31 && m == Calendar.AUGUST) {
     return "Summer Bank Holiday";
return null;
```

Callnfo

Description: show your data in the calendar **Definition**:

```
package com.groiss.cal;
public interface CalInfo {
    public List<CalEvent> listEvents(Persistent object, Date startDate, Date
        endDate) ;
    public String getName();
    public List<Pair<String,String>> getCaptions();
    public com.groiss.cal.CalView getView(String id,User u);
    public List<Pair<String,String>>getPossibleViews(User u);
}
```

Adapter Class: CalInfoAdapter

Declaration: in configuration file (avw.conf), parameter cal.applications contains a comma separated list of CalInfo implementations.

In Product: com.groiss.calendar.CalendarAppl

com.groiss.calendar.wf.DueTasks

com.groiss.calendar.wf.FinishedTasks

Demos: com.groiss.demo.OrderDates

Callnfo (2)

- listEvents returns the events shown in the calendar, a list of CalEvents normally SimpleEvent instances are created
- CalEvent properties:
 - subject: short text
 - text: detailed text
 - start date
 - end date
 - caption: index in list returned by getCaptions
- getCaptions can be used to define the color of the event, return pairs of color and name
- Customize the views: define a view with sources (Callnfo implementations) for participants.
 - getPossibleViews adds views to the list
- getView returns a view: provide a list of Callnfos and Participants

CalInfo Example

Example: show the duedates of the order items in the calendar.

```
public class OrderDates extends CalInfoAdapter {
 /** name of this event source */
 public String getName() {
   return "Order duedates";
 }
 public List<CalEvent> listEvents(Persistent object, Date startDate, Date
   endDate) {
  List<DMSForm> forms = ServiceLocator.getStore().list(
    "com.dec.avw.appl.demo orderitem 1", "duedate is not null");
  List <CalEvent> result = new ArrayList<CalEvent>();
  WfEngine e = ServiceLocator.getWfEngine();
  DMS dms = ServiceLocator.getDMS();
  Date now = new Date();
  for(DMSForm form: forms) {
    DMSForm mainform = dms.getMainForm(form);
    ProcessInstance pi = e.getProcess(mainform);
    Date due = form.getField("duedate");
    SimpleEvent event =
      new SimpleEvent(pi.getId()+":"+ pi.getSubject(),due, due);
    event.setEventType(EventType.Task);
    event.setCaption(now.after(due) ? 1 : 0); // set color
    event.setOnClick(
      "window.open('com.groiss.avw.html.HTMLGui.showDetail?pi=" +
      pi.getOid() + "')");
    result.add(event);
  return result;
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```

Callnfo Example (2)

```
/** colors and legend of the events */
public List<Pair<String, String>> getCaptions() {
 return Arrays.asList(
   new Pair<String,String>("green","not yet due"),
   new Pair<String,String>("red", "already due"));
}
/** id and name for selection */
public List<Pair<String, String>> getPossibleViews(com.groiss.org.User u) {
 return Arrays.asList(
   new Pair<String,String>("demo orders", "Order duedates"));
}
/** return this view */
public com.groiss.cal.CalView getView(String id, com.groiss.org.User u) {
 if("demo_orders".equals(id)) {
   return new SimpleCalView(id, null,
       Arrays.<Persistent>asList(u),Arrays.<CalInfo>asList(this));
 throw new IllegalArgumentException();
```

6. Deployment and Upgrade

- package your application
 - most resources are loaded from the classpath and can therefore be packaged in a jar file
 - you may need other jar files of third-party libraries
- using install application

package the application into a zip file

- jar files in lib sub-directory
- classes in classes sub-directory
- appl.prop in root with the following properties
 - avw.application.id application id
 - avw.application.name application name
 - avw.application.class application class
 - avw.export.file comma separated list of XML export files

use the function "Install application" on the target system

see demos.zip or hr_proc.zip for examples

Deployment and Upgrade (2)

initial deployment

- install @enterprise and then the application zip or
- install a complete installation with a database dump

application upgrade

- code: replace the jar file(s)
- database-objects: make a new import or import parts of the application
- put an action in the upgrade method of the application adapter class

7.

System administration

1. System Requirements

- Operating System
 - should run everywhere: tested on Windows, Solaris, Linux

Database

- Oracle, >= 10g
- DB2 UDB or Z/OS
- MS-SQL Server
- Derby
- Postgres
- Firebird
- MySQL: experimental
- Java
 - 1.6

System Requirements - Client

Operating System

- should run everywhere: tested on Windows, Linux, Mac, mobile devices like iPhone
- Browser
 - MS Internet Explorer 6,7,8
 - Firefox 2,3
 - Safari 4
- Java
 - Java Plugin 1.6 for process editor (developers only)

Database Configuration - Oracle

 Create Oracle user with the following rights: CREATE SESSION ALTER SESSION CREATE TABLE CREATE VIEW

Example:

SQL> create user epcourse identified by epcourse default tablespace users; User created. SQL> grant create session, alter session to epcourse; Grant succeeded. SQL> grant create table, create view to epcourse; Grant succeeded. SQL> grant unlimited tablespace to epcourse; Grant succeeded. SQL>

Database Configuration – SQL Server

- Database Installation
 - use option "case-insensitive"
- create a database
- create a user who is dbowner
- before creating tables:

execute the standard procedure:

EXEC sp_dboption <dbname>,'ANSI null default', true or change in database options: check ANSI null default

Database Configuration – DB2

- create Windows user
- create a Database user with the rights
 - connect
 - create table
- create a dabase schema for this user

2. Installation

- 1. Double click setup80.jar or execute
 - java -jar setup80.jar
- 2. select the installation directory
- 3. select a Java runtime environment
- 4. select a HTTP-port
- 5. optionally install as service (Windows only)
- 6. start the browser and the batch file

Installation



Installation



Installation



3. Initial Configuration

After starting the batch/script file, the browser is used to complete the installation:

- License information
- database connection
- Ioad database schema
- start services
- set password for system administrator
- add a user and an organizational unit
- Ioad examples
- the system is ready and the login mask is shown

Initial Configuration

Welcome screen of Setup

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	We have detected that your system needs to be set up for @enterprise. This tool will guide you through the configuration steps. After completing the setup, you will be able to start using @enterprise and create processes, users, roles and other objects with the admin tool.								
	The documentation index page is available from here.								
	If you encounter problems with the setup process, please report them to support@groiss.com.								
							Start Setup	1	

Setup

- Server-Id: id for this server, visible in the GUI, no special characters
- License key provded by the vendor
- language: standard system language (can be changed later)

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Setup

upload the JDBC driver, depends on used database

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Setup

 Database specific settings

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Database Selection

	DBMS	Driver Vendor	Driver Kind	Class	URL
0	DB2 UDB	IBM	Universal	COM.ibm.db2.jdbc.app.DB2Driver	jdbc:db2:'dbname'
0	DB2 Z/OS	IBM	OS390	COM.ibm.db2os390.sqlj.jdbc.DB2SQLJDriver	jdbc:db2os390:'location-name'
0	Derby	Apache	Embedded	org.apache.derby.jdbc.EmbeddedDriver	jdbc:derby:ep;create=true
0	Firebird SQL 1.5	Firebird	JCA	org.firebirdsql.jdbc.FBDriver	jdbc:firebirdsql:'host'/3050:'dbalias'
0	MS-SQLServer	Inetsoftware	Una2000	com.inet.tds.TdsDriver	jdbc:inetdae:'host':1433?sql7=true
0	MS-SQLServer	jTDS Project	jTDS	net.sourceforge.jtds.jdbc.Driver	jdbc:jtds:sqlserver://'host':1433
0	MySQL (V5.0, experimental)	MySQL	Connector/J (3.1)	com.mysql.jdbc.Driver	jdbc:mysql://'host':'port'/'database'
0	Oracle LOBs	Oracle	Thin (>=10g)	oracle.jdbc.OracleDriver	jdbc:oracle:thin:@'host':1521:'SID'
0	Oracle LOBs	Oracle	OCI	oracle.jdbc.OracleDriver	jdbc:oracle:oci:@'TNSNAME'
0	Oracle LONGs	Oracle	Thin	oracle.jdbc.OracleDriver	jdbc:oracle:thin:@'host':1521:'SID'
0	Oracle LONGs	Oracle	OCI	oracle.jdbc.OracleDriver	jdbc:oracle:oci:@'TNSNAME'
0	PostgreSQL (V8.1, experimental)	PostgreSQL	Native PostgreSQL Driver	org.postgresql.Driver	jdbc:postgresql://'host':'port'/'database'

Accept Cancel
Test the database character set

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Add a user and an organizational unit

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 Load an example process and reports

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		Filename		Descr	iption										
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		jobappl.xm	h	Jobpro	oc - a si	imple e	example	e proce	ess.						
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Setup completed, login

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## **@enterprise Directory Structure**

٠	./	start scripts ep.bat and ep.sh
٠	./bin	contains the optional command-line administration shel
٠	./classes	empty directory, allows to shadow @ep resources
٠	./conf	configuration file avw.conf
٠	./doc	example files, demo application
٠	./forms	form classes
٠	./lib	Jar-Files of @enterprise, documentation
٠	./log	log files
٠	./service	files for installation as a windows service
٠	./tmp	temporary files
٠	./WEB-INF	configuration of HTTP-Server (Jetty)
٠	./ws	configuration for web services

## 4. Administration Tasks

functions for administration and operating

- Server
  - Monitor, Restart, Timer, Class path, ...
- User
  - Permission check, disable login, ...
- Import/Export
  - Install applications
  - archive data
- Reorganisation
  - change role assignments, find stuck process instances
- Communication
  - communication with other systems (E-Mail, LDAP,...)

## **Server Monitor**

#### Overview of system activity

🕙 @enterprise-Administration - Moz	zilla Firefox			
<u>Eile E</u> dit <u>V</u> iew Hi <u>s</u> tory <u>B</u> ookmark	s <u>T</u> ools <u>H</u> elp			
enter-	Administration		demo-	Logged in: John Smith
() prise	\$			8 🗗 🔀 🗈
Organization	Server Monitor			
Applications				
Search	@enterprise Server: dem	o, System State at	2009-10-20 23:59:29	
Admin-Tasks	Database Connections:	2/4-4	[Detail] [Histogram]	
Server	HTTP Threads:	2/2-25		
Server Monitor	User Sessions:	1	[Detail]	
Server Control	Memory:	42.58/60.47 M	B	
Events	Excentions:	AZ.30700.47 IM	[Detail ]	last:
Worklist-Cache	Up since:	2009-10-20 23	:42:01	idot.
[—] Class Path				
Timer	Requests served:			
Object History	HTTP:	108		
Interface Forms	RMI:	0		
	DB-Statements:	162	[Detail]	
Event Registrations	Active Stens:	2		
Manage certificates	Active Orepo.	2		
Running Nodes Monitor	[Log-Files] [View Configura	tion] [Server Info] [	[Client Info]	
-Full-Text Search	Refresh Interval: se	conds		
-Query-Tool				
Configuration				

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## **Server Control**

- shutdown or restart server
- update the system
- initialize the log file
  - copies away the current one
- reload the configuration
  - for example after manual changes
- show and reparse the reporting definition

Ser	ver Control
0	Shutdown Server
Θ	Restart Server
1	Show patch files
٠	Execute Database Upgrade
<b>₿</b>	Initialize Log File
	Reload Configuration
8	All passwords have to be changed on next login
۲	Show reporting schema
\$	Reparse Reporting schema

## **Event Log**

- List of events stored in the database, can be used in applications.
  - @enterprise writes startups and shutdowns into the  $\log$

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Organization	Evente				
Applications	Events				
Search	From:	To:	Type:	<b>•</b>	Search
Admin-Tasks					
📮 Server 🔔	•	Time	÷ld	Description	
Server Monitor	20-10-2009 23:42		shutdown		<u> </u>
Server Control	20-10-2009 22:11		shutdown		
Evente	20-10-2009 09:08		shutdown		
Lyon o	19-10-2009 15:52		shutdown		
vvorkiist-Cache -	20-10-2009 23:42		startup		
[™] Class Path	20-10-2009 22:11		startup		
Timer	20-10-2009 12:59		startup		
Object History	19-10-2009 15:54		startup		-
Interface Forms	··- ·- · ·- ·-				_
Pending Changes	Number of entries: 9				
Configuration					
Done					1.

## **Worklist Cache**

- View and change the state
- reinitialize the cache structures
  - Org.structures after changes in organzation: new application, org.unit, role, changes in org. hierarchy
  - Activity instances: should not be necessary (except manual changes in DB)
- check match between database and cache for one user

Worklist-Cac	he			
— Cachestate: A	Activated			Refresh Cache
New Cache State:	C Switched Off			<ul> <li>Refresh Activity Instances [2009-10-20 23:42:05]</li> </ul>
	C Started (but n ● Activated Upda	ot active) te		
<b>Check Cache</b> User-Id: john	for User	Check Cache	Refre	esh Cache for User
✓Persona	l Items	ltems: 0		▼
✓Role Iter	ms	ltems: 0		▼
✓Persona	l Suspended Items	ltems: 0		▼
✓Role Su	spended Items	ltems: 0		▼
✓Pending	Items	ltems: 0		▼

## Classpath

## @enterprise reads programs and resources from the libraries and directories in the classpath

#### The page has three functions

- show the complete classpath three sections
  - boot classpath
  - system classpath
  - application classpath
- find resources in classpath
  - from where are they loaded
- find shadowed classes
  - and their locations

0					Ŷ	
Class Path						
Class or Resource:					8	
URL:						
Boot Class Path-						
C:\Programme	Java\ire1.6.0 03\	lib\ext\dnsns.i	iar			
C:\Programme	Java\jre1.6.0 03\	lib\ext\localed	lata.jar			
C:\Programme	Java\jre1.6.0 03\	lib\ext\QTJava.	zip			
C:\Programme	Java\jre1.6.0 03\	lib\ext\sunjce	provider.jar			
C:\Programme	Java\jre1.6.0 03\	lib\ext\sunmsca	api.jar			
C:\Programme	Java\jre1.6.0_03\	lib\ext\sunpkcs	s11.jar			
C:\Programme C:\herb\demo\	Java\jre1.6.0_03\ demo80_2\ep80\lik	lib\ext\sunpkcs )bootstrap.jar	11.jar (2009-10-19 1)	1:36 [rev	7:67:	16]
C:\Programme\ C:\herb\demo\ System Class Pat C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\	Java\jre1.6.0_03\ demo80_2\ep80\lik demo80_2\ep80\cla demo80_2\ep80\cla demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik	lib\ext\sunpkcs o\bootstrap.jar asses o\XmlSchema-1.4. o\asm-3.1.jar o\axiom-api-1.2.	11.jar (2009-10-19 1) 2.jar 8.jar	1:36 [rev	7:67:	16]
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C:\Programme\ C:\herb\demo\ System Class Pat C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\	Java\jre1.6.0_03\ demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik	lib\ext\sunpkcs o\bootstrap.jar asses o\XmlSchema-1.4. o\asm-3.1.jar o\axiom-api-1.2. o\axiom-dom-1.2. o\axiom-impl-1.2	11.jar (2009-10-19 1) 2.jar 8.jar 8.jar 2.8.jar	1:36 [rev	7:67	16]
C:\Programme\ C:\herb\demo\ System Class Pat C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\	Java\jre1.6.0_03 demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik	lib\ext\sunpkcs o\bootstrap.jar asses o\XmlSchema-1.4. o\asm-3.1.jar o\axiom-api-1.2. o\axiom-dom-1.2. o\axiom-impl-1.2 o\axis2-adb-1.5.	11.jar (2009-10-19 1) 2.jar 8.jar 8.jar 2.8.jar jar	1:36 [rev	7:67:	16]
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C:\Programme\ C:\herb\demo\ System Class Pat C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\ C:\herb\demo\	Java\jre1.6.0_03 demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik demo80_2\ep80\lik	lib\ext\sunpkcs b\bootstrap.jar xsses b\XmlSchema-1.4. b\asm-3.1.jar b\axiom-api-1.2. b\axiom-dom-1.2. b\axiom-impl-1.2 b\axis2-adb-1.5. b\axis2-adb-code b\axis2-adb-code b\axis2-adb-code	11.jar (2009-10-19 1) 2.jar 8.jar 8.jar 2.8.jar 1jar 2.gen-1.5.jar gin-1.5.jar	1:36 [rev	7:67:	16]

C:\herb\demo\demo80_2\ep80\lib\xmlsec-1.4.1.jar

#### -Application Class Path-

- C:\herb\demo\demo80_2\ep80\forms
- $\verb|C:\herb\demo\demo\0_2\ep80\WEB-INF\lib\pjl-comp-filter-1.7.jar|$
- C:\herb\demo\demo80_2\test\classes
- C:\herb\demo\demo80_2\hrproc\lib\proclib_hr.jar

## Timer

system-defined and application-defined timers for periodical actions

- Attributes:
  - Classname: TimerTask interface
  - First time: first run
  - Period: seconds or cron-pattern: use sub-window to enter value
  - Active
  - Run on startup
  - Run on each Node: in cluster
  - Thread-Id: run in own thread?
- on error:
  - E-Mail to the Administratior
  - timer is passivated: must be reactivated manually
  - warning icon is shown in active column

## **Manage Certificates**

Set up SSL

- enter keystore path, password, and certificate password in Configuration -> Security
- enter HTTPS port in Configuration -> HTTP Server
- restart server
- generate a self-signed one

Attributes

- Alias: name in keystore
- other information about organization
- key size
- duration
- optionally: generate a certification request, send it to a CA and import the returned certificate chain

## **Further Administration Tasks - Server**

- Object History: Find changes of objects
  - select object class
  - confine time span
- Interface Forms
- Pending Changes
  - list of scheduled updates of master-data objects
- Event Registrations
  - Process instances waiting for events, finishing them manually

## **Further Administration Tasks - Server**

- Running Nodes Monitor
  - for cluster
- Full-Text Search
  - initialize the cache structures
- Query-Tool
  - perform selects on the database
  - activate with the parameter "database.direct.access=true" in configuration file
  - available for users with execute right on all objects (for example through the sys role)
  - useful in development system, don't activate in production
- Process Mining / Duration Statistics
  - create statistics for time management

## **Administration Tasks - User**

- Disable/Enable Login
  - disable login for administration tasks
- Permission Test
  - check whether a user has a right for an object
- Expired passwords
  - list of users with expired password

## **XML Export**

Transfer data between @enterprise installations

- for example between development and production
- Export "packages"
  - applications
  - process definitions
  - org.units
  - users
  - permission lists
  - reports
  - timers
  - LDAP settings
  - mail boxes
  - dashboards
  - process instances
  - DMS folders
  - forms

## **Further Administration Tasks - Import/Export**

#### Archive Processes

- delete from database
- archive class may write the data to an external system

#### Install Application

- upload an application zip file
- extract it, modify the application class path
- import the contained xml files

#### File Import

- upload a csv file and synchronize the content with a database table

## **Further Administration Tasks – Reorganize**

- Change Role Assignments
  - copy roles from one org.unit to another
- Analyze Process Instances
  - find "stuck" process instances
- OU History
  - maintain a relation between org.units (reorganization szenarios)

## **Further Administration Tasks – Communication**

#### MailBoxes

- maintain mailboxes, actions can be performed on incoming mails
- LDAP
  - synchronize org. data with an LDAP directory
- BatchJobs
  - overview over running or finished BatchJobs
  - change status
- WfXML
  - communication with other workflow engines
- Web Services
  - maintain local services
  - resolution of links to other systems

## Dashboard

- is shown in working area when you enter the administration
- arrange desired pages for a quick overview
  - list of timers
  - reports

. . .

server monitor

🖏 @enterprise-Administration - Mozilla Firefox - 🗆 × <u>File Edit View History</u> Bookmarks Tools Help eptrunk - Logged in: Herbert Groiss Administration enterprise 💡 合 强 🖪 X X Organization Applications Timer Server Monitor Search Admin-Tasks **C**# @enterprise Server: eptrunk, System State at 2009-10-27 15:41:51 Id Last Run Description Pe ⊡ Server Database Connections: 2/5-5 [Detail] [Histogram] Server Monitor 360 🔺 HTTP Threads: 6/6-24 Server Control removes all seen-information 0.2 User Sessions: [Detail] 1 Events SeenObjectCleaner which is not Memory: 69.91/88.02 MB Worklist-Cache needed anymore Exceptions: 3 [Detail ... last: 2009-10-27 09:36:22 Class Path 2009-10-27 2009-10-27 09:36:03 Up since: BatchManager start batch jobs 360 14:49:00 Timer enables/disables Object History Requests served: 2009-10-27 CurrentSubstitutes time-triggered 360 HTTP: 283 14:49:00 Interface Forms substitutions RMI: 0 Pending Changes starts timeout 1038 DB-Statements: [Detail] 2009-10-27 tasks and Event Registrations Escalations 360 14:49:15 escalation Manage certificates Active Steps: 73 actions Running Nodes Monitor 2009-10-27 takes work 300 Suspension items out of Full-Text Search [Log-Files ...] [View Configuration ...] [Server Info] [Client Info] 15:39:00 suspension list -Query-Tool Refresh Interval: seconds • Þ Process Mining Number of entries: 20 | 0 selected Duration statistic 🗄 User Import/Export 🖻 Reorganize Communication Configured Tasks Dashboard Configuration Done

## 5. Configuration

View and change the @enterprise configuration - stored in a property file, normally ./conf/avw.conf



## **Configuration - License**

- @enterprise License key
  - check it in system monitor -> server info or at the begin of the log file

🥹 @enterprise-Administration - Mozilla Firefox		
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enter-	Administration	demo - Logged in: John Smith
() prise		? 🚖 🔀 🗈
Organization	Linence	
Applications	License	
Search	License Key	
Admin-Tasks	* - Deremeter ehenre neede restert	
🖻 Server 🔶	- Parameter change needs restan	
Server Monitor		
-Server Control		
Events		
Liwigia - 🗵		
Configuration		

## **Configuration - HTTP**

- Allowed and Denied Hosts or Networks:
  - comma separated lists of pairs of IP addresses and network masks, for example 10.205.112.0/255.255.255.0
  - empty allow list means access from every host except the denied ones is allowed

Organization	HTTP Server
Applications	IIIIF-Selvel
Search	Server IP Port * 8000
Admin-Tasks	Minimum Number of Threads * 2
🖻 Server 🔺	Maximum Number of Threads * 25
Server Monitor	Server SSL Port *
Server Control	Client Certificates for HTTPS * are not requested -
Events	Allowed Hosts or Networks *
Worklist-Cache	
Class Path	
Timer	Denied Hosts or Networks *
Object History	
Interface Forms	Access Control
Thending Changes	
Event Registrations	
Manade certificates 📃 🔟	* = Parameter change needs restart
Configuration	

## **Configuration - HTTP**

# Access Control combination of IP-address, URL prefix and right Syntax: { ( ip-specifier | "*" ) SPACE (url-prefix | "*") SPACE ( "*" | "DENY" | ( right { SPACE right }* ) COMMA }*

The rules are evaluated in the given order until a match is found.

If no match is found or the right of the matched rule is DENY access is denied.

Examples:

```
127.0.0.0/255.0.0.0 * *
```

Access from local host subnet is not restricted.

10.205.112.26/255.255.255.255 * DENY

Access from 10.205.112.26 is not allowed.

10.205.112.0/255.255.255.0 com.groiss.org.PasswdAuth *

Login of hosts from subnet 10.205.112.0 is allowed.

10.205.112.0/255.255.255.0 * internal

All operations of hosts from this subnet are allowed if users have the right internal.

* com.groiss DENY

Access to com.groiss.* classes and methods is denied to every host.

## **Configuration - Database**

#### see installation and initial configuration

실 @enterprise-Administration - Mozi	illa Firefox	
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enter-	Administration	demo - Logged in: John Smith
() prise		8 合 🔀 🗈
Organization	Database	
Applications		
Search	Database	* Derby 🔽 😵
Admin-Tasks	JDBC Driver Class	* org. apache. derby.jdbc. EmbeddedDriver 🖌 🖌
E Server	JDBC URL	* jdbc:derby:ep;create=true
Server Monitor	Database Userid	* herb
Server Control	Database Password	* ********
Events	Number of Connections	4
Worklist-Cache	Maximum Number of Connections	4
[™] Class Path	Session Environment	*
Timer		
Object History		
Interface Forms	Connection Properties	*
Pending Changes		
- Event Registrations	Reconnect Try Intervall (sec.)	
Manage certificates	Reconnect Tries	
	Query Timeout (sec.)	
Full-Text Search	Gaery filleour (Sec.)	
Configuration	* = Parameter change needs restart	

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## **Configuration - Database**

- Size of connection pool
  - see Server Monitor for actual needs
- Session Environment
  - statements executed after database connect, for example in SQL Server: set textsize=1000000
- Reconnect Try Interval
  - wait seconds between reconnect tries
- Reconnect Tries
  - number of reconnect tries
- Query timeout
  - maximum duration of a dabase statement (not supported in every database)

## **Configuration - Directories**

Home-directory: base directory for all relative paths in the system

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enter-	Administration	demo - Logged in: John Smith
() prise		8 📥 🗟 🗈
Organization	Directories	
Applications	Directories	
Search	Home-Directory *	
Admin-Tasks	Directory of Form Classes * forms	
🖻 Server 🔄	Directory for Temporary Files * tmp	
t ⊡ User	imp	
Import/Export	* = Parameter change needs restart	
🗉 Reorganize		
Configuration		

## **Configuration - Logging**

- Logfile: Name and location of log file
- Restart: either daily or on startup
- Numer of Logs we keep
- Trace-Level (Log-Level):
  - 0: only errors are logged
  - 1: HTTP requests are logged (Timestamp, User, IP-Address and URL).
  - 2: SQL-Statements and process oriented logging.
  - 3: HTTP-Header, parameter of prepared statements, .... (Performance!!)

Organization Applications	Logging		
Search	Logfile	log/access.log	•
Admin-Tasks	Restart Log	Daily 🔽	
Server 📥	Number of Logs	10	
Server Monitor	Error File	log/error.log	•
Server Control	Restart Error Log	Daily 💌	
Events	Number of Error Logs	10	
Worklist-Cache	Logger Class		×
Class Path	Trace Level	1	
Timer	Log on console		
Object History	* - Deremeter oberge n	and root at	
Configuration	– Harameter change h	eeus restart	

## **Configuration - Classes**

- Customize authorization, notification, archiving, error formating
- Services: @enterprise is composed of services, that are started in the given order. You can add own services

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enter-	Administration	demo - Logged in: Joh ø	n Smith
Organization Applications	Classes	8	
Search	Authorization Class	com.groiss.org.PasswdAuth	<b>~</b>
Admin-Tasks	Settings Class Notification Provider Class Archiving Class Error-Formatter Class Services	* com.groiss.store.DBConnPool store, com.groiss.server.ApplicationLoader appls, com.groiss.server.EventDispatchServer ev, com.groiss.timer.TimerManager timer, com.groiss.server.RmiServer rmi, com.groiss.server.RmiServer rmi, com.groiss.httpd.jetty.Jetty httpd, com.groiss.reporting.ReportingService reporting, com.groiss.wfxml2.WfXMLService wfxml	
Event Registrations Configuration	* = Parameter change needs	restart	

## **Configuration - Localization**

- List of available languages: user can select one of them
- Language, country and variant: system default
- character set for communication with the browser: don't change

Organization	Localization	
Applications		
Search	List of Locales	en_US,en_GB,de_DE,de_AT,de_CH
Admin-Tasks	Language	en
Server Monitor	Country	US
Server Control	Variant	
Events	Character Set	UTF-8
Worklist-Cache	Decimal Separator	
Class Path	Date Format	dd-MM-yyyy
Timer	Date-Time Format	dd-MM-yyyy HH:mm
Object History	DefaultUnit for displaying TimeIntervals	seconds 💌
Interface Forms	Applet Look-and-Feel	metal 💌
Pending Changes	Max. Table Length	100
Event Registrations	Items per Page	40
Manage certificates	Keep object changes (days)	
Running Nodes Monitor	Remove user sessions after (days)	
Full-Text Search	Use browser language	
Query-Tool	Select List Look-and-Feel	Select List -
Process Mining	Select List Search Option	Starts with 💌
Duration statistic	Enable Wiki Link Syntax	
Configuration	* = Parameter change needs restart	

## **Configuration - Localization**

- Date and Date-Time format: see installation guide for patterns
- Max. Table length: If an (administration) table has more than n entries you must use a search to reduce the displayed set of objects
- Items per Page: if paging is enabled
- Use browser language: instead of the language defined in @enterprise
- Enable Wiki Link Syntax: for activity comments (set agent, go back) you can enter links in the syntax [[ url | text ]]

vvurkiist-Cacrie	Doomial Coparator	•
Class Path	Date Format	dd-MM-yyyy
Timer	Date-Time Format	dd-MM-yyyy HH:mm
Object History	DefaultUnit for displaying TimeIntervals	seconds 💌
Interface Forms	Applet Look-and-Feel	metal 💌
Pending Changes	Max. Table Length	100
Event Registrations	Items per Page	40
Manage certificates	Keep object changes (days)	
Running Nodes Monitor	Remove user sessions after (days)	
Full-Text Search	Use browser language	
Query-Tool	Select List Look-and-Feel	Select List 💌
Process Mining	Select List Search Option	Starts with 💌
Duration statistic	Enable Wiki Link Syntax	
	* = Parameter change needs restart	
Configuration	5	

## **Configuration - Communication**

Organization	Communication	L
Applications	communication	
Search	SMTP Host	
Admin-Tasks	Mail Sender	
Server Monitor	Administrator E-Mail Address	
-Server Control	RMI Port	* 1099
Events	Enable RMI class loading	되 *
-Worklist-Cache	Enable full RMI access	* 🗆
-Class Path	Allow plain communication over RMI	*□
Timor	Export Port for plain RMI communication	*
Object Wistow	Use SSL for login sequence at RMI communiction	* 🗆
Object History	Crypt RMI communication with SSL	* 🗆
Interface Forms	Export Port for RMI over SSL	*
Pending Changes	Client Certificates for RMI over SSL	* are not requested -
Event Registrations	Enable Admin-Shell	
Manage certificates	Require SSL for Admin-Shell	
-Running Nodes Monitor	Allowed Hosts of Networks for Admin-Shell	*
Full-Text Search	Enable Wf-XML	off 🔻
Query-Tool	WfXML Org Unit	
Process Mining	WfXML User	mbeava
Duration statistic	WfXML Server	Journ
⊡-User	WfXML access log for	Sonico registry
Import/Export		Factory
🗷 Reorganize		Instance
Communication		Activity
Configured Toolso	Cize of log	Observer 🗹
Configuration	Size of log	100

## **Configuration - Communication**

- SMTP Host for outgoing mails
- Mail Sender: sender of system mail
- E-Mail Address of Administrator: for receiving alerts
- Settings for RMI
- Enable the admin-shell: for command-line based administration
- WfXML Settings
## **Configuration - Cluster**

- If cluster is activated, each node must have a unique id
- Performance-Factor: for load balancing
- Clustercheck Tolerance Time
- Heartbeat Tolerance Time
- Transport layer for Coherence: JMS, JGroups, MultiCast

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enter-	Administration		demo - Logged in: J	ohn Smith
() prise				💡 合 🕄 🗈
Organization	Cluster			
Applications	Cluster			
Search	Clustering enabled	* 🗖		
Admin-Tasks	Server Name	* demo		
Server Monitor	Node-Id	*		
Server Control	Performance Factor	1.0		
Events	Clustercheck Tolerance (sec.)			
Worklist-Cache	Heartbeat Tolerance (sec.)			
Class Path	Coherence Strategy	* via Notification 💌		
Timer	Transportlayer for Coherence	* JMS	<b>•</b>	
Object History	* = Parameter change needs res	tart		
Configuration				

#### **Configuration - Cluster**



## **Configuration - Workflow**

- Open form on process start: instead of showing the worklist
- Inherit Ids to subprocesses: don't generate a new one
- All tasks can be selected as adhoc: when an adhoc process is created at runtime
- Enable application-spanning process definition: instead of allowing components only from the default application and the application of the process
- Allow automatic take: form editing and worklist functions are possible in role worklist
- Organizational hierarchy mandatory: org.unit must belong to a hierarchy before it can be used in process instances
- Enable Groovy Scripts: for preprocessing, functions, etc.

Organization	Workflow	
Applications		
Search	Open form on process start	
Admin-Tasks	Inherit Ids to subprocesses	
Server Monitor Server Control Events Worklist-Cache	All tasks can be selected as adhoc Enable application-spanning process definition Allow automatic take Organizational hierarchy mandatory Enable Groovy Scripts	
	* = Parameter change needs restart	
Configuration		

# **Configuration - DMS**

- Inherit permission list: of folder to new documents in folder
- Basic-Auth in WebDAV: use this authorization for WebDAV access
- Do not display hidden documents: documents starting with "."
- Character Set for Text Files: text documents are stored without a charset information. When sending it to the browser we use this charset (UTF-8 is default).

DMS	<b>^</b>
Show extensions	
Versioning	not automatically 💌
Inherit permission list	
Basic-Auth in WebDAV	
Open docs in new window	
Maximum Document Size (in bytes)	
DMS Storage Class	✓
DMS Archiving Class	<b>✓</b>
Standard Table Model /Table Handler	<b>~</b>
Signature Class	<b>~</b>
Signature Types	
Full-text Search	Switched Off
Do not display hidden documents	
Character Set for Text Files	
* = Parameter change needs restart	

## **Configuration - Search**

- Parameter for resource care
  - Maximum Table Size on Server (rows)
  - Cache Interval (minutes)
  - Maximum Number of Cached Queries
  - Maximum Number of Simultaneous Queries
  - Maximum Number of Startable Queries

Organization	Saarah		
Applications	Search		
Search	Maximum Table Size on Server (rows)	100000	
Admin-Tasks	Cache Interval (minutes)	15	
Interface Forms	Maximum Number of Cached Queries	10	
Pending Changes	Maximum Number of Simultaneous Queries	2	
Event Registrations	Maximum Number of Startable Queries	10	
Manage certificates	Default process-id searchttype	exactly 💌	
	Default Subjectsearchttype	exactly 💌	
Full-Text Search	Process Relations		
Query-Tool	Search case-insensitive by default		
Process Mining	Exact Id Shortsearch only		
Duration statistic	Shortsearch includes subject		
I⊐ User	Shortsearch includes Fieldvals		
Import/Export —	Order Process-Ids by OID		
🖻 Reorganize	Show all rows, even when no View Right		
Configuration	* = Parameter change needs restart		

## **Configuration - Search**

- Standard search
  - how process-ids and subject fields are searched
- default for case-sensitive
- short search customization
- process relation: list of relation type, can be used in applications
  - for example "follower"

Organization		Saarah	
Applications		Search	
Search		Maximum Table Size on Server (rows)	100000
	Admin-Tasks	Cache Interval (minutes)	15
	Interface Forms	Maximum Number of Cached Queries	10
	Pending Changes	Maximum Number of Simultaneous Queries	2
	Event Registrations	Maximum Number of Startable Queries	10
	Manage certificates	Default process-id searchttype	exactly 💌
	Running Nodes Monitor	Default Subjectsearchttype	exactly 💌
	Full-Text Search	Process Relations	
	Query-Tool	Search case-insensitive by default	
	Process Mining	Exact Id Shortsearch only	
	Duration statistic	Shortsearch includes subject	
	🖳 User	Shortsearch includes Fieldvals	
	⊡mport/Export	Order Process-Ids by OID	
	⊕ Reorganize	Show all rows, even when no View Right	
	Communication Configuration	* = Parameter change needs restart	

# **Configuration - Tuning**

- Reload classes: if they have changed, costs performance but is very useful during development
- Statement statistics: logging of SQL statement execution times, can be checked in server monitor
- Settings for permission cache

Organization	Tuntan	
Applications	Tuning	
Search	Ignore reference roles	
Admin-Tasks	Ignore hierarchic roles	
Interface Forms	Ignore personal substitutions	
Pending Changes	Ignore role substitutions	
Event Registrations	Worklist-Cache at server startup	Activated
Manage certificates	Do not cache Seen Objects	
Running Nodes Monitor	Reload classes	
-Full-Text Search	Statement Statistics	
Query-Tool	File Cache Size (in Bytes)	
Process Mining	Archive Schema	
Duration statistic	Permission Cache activated	
±-User	Max. Number of object specific rights	10000
±⊡mnort/Exnort	Lifetime of object specific rights (sec.)	300
	Max. Number of class rights	10000
	Lifetime of class rights (sec.)	300
	* = Parameter change needs restart	
Configuration	i diameter change needs restalt	

# **Configuration - Security**

Settings for the key store

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enter-	Administration	demo - Logged in: John Smith
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Organization	Constant	
Applications	Security	
Search	KeyStore File *	
Admin-Tasks	KeyStore Password *	
Interface Forms	Password for Server Certificate *	
Pending Changes	* = Parameter change needs restart	
Configuration		

## **Configuration – Password Policy**

#### Rules for password check algorithm

Organization	Deserved Delley	
Applications	Password Policy	
Search	Period of Validity (in days)	0
Admin-Tasks	Inform user before password expires (in days)	0
Timer	Maximal Number of Unsuccessful Logins till Account is	0
Interface Forms	One-way Hash Algorithm to Use	MD5
Pending Changes	Minimal Length of Password	0
····Event Registrations	Maximal Length of Password	0
Manage certificates	Minimal Number of Letters in Password	0
	Minimal Number of Capital Letters	0
Full-Text Search	Minimal Number of Lowercase Letters	0
Query-Tool	Minimal Number of Digits	0
Process Mining	Minimal Number of Special Characters	0
Duration statistic	Minimal Number of Different Characters	0
ter User	Maximal Sequence of Same Character	0
[∎] Import/Export	Maximal Length of Substring (generated from user data)	0
🕀 Reorganize	Number of Old Passwords to Check	0
Communication	Minimal Number of Whitespace Characters	0
Configured Tasks	Checker Class	
🛄 Dashboard 🚽	* = Parameter chanαe needs restart	
Configuration		

### **Configuration - Calendar**

- iMIP: use email to transfer status information about appointments
- Resources: define classes of objects that can participate in appointments

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enter-	Administration	demo - Logged in: John Smith	
() prise		8 📥 🔀 🗈	
Organization Applications	Calendar	<b>^</b>	
Search	Holiday Class	✓	
Admin-Tasks	Allow Mail-Attendee		
Timer 📥	iMIP		
Object History	iMIP email address		
Interface Forms	Show Default-Resource		
Pending Changes	Resource Classes		
Event Registrations			
Manage certificates	Non Working Dou		
Running Nodes Monitor	Non working Day	sunday 🔄	
Full-Text Search		tuesday	
- Query-Tool		wednesday	
Process Mining		tnursday fridav	
Duration statistic		saturday 🔽	
Configuration	* = Parameter change nee	eds restart 📃	

#### Kontakt

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