@enterprise *10.0*

System Administration

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Introduction

This manual describes the administration of the Workflow-Management-System @**enterprise**. It is written for readers, who administrate the system, define users or the organization structure, or define workflows.
The manual is structured as follows:

- **System architecture:** The architecture of @**enterprise**is described.
- **The HTML interface:** The structure and usage of the HTML interface for administration is described.
- **Ids, names and internationalization:** Here you can find information about which attributes of an object class are used as ids and how the conventions for ids look like in @**enterprise**. Furthermore you can find information about the internationalization of master data and object classes.
- **Definition of the Organizational Structure:**

  Modeling the objects and the structure of the organization is necessary for modeling workflows. The following object classes are maintained in @**enterprise**:

  - **Server:** An @**enterprise**installation can consist of several servers, which cooperate for workflow execution.
  - **Roles:** Roles define groups of participants exhibiting a specific set of attributes, qualifications and/or skills.
  - **Rights:** Rights are used to restrict some operations to selected users.
  - **Permission lists:** It is possible to combine several rights to permission lists. This permission lists can be assigned to users or roles.
  - **Users:** All persons, which work with @**enterprise**, must be registered as "users".
  - **Organizational units:** The structure of the organization is modeled with organizational units and the hierarchy between them. Organizational units are abbreviated by *OU*.
  - **Organization classes:** Organization classes are used to classify the organizations.
  - **Organization hierarchies:** OUs can form hierarchies, i.e. one OU can be subordinate to another one and vice versa. The hierarchy of OUs is defined by

restoring the corresponding OUs into the organization hierarchy. In doing so one superordinate OU can own several subordinate OUs, but a subordinate OU (in one organization hierarchy) can only belong to one superordinate OU. A OU can be arranged in several organization hierarchies (in this way it is possible to map OUs belonging to several divisions).

- **The @enterprise permission system:** This chapter describes the permission system of **@enterprise**, which enables you to assign the required rights to users.
- **Workflow modeling:** Using the organizational structure we can define processes (workflows). The following object classes are described in the respective chapters:
  - **Applications:** Applications group processes.
  - **Tasks** are the elementary activities of processes.
  - **Functions** are representations of interactive Java-methods used for execution of activities.
  - **Forms** are the data containers for local data of processes.
  - **Processes** describe the structure of a business process.
- **Process definition:** In this chapter, the definition of processes is described. It contains two sections, the definition with the script language WDL and the definition using the graphical process designer. It is also possible to define processes with XWDL – an extension of WDL – which is described in the *Application Development Guide* in section *XWDL*.
- **Searching in @enterprise:** Here you can find cross references to those documents which are describing the possibilities to find certain information within **@enterprise**.
- **Administration Tasks:** The search facility and a set of common administration functions is described.
- **Configuration:** This chapter describes the configuration of **@enterprise**–server.
- **Dashboard:** This chapter describes how you can use the dashboard of **@enterprise**.

Contents

1 System architecture

The workflow system @**enterprise** is build for using in the intranet and internet and based on the technologies of the World Wide Web. We briefly describe these concepts before explaining the architecture of the system.

1.1 The World Wide Web

Three concepts make up the World-Wide Web (WWW): uniform addressing of information in the Internet via the Uniform Resource Locator (URL), presentation of information in the Hypertext Markup Language (HTML), and transmission of data using the Hypertext Transfer Protocol HTTP.

The HTML format allows the integration of different media type into a document. So-called hyper-links enable the integration and connection to other documents or media types. Important for using the WWW for workflow systems is the feature of fill-in forms in HTML, which allows a form based interaction between the user and a program.

HTTP is a simple protocol for transmitting information over the net. The client (browser) requests a document from a server, by opening a socket connection and sending the URL of the document to the server. The server sends back the content of this document together with some status information. If the URL points to an executable program the server executes this program and sends the output back to the client. Moreover, the HTTP protocol provides a mechanism for user authorization allowing to restrict access to a group of users or hosts.

1.2 The system components

Fig. 1.1 shows the components of the system. The components in detail:

- *Database:* The database contains all data relevant for process execution, process definition, organizational hierarchy, roles, as well as the dynamic data of the process instances.

- *Workflow engine:* This component contains the interpreter for the defined processes, it is called whenever a process is started or an activity is finished through the user interface. Additionally, the engine comprises services like timers, import-export mechanisms, the monitoring component, etc.

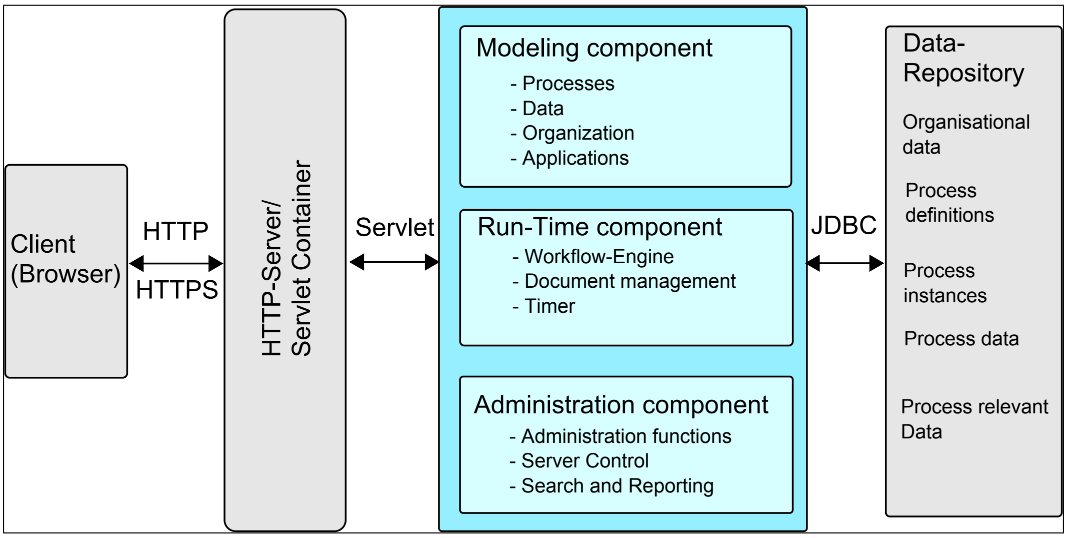


Figure 1.1: **@enterprise system architecture**

- *HTML interface:* The HTML interface creates the HTML pages of the user interface. It is triggered from the HTTP server whenever a user clicks on a link or a button. On the back end it communicates with the **@enterprise** engine via the API. The HTML interface consists of the following parts:

  - *Workflow client:* It generates the HTML pages and forms used for interaction with the user (not administrator) of **@enterprise**. The main page is the user worklist, which contains links to the other relevant information, i.e. the forms, process descriptions, history, etc.

    See the User Manual for a description of this interface.

  - *Administration and monitoring tool:* It contains functions for creating, modifying and deleting users, roles, and organizational units. It also allows the inspection and modification of running processes, like terminating instances, reassigning steps, etc. Like the other components communicating with the HTTP Server, the interactions with the user are done by creating and receiving HTML pages and forms.

    Two interfaces are available for process definition: Workflows defined as WDL scripts can be compiled and loaded into the system. Additionally, the process editor allows graphical definition of processes. Both components are accessible using a Web browser.

    Forms are created using a standard HTML editor. A parser extracts all input fields from the form and presents the user with a suggestion for the definition of the corresponding database table. The user can alter the data-types and creates the form table. The HTML form is stored in the database.

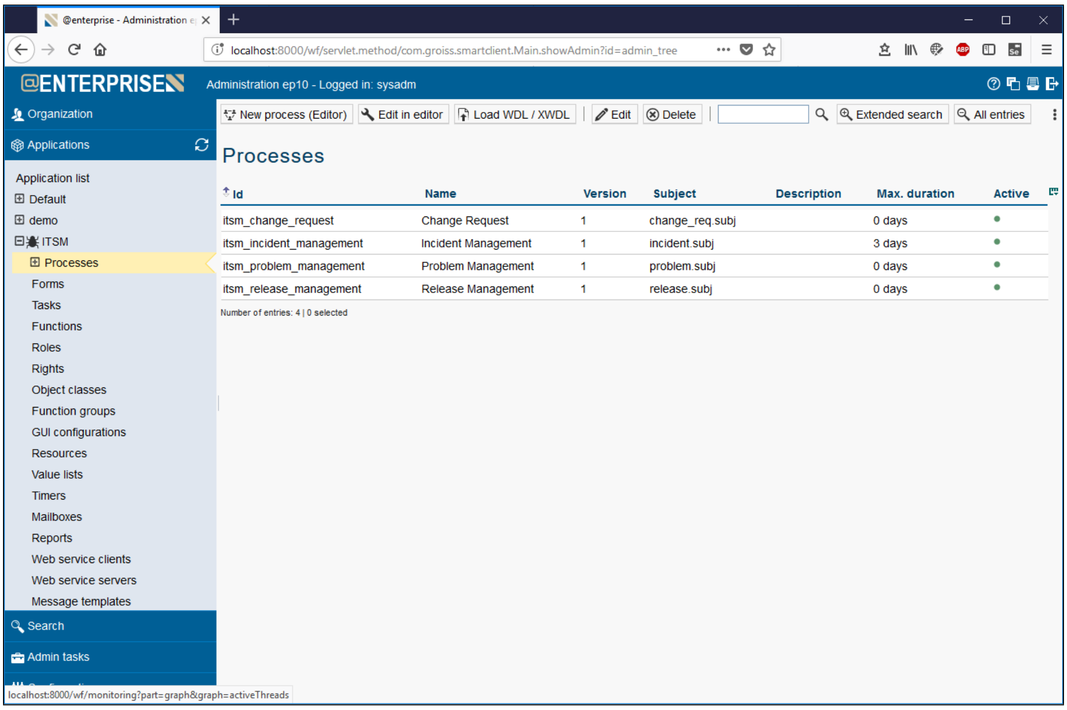
- *HTTP server:* The HTTP server is the interface between the Web and the workflow system. It translates the requests from the users to calls of the corresponding procedures of the workflow system.

- *Browser:* Every interaction with the system is done by a Web browser. This allows wide availability and platform independence and made system implementation easier.

2 The HTML interface

For using the **@enterprise** administration component a web browser is necessary on your machine (Internet Explorer, Mozilla Firefox, Google Chrome, etc.).

Login to the system either as `sysadm` or as another user. In the latter case you will be redirected to the worklist component. Click the **@enterprise** menu and "Administration" to enter the system administration (you will see this link only if you have the right "admin"). Depending on the server settings, a casual user (with admin rights) has to log-in again to get an admin session (if admin host and port are the same). The necessary information about admin host/port can be found in *Installation- and Configuration Guide* section *HTTP server*. Fig. 2.1 shows the structure of the main window.



Id	Name	Version	Subject	Description	Max. duration	Active
itsm_change_request	Change Request	1	change_req.subj		0 days	●
itsm_incident_management	Incident Management	1	incident.subj		3 days	●
itsm_problem_management	Problem Management	1	problem.subj		0 days	●
itsm_release_management	Release Management	1	release.subj		0 days	●

Number of entries: 4 | 0 selected

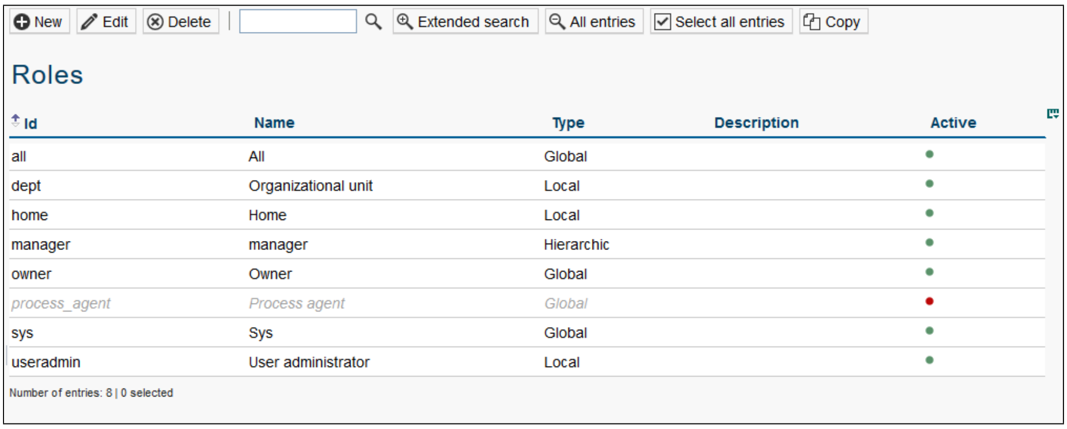
Figure 2.1: **System administration**

The interface is split up in the following parts:

- **Information:** The top frame contains information about the logged in user and actual running server. Four functions are always visible on the right end of the information bar:
  - **Help:** Opens a help page in a new window depending on the selected context (area). By selecting the same area and hitting the key F1 the same help page is opened.
  - **Dashboard:** Shows your dashboard in the working area.
  - **Worklist:** Switch to the worklist component of @**enterprise**.
  - **Logout:** Logout from @**enterprise**.
  - **Note:** If this symbol appears, a modification at the @**enterprise**-system was made. By clicking the symbol you will get nearer information, if you have to restart the server or have to refresh the cache-structures.
  - **Toolbar:** Directly positioned under the information frame is the toolbar which contains different functions for manipulating the informations displayed in the working-area.
- **Navigation:** The navigation frame on the left contains the following elements:
  - **Organization:** Contains links for administration of the application-independent information: *Users*, *Organizational units*, *Organizational classes*, *Organization hierarchies* and *Permission lists*.
  - **Applications:** This area contains subtrees for every application. For each application a link to its *Processes*, *Forms*, *Tasks*, *Functions*, *Roles*, *Rights*, *Object classes*, *Function groups*, *GUI configurations*, *Resources*, *Value lists*, *Timers*, *Mailboxes*, *Reports*, *Web service clients*, *Web service servers*, *Message templates* and *Test cases* is shown. This area also contains a link to the overview of all applications, called *Application list*.
  - **Search:** This folder contains links to the various search functions (*Process search*, *Document search*, *Report designer* and *Reports*).
  - **Admin tasks:** Shows a list of administration tasks, for example for restarting the server, exporting data, etc.
  - **Configuration:** All functions for configuring your installation are placed here.
- **Working area:** The working area is the main part of the interface. It contains different masks and tables for manipulating the master data, configuration etc. After opening the administration your dashboard is displayed here. You can change the content of the working area by activating a link of the navigation area.

2.1 Tables

Master data are displayed in tables initially. The table contains the different objects in its rows and the columns show different information of the respective object.
Detailed information and additional functions for the object are displayed in an own window (see chapter 2.2). You can open this window by double-clicking a row in the table or



Roles

Id	Name	Type	Description	Active
all	All	Global		●
dept	Organizational unit	Local		●
home	Home	Local		●
manager	manager	Hierarchic		●
owner	Owner	Global		●
process_agent	*Process agent*	*Global*		●
sys	Sys	Global		●
useradmin	User administrator	Local		●

Number of entries: 8 | 0 selected

Figure 2.2: **Example for table display (Roles)**

selecting the row first and activating the toolbar-function *edit* secondly.

Before the table is shown, the system checks the length of the table. If it exceeds the defined limit, the system asks the user whether he will view the full table. The limit can be configured in the system configuration (parameter group Localization).

Following formats are used to display the table rows:

- **Last changed:** The row which is changed at last is colored.
- **Inactive entries:** Inactive objects are displayed with grey and *italic* letters. Additionally forms, where the form class can not be loaded are marked as inactive entries, too.
- **Selected entries:** Actually selected entries are colored.

2.1.1 Column picker, sorting and filter

You can change the number of displayed columns by using the column picker. The column picker is placed rightmost of the table header. Activate the functions and a popup-window containing the names of all actually visible and possible columns opens.

Already visible columns are displayed with a small checkmark. To add a new column to the table, activate a column name (without the checkmark). The table refreshes and the selected column is displayed. To remove a column from the table, activate a column name (with the checkmark). The table refreshes without the removed column.

You can change the sorting column and sorting direction by activating a column header. Which column and direction is actually used for sorting is marked by a small arrow left of the column name.

The link *Filter* helps you to keep an overview if your table contains a lot of entries. The filter can be seen as selection criteria to mask certain entries in your table.

By clicking on the corresponding column header of your table a context sensitive filter menu with the following entries is shown:

- Order ascending: The entries of the table are ordered in ascending order by the current column.
- Order descending: The entries of the table are ordered in descending order by the current column.
- All entries: The use of the column filter of the current column gets nullified.
- User defined: By selecting this menu item a HTML–page is shown where you can enter a certain value. If you confirm your entries in this page by clicking the button ”Ok” the table is filtered by the corresponding value.
- All column entries are shown; if you select one or more of these entries the column gets sorted by your selection.

If you want to save the current combination of filters you have to click the link ”Filter” in the heading of the table. The filter menu is shown:

- Save filter: By selecting this menu item you save the current combination of column filters under a name defined by you. You can also enter a description for the filter.
- Edit filter: By selecting this menu item you can edit or delete all filters. There is no undo function for deleting a filter!
- A list of all saved filters. If you select one of these entries the table is filtered by this filter. The list can also contain filter which have been defined by another users.
- All entries: The use of the saved filter is nullified.

When a filter is selected only those entries of the table are displayed which match all the criteria specified by the filter.

2.1.2 Standard functions

Following functions are displayed for manipulating most of the tables in the administration:

- ⊕ **New:** opens object-details for creating a new object.
- ✎ **Edit:** opens object-details for updating, deleting, viewing the history etc. the information. Depending on the class of the object further functions may be available on this page.
- ⊗ **Delete:** deletes selected objects.
- 👁 **View:** opens object-details in read-only-mode, excepting forms and processes

- **Search:** If you insert a search string and click to "Search" button the result list will contain all objects matching the search string. Normally, the string is matched against the id and name of the objects, the text left of the input field names the search attributes.
- **Extended search:** With the button "Extended search" you can search in all attributes of the object.
- **All entries:** views the complete list of objects of the class.
- **Select all entries:** mark all entries as selected by activation this function.
- **Refresh:** Refresh the content of the working area.
- **Copy:** This function allows to copy the selected object incl. its settings (made in the tabs), e.g. the selected ACL with its entered rights is copied.

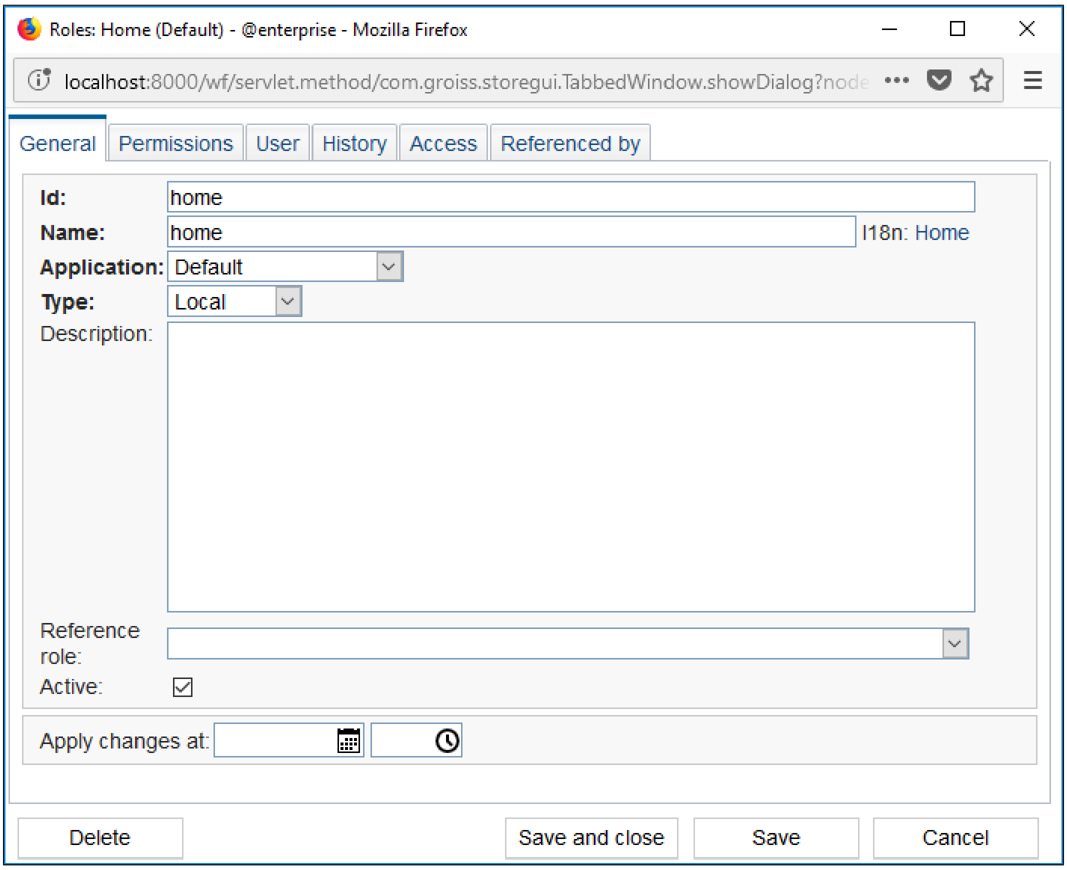
2.2 *Object details*

The detail view of an object can be opened by double-clicking the entry in the table, or selecting the table row and activating the *edit*-function in the toolbar. The object-details are buildup as tabbed pane. Each tab has its information and function to the actual object (see Fig. 2.3).
The main functions of the object details are:

- **Save and close:** Activating this button saves the changes in the database and closes the window. The table refreshes. In most cases this button is colored green after changing anything on mask; the color indicates that this is the default action.
- **Save:** Activating this button saves the changes in the database and refreshes the table. You can activate this button only if the actual tab contains a mask where you can edit the information directly.
- **Cancel** or **Close:** Close the window and in case of *Cancel* discard the changes. The button *Close* is available only, if there is no actual save action in the current tab in tabbed window.
- **Delete:** Delete this object from the database.

2.2.1 Tab: General

In general the tab *General* is the first tab of the object-details. Here you can view or edit the general settings of the actual object. After changing the attributes save them through activating the button *Save and close*, *Save* or changing the tab. In this tab the button **Delete** is active, too. This function is the same as the function *Delete* in the toolbar outside.



Roles: Home (Default) - @enterprise - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node

Id: home

Name: home I18n: Home

Application: Default

Type: Local

Description:

Reference role:

Active: ☑

Apply changes at:

Figure 2.3: **Object details: Example**

Apply changes later

Some objects can be changed so that the changes become effective at a future date. The field "Apply changes at" on the detail mask provides this functionality.

Insert in the field **Apply changes at** the date (and time) the changes should get effective. After activating the button *Save and close*, *Save* or changing the tab the deferred changes are saved.

If you view the detail mask of an object with such pending changes, you will see the date when the changes get effective in the field *Object changes at*. Activating the icon beside this field opens the detail-view of the changes. Here you can discard the changes by activating the button **Discard changes**.

Activating / Deactivating objects

Some objects have the attribute "active" indicating whether the object is currently usable or not. In the detail mask of these objects you can manipulate this attribute with a checkbox. If the checkbox is not checked, the object is inactive. This means for:

- Users: the user cannot log in and cannot receive a worklist entry.
- Processes: the process cannot be started (except via the API).
- Roles, role assignments: the role cannot receive a worklist entry.

In the table of objects, the inactive items have a grey background and *italic* letters.

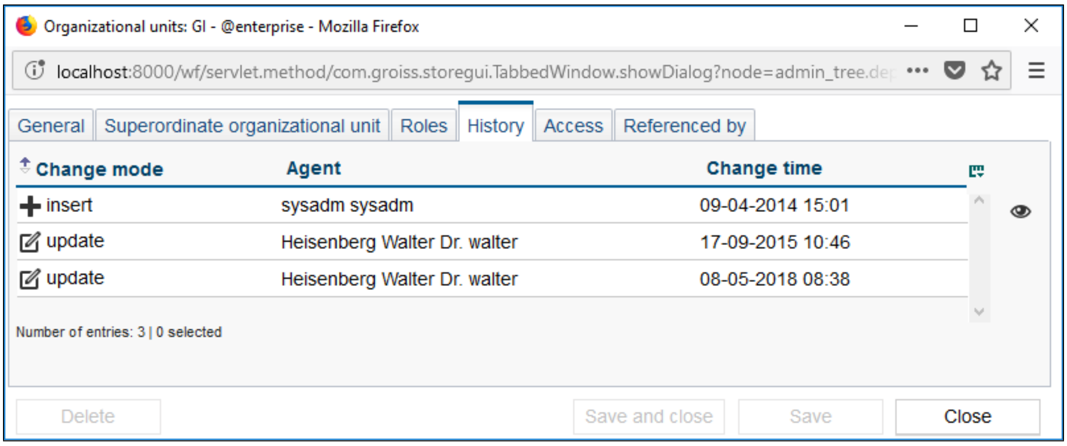
Internationalization

The name of application-dependent objects can be translated into the available languages.

The name translated into the actually used language is displayed beside the field *Name* as link. After activating this link the internationalization for all available languages is displayed. Clicking the button *Close* closes the window. How you can change the internationalization is described in chapter 3.

2.2.2 Tab: History

This tab shows the history of changes on this object (see Fig. 2.4). You can even view the older versions of the object by activating the function *view* in the toolbar. The detail view allows a comparison with previous made changes. This functionality is the same as e.g. at the process history tab (see *User manual*, section *Functions of the process history*).


Organizational units: GI - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_tree.de
General
Superordinate organizational unit
Roles
History
Access
Referenced by
Delete
Save and close
Save
Close

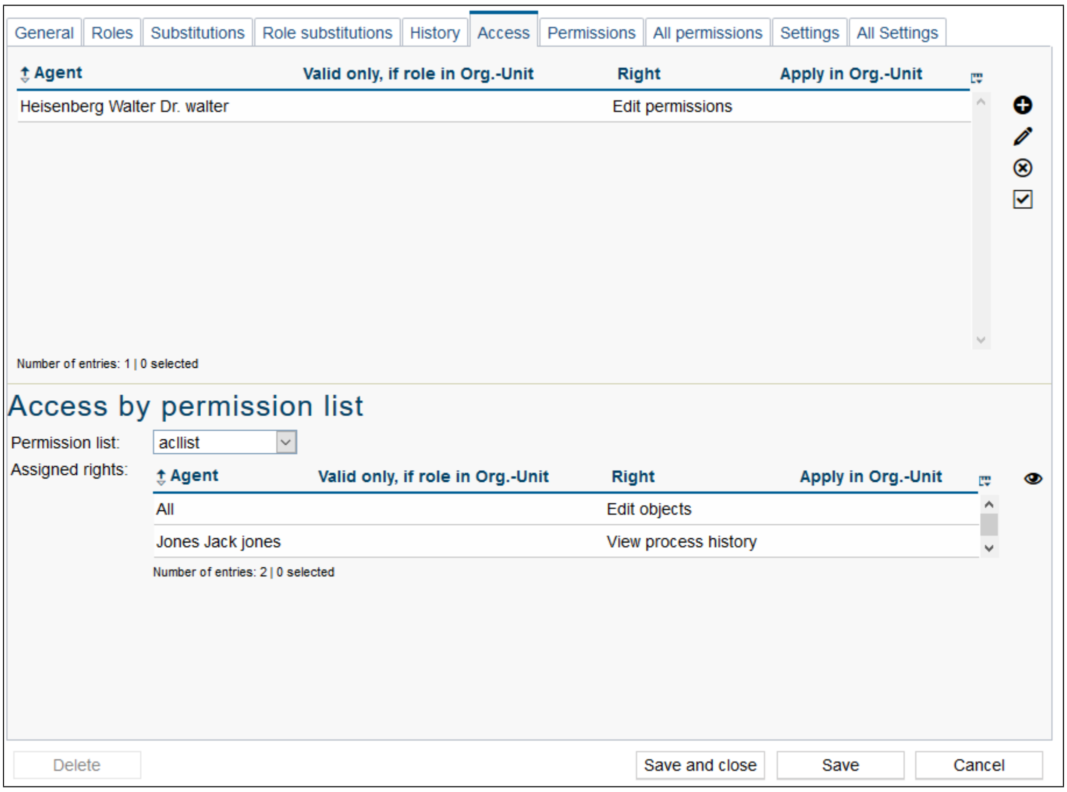
Change mode	Agent	Change time
insert	sysadm sysadm	09-04-2014 15:01
update	Heisenberg Walter Dr. walter	17-09-2015 10:46
update	Heisenberg Walter Dr. walter	08-05-2018 08:38

Number of entries: 3 | 0 selected

Figure 2.4: **Tab: History**

2.2.3 Tab: Access

This tab shows you who has which access to the object directly or indirectly via permission lists (see Fig. 2.5). You can edit the access rights to this object here, see chapter 5.



Agent	Valid only, if role in Org.-Unit	Right	Apply in Org.-Unit
Heisenberg Walter Dr. walter		Edit permissions	

Number of entries: 1 | 0 selected

Access by permission list

Permission list: acllist

Assigned rights:

Agent	Valid only, if role in Org.-Unit	Right	Apply in Org.-Unit
All		Edit objects	
Jones Jack jones		View process history	

Number of entries: 2 | 0 selected

Figure 2.5: **Tab: Access**

2.2.4 Tab: Referenced by

If you select the tab **Referenced by**, an overview about all objects will be shown, which reference on the current object (see Fig. 2.6). The objects are displayed in a hierarchical structure. The symbols will be described as follows:

⊞

- *Plus sign:* this object has one or more sub-objects, which are not shown yet. If you click on the plus-sign, the sub-objects will be shown. Furthermore the plus will be converted into a minus.

⊟

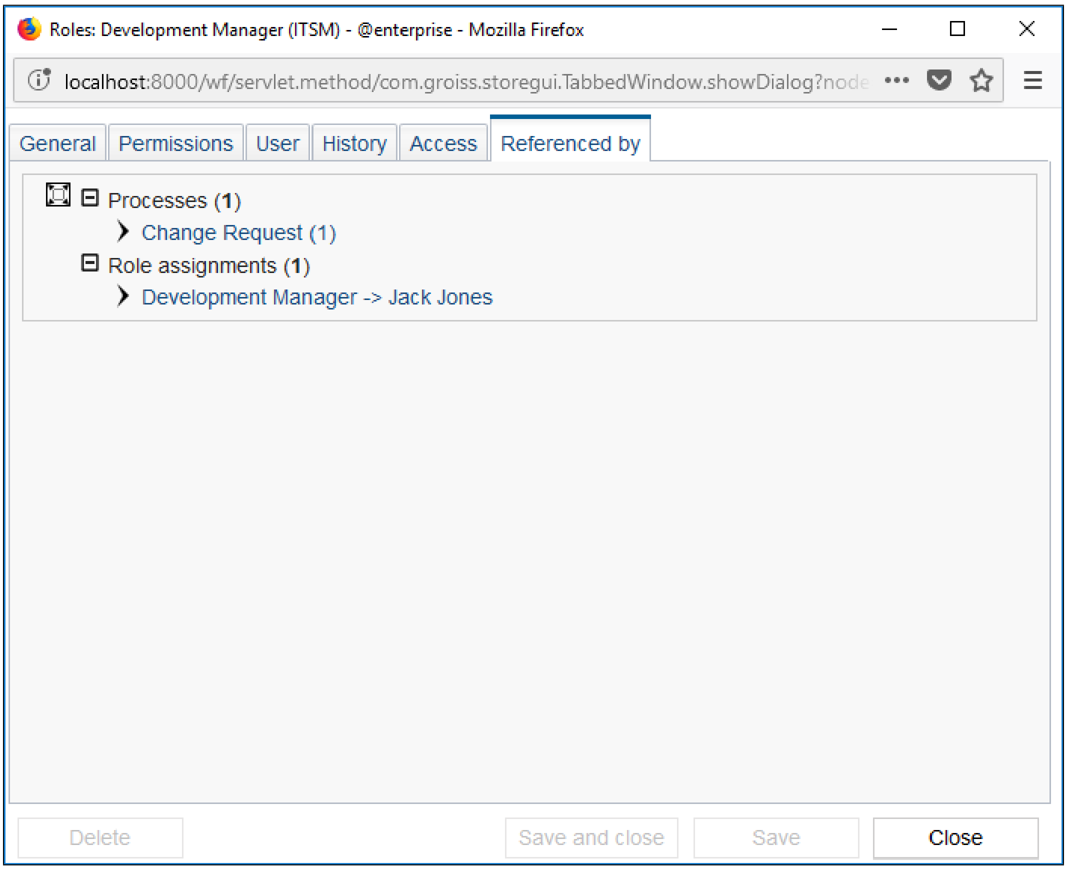
- *Minus sign:* this sign shows, that a hierarchy is already expanded. If you click on the minus-sign, all objects of this hierarchy will be hidden. Furthermore the minus will be converted into a plus.

⛶

- *Expand all:* by this sign the whole objects can be expanded or the sub-objects can be collapsed.

›

- *Arrow:* shows, that a detail view of the object exists.



Roles: Development Manager (ITSM) - @enterprise - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node

⊟ Processes (1)
  › Change Request (1)
⊟ Role assignments (1)
  › Development Manager -> Jack Jones

Figure 2.6: **Tab: Referenced by (Roles)**

2.2.5 Further functions

Some functions are used in the masks again and again. The following chapters describes this functions.

- 🔍 **Select:** Activating this function opens a new window where you can select a object. The selected value is inserted in the field beside this function. For example: selecting a user, an organizational unit.

- ✖ **Remove:** Activating this function removes the value of the field beside. This function is always combined with the *Select*-function.

  ▾ Since **@enterprise** version 8.0 DOJO drop-down lists are integrated. By activating this symbol, the content of the list is displayed, where you can select the needed object or search for it. In case of a multiplicity of entries, the parameter *Items per page* under *Configuration/Localization* is used to display entries in a paged way.

- 📅 **Calendar:** After activating this function a calendar is displayed. The calendar helps you selecting a date. Detailed information can be found in the user manual in section *Calendar and time selection*.

- **Time selection:** In time fields this function is provided which supports you by selecting an appropriate time (optionally time must be entered manually). Detailed information can be found in the user manual in section *Calendar and time selection*.
- **Class path checker:** With the Classpath-Checker you can check URLs. The existing class and also the existing method and the correct method-signature will be checked. In special cases will be checked, if the class implements the required interface (e.g. Logger Class must implement the interface com.groiss.log.ILogger). If the URL can be found in the classpath, the symbol of the Classpath-Checker changes its color to green. In any other case the color of the Classpath-Checker is red.

3 Ids, names and internationalization

3.1 Ids and names

In **@enterprise** all master data objects are identified internally with an unique identifier (*id*). The *name* is normally used in the user interface. According to the object class the following attributes are used as identifiers:

- id
- name
- both the id and the name
- a combination of id and version
- a combination of name and version

The object classes and their corresponding identifiers are listed in table 3.1.

Within **@enterprise** the id of an object is unique and furthermore the id is also unique for all applications of **@enterprise**. Therefore it is not possible to create an object of the same class in different applications with the same ids (e.g. user *A* in application *X* and user *A* in application *Y*).

Another peculiarity of **@enterprise** is, that the user and roles are sharing their scope, i.e. it is not possible that within one **@enterprise**–server there are a user and a role which ids are identical or where the name of the user corresponds to the id of the role or vice versa.

For a syntactically correct *id* the following rules apply:

- Ids start with a letter or $. Then, characters, numerics and signs _ / \ $ are allowed.
- The complete length of an id must not exceed 80 characters.
- User-Ids can also contain special characters (e.g. email-addresses), but whitespaces, exclamation marks and commas are not allowed.
- In a WDL definition the agent-id must start with an exclamation mark, if the id is no "simple" id.
  Example:

Object class	***Identifier***
User	Id
Organizational unit	Id
Function	Id
Access list	Name
Object class	Name
Function group	Id
Role	Id, Name
Right	Id, Name
Organizational class	Id, Name
Organizational hierarchy	Id, Name
Application	Id, Name
Server	Id, Name
Task	Id+Version
Process	Id+Version AND Name+Version
Form	Id+Version AND Name+Version

Table 3.1: **Object classes and their identifiers**

```
!right.user@xy.com do_something(f);
```

3.2 Internationalization of meta data objects and object classes

In **@enterprise** it is possible to internationalize object classes and all meta data where it makes sense. Meta data which can be internationalized are:

- Applications
- Tasks
- Functions
- Roles
- Rights

In implementing a corresponding *java.lang.ResourceBundle* and putting it into the corresponding application directory, it is possible to internationalize your own applications. For further details on this topic read the programming handbook of **@enterprise**. There you find also informations on how to internationalize the meta data of the default application.

4 Definition of the organizational structure

4.1 Roles

Roles define groups of participants exhibiting a specific set of attributes, qualifications and/or skills. Examples are *Supervisor* or *Insurance Underwriter*. To assign a role to a user you must first define the role, then assign it to one or more users (see the next section).

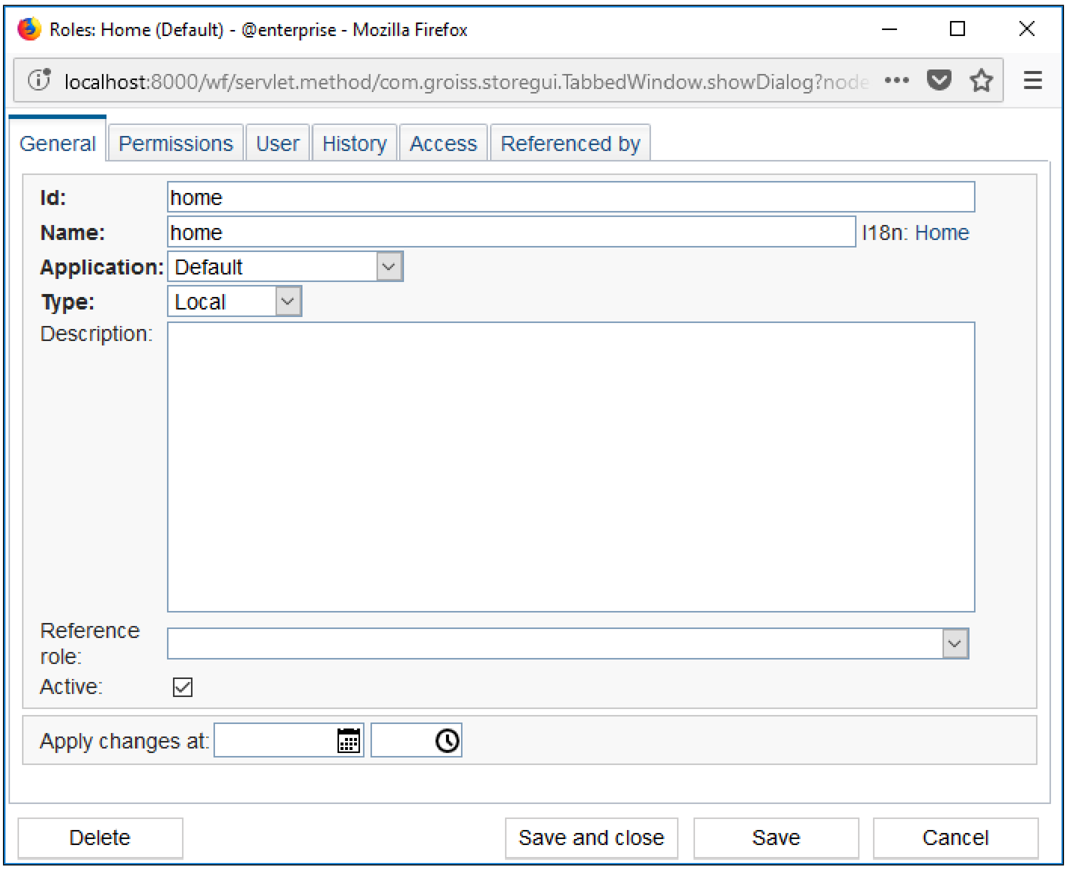
The object-details of roles contain the following tabs:

- General
- Permissions
- User
- History
- Access
- Referenced by

4.1.1 Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the role.
- **Name:** Name of the role. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Application:** Application, the role belongs to.
- **Type:** **@enterprise**distinguishes three role types:
  - **Local:** A local role is assigned to a user in one organizational unit.
  - **Global:** A global role is independent of organizational units.


Roles: Home (Default) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node
General
Permissions
User
History
Access
Referenced by
Delete
Save and close
Save
Cancel

Id: home

Name: home I18n: Home

Application: Default

Type: Local

Description:

Reference role:

Active: ☑

Apply changes at:

Figure 4.1: **Object details: Roles**

   - **Hierarchic:** A hierarchic role is assigned to a user in an organizational unit, but it is valid also for all sub-OUs, (the organizational units which are below in the organizational hierarchy).

- Description: Free text.
- Reference role: Reference roles are used for defining different roles with different rights but one "reference" role used in process definitions.

  1. Example: Assume we have defined the role *assi* for assistant and use this role in process definitions. the roles *asi_no_rights* oder *assi_many_rights* are assigned to persons with no or with many extra rights, respectively. Both roles have *assi* as reference roles, so that an activity assigned to the role *assi* is also assigned to the persons with the other to assi* rights.

  2. Example: Our company has assistants and a department manger. The first agent of process definition P is the role *dm_assi*. This role is a reference role of roles *dm* and *assi*. The users have the roles *dm* or *assi*, but assistants and department managers are able to start process P and have the same rights in first process step.

Note, that it is not possible to define reference roles for reference roles.

- Active: see chapter 2.2.1.

4.1.2 Tab: Permissions

In this tab you can add and edit the permissions assigned to the role. Users who are assigned to the role have the permissions assigned to the role. Use the toolbar functions for manipulating the permissions.

4.1.3 Tab: User

This tab shows you which users are already assigned to the role. You can open the details of this relationship, edit it or create a new one.

4.1.4 System-defined roles

In **@enterprise**following system-defined roles exist:

- **all**: A useful role you can assign to all users. If you define then rights for this role, everybody has this right. Processes with *all* as agent of the first task, can be started by all workflow participants (or more exactly: by everybody, who has the role *all* assigned).

- **sys**: This role is used for system administration, it allows you to perform all system administration activities.

- **home**: The home-role connects a user to a "home" organizational unit. A user can have at most one home OU.

- **dept**: The role dept is used as "Inbox" of an organizational unit. If you want to send a process instance to a OU without knowing the specific user, you can send it to the role *dept*. Note, that you must assign this role to a user, before you can use it as agent of a task.

- **useradmin:** The local role "useradmin" can be used for the restricted administration of **@enterprise**. More information can be found in section 13.

4.2 Rights

Rights are used to restrict some operations to selected users. The assignment of rights to users is directly or using roles. See chapter 5 for a detailed descriptions of the **@enterprise** permission system.

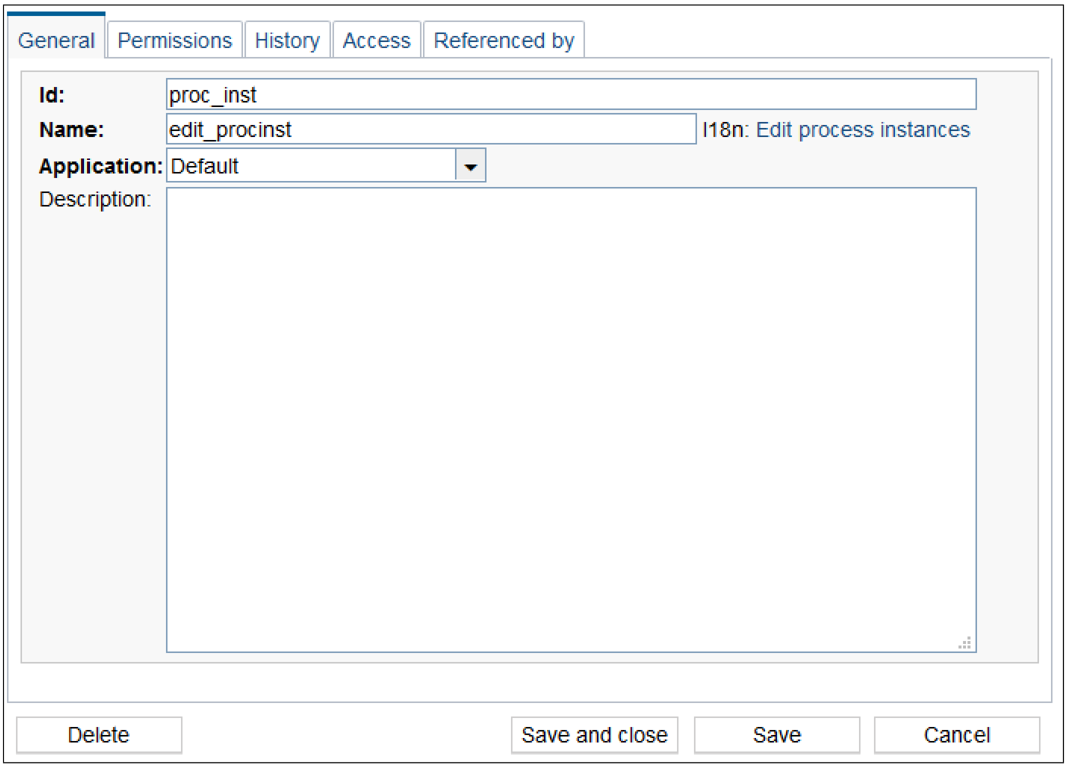
The object-details of rights contain the following tabs:

- General

- Permissions

- History
- Access
- Referenced by

4.2.1 Tab: General



Id: proc_inst

Name: edit_procinst I18n: Edit process instances

Application: Default

Description:

Figure 4.2: **Object details: Rights**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the right.
- **Name:** Name of the right. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Application:** Application, the right belongs to.
- Description: Free text.

4.2.2 Tab: Permissions

In this tab you can see a list of users and roles which have the current right. If the right is limited to a certain object, this object is displayed in the column *Target Object*.

4.2.3 System-defined rights

In @**enterprise**the following system-defined rights exist:

- **Abort step (abort_step):** Abort a step in a process-instance.
- **Administer OU reference folders (admin_dept_reffolder):** A user with this permission can:
  - create the root reference folder for that OU
  - create other reference folders for that OU
  - edit folders of that OU
  - delete folders of that OU
  - add/remove content to/from folders of that OU
  - add/remove subfolders to/from folders of that OU
  - edit the permissions of folders that OU
- **Administration (admin):** Right to access the system administration.
- **Create objects (create):** Create an object.
- **Delete objects (delete):** Delete an object.
- **Edit calendar appointments (editCal):** Used to edit calendar entries.
- **Edit configuration (conf):** Right to configure the system.
- **Edit objects (edit):** Edit an object.
- **Edit permissions (edit-acl):** Edit the rights somebody has for an object.
- **Edit plan (edit_plan):** Edit a process plan.
- **Edit process instances (proc_inst):** Necessary to cancel process instances or to edit the agent of process instances. Additionally, it grants all the permissions defined by the right *View process instances*. The right is resolved in the context of the organizational unit of the process instance. If someone has this right for an OU, he may cancel all process instances that have been started in this OU.
- **Enter substitute (grant_subst):** Allows the definition of personal and role substitutions.
- **Execute objects (execute):** Execute the object (for example a function object).
- **Grant folder share for OU (grant_share_dept):** Grant permissions to a reference folder if the agent is a local or hierarchical role.
- **Grant folder share for user (grant_share_user):** Grant permissions to a reference folder if the agent is a user.
- **Grant folder share system (grant_share_system):** Grant permissions to a reference folder if the agent is a global role.

- **Insert calendar appointments (insertCal):** Used to create calendar entries.
- **Named user (named_user):** To qualify a user as *Named User* in order to allow log in regardless of the number of currently logged-in users.
- **Reassign (set_agent):** Necessary to edit the agent of process instances. Additionally it grants all the permissions defined by right *View process instances*.
- **Search (find):** The right to find a reference folder.
- **Searchable (searchable):** Search in forms and list stored reports.
- **Share (share):** Right to allow other users to use its objects (e.g. worklist filter).
- **Share filter (share_filter):** Right to share filters with other users
- **Statistics (stat):** Create reports with report designer.
- **View calendar appointments (viewCal):** Right to see calendar entries of other users.
- **View configuration (view_conf):** View configuration.
- **View objects (view):** View an object.
- **View process history (view_history):** View process history only.
- **View process instances (view_procinst):** View process history, list of documents and notes and all process forms and versions.

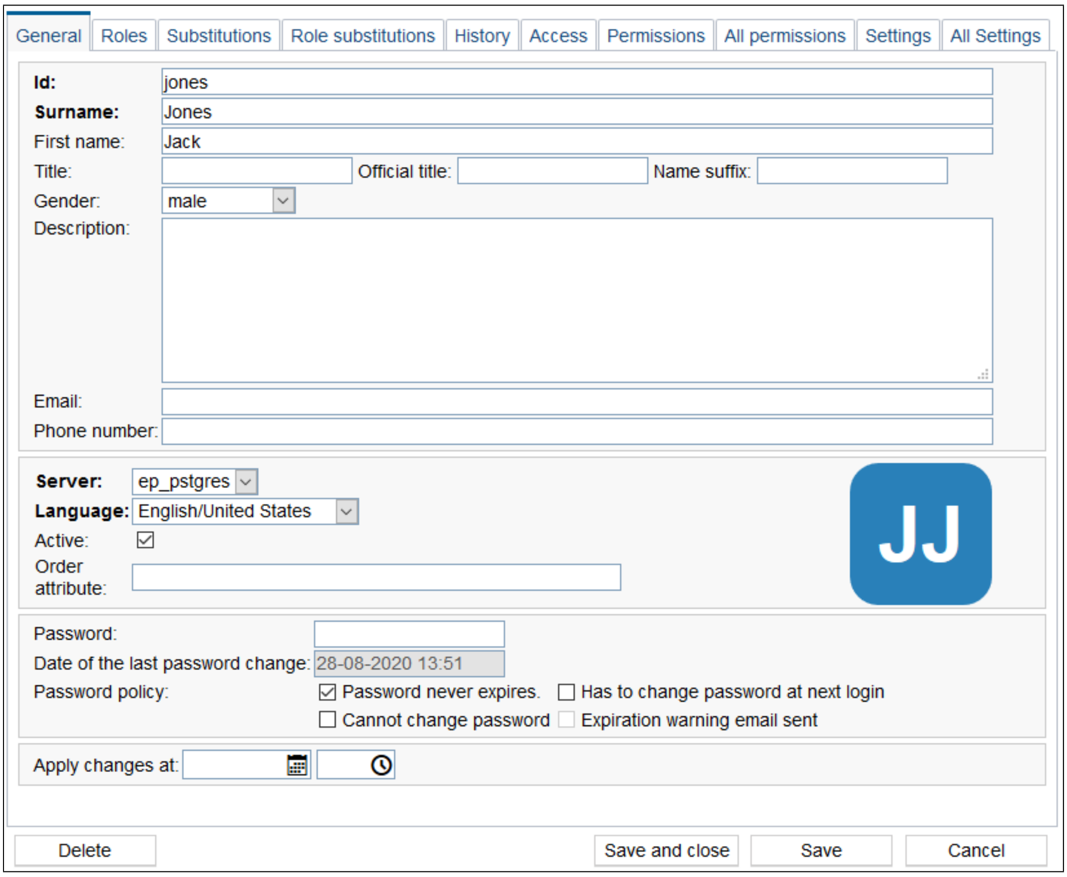
4.3 Users

All persons, which work with **@enterprise**, must be registered as "users". At the extended search the number of shown users in the user list can be influenced by different search-attributes. For example a search-attribute is the Organizational Unit, only these users will be listed, who have a role in this OU.

The object-details of roles contain the following tabs:

- General
- Roles
- Substitutions
- Role substitutions
- History
- Access
- Permissions
- All permissions
- Settings

4.3.1 Tab: General



Id: jones
Surname: Jones
First name: Jack
Title: Official title: Name suffix:
Gender: male
Description:
Email:
Phone number:

Server: ep_pstgres
Language: English/United States
Active: ☑
Order attribute:

Password:
Date of the last password change: 28-08-2020 13:51
Password policy: ☑ Password never expires. □ Has to change password at next login
□ Cannot change password □ Expiration warning email sent

Apply changes at:

Figure 4.3: **Object details: Users**

You can edit the following attributes (required fields are bold):

- **Id:** unique identifier of the user. More information about IDs and names can be found in chapter 3.1.
- **Surname:** Surname of the user.
- First name: First name of the user.
- Title: Some (academic) title
- Salutation: Some salutation, e.g. principal.
- Name suffix: Free text which is set after the name, e.g. Sen
- Gender: Selection between male, female and other.
- Description: Free text.
- Email: Email address of the user.

- Phone number: Phone number of the user (or some other text, we don't use this field).
- **Server:** The **@enterprise**server, where the worklist is accessible.
- **Language:** Select the language for the user interface.
- Active: see chapter 2.2.1.
- Order attribute: free text, can be used for sorting.
- Profile picture: Upload a profile picture for this user which is displayed in user profile (smartclient). By default, a placeholder for the profile picture with the user's initials is displayed here.
- Password: Password for login.
- Date of the last password change: Date, when the password was changed.
- Password-Policy:
  1. Password never expires: The password of this user never expires.
  2. Has to change password at next login: The user has to change his password at the next login.
  3. Cannot change password: The user should not able to change his password.
  4. Expiration warning email sent: Indicates, if an expiration warning email has been sent by timer *PasswordExpiration* to the users email address. The checkbox is reset automatically, if password has been changed.
- Apply changes at: see section 2.2.1.

4.3.2 Tab: Roles

In the role assignment mask you can specify the following attributes:

- User: The user you want to give a role.
- Role: The role you want to give to the user.
- Organizational unit: the organizational unit where the role should be assigned. Note, that this should be left blank for global roles but is mandatory for local and hierarchic roles.
- Active: see chapter 2.2.1.

Define a substitute of a role of a user

To make substitutions more fine-grained, it is possible to define one or more substitutes for each role-assignment. Use the following steps to define such a substitution:
Activate the tab *Substitutions* of the role-assignment to add role substitutes.

Hint: The timer *CurrentSubstitutes* activates/deactivates the substitution, if a from- and/or to-date has been entered (see section 9.1.8).

4.3.3 Tab: Substitutions

For each user you can define several substitutes, each of them with an optional substitution interval.
In this tab you can define the personal substitutes. A popup window for the administration of the substitutes will be opened.

Hint: The timer *CurrentSubstitutes* activates/deactivates the substitution, if a from- and/or to-date has been entered (see section 9.1.8).

4.3.4 Tab: Role substitutions

The tab *Role substitutions* provides information about role substitutions which concern you.

This HTML–page is divided into two sections:

1. The first section, called *Users who substitute my roles*, lists all users, who substitute you in a certain role. If you are substituted in a certain role and a task is forwarded to this role, then this task also appears in the role–worklist of your substitute.
2. The second section, called *Users whose roles I'm substituting*, lists all roles you got due to a substitution. Tasks that are assigned to these roles will appear in your role–worklist.

The table *Users who substitute my roles* contains the following information:

- **Active:** Indicates, if a role is active (= green point) or inactive (= red point).
- **Role:** Name of the role your substitute have got due to his substitution.
- **Organizational unit:** Name of the organizational unit in which your substitute have got the corresponding role.
- **User:** Here you find the name of the user who substitutes you in a certain role.
- **From:** This column shows the point in time when your substitute start having the role substitution for you.
- **Until:** This column shows the point in time until when your substitute stops having the role substitution for you.

The table *Users whose roles I'm substituting* contains the following information:

- **Active:** Indicates, if a role is active (= green point) or inactive (= red point).
- **Role:** Name of the role you have got due to a substitution.
- **Organizational unit:** Name of the organizational unit in which you have got the corresponding role.
- **User:** Here you find the user whose role substitution you have got.

- **From:** This column shows the point in time when you start having the role substitution for this user.
- **Until:** This column shows the point in time until when you have the role substitution for this user.

4.3.5 Tab: Permissions

You can assign rights to users either directly or via roles. See chapter 5 for an introduction to the **@enterprise**permission system.
Edit the personal rights of a user in this tab. A HTML–page is shown which enables you to update the actual right.

4.3.6 Tab: All permission

The overview shows all rights, either assigned directly to the user or via a role assignment. Furthermore this tab contains a view of rights (of the user) at a specified time stamp.

4.3.7 Tab: Settings

With the help of this function the system administrator is able to update the settings of the current user. The mentioned settings are described in the user manual of **@enterprise**. Some settings are only available in the administration:

- Items per page: This parameter is used in old GUI only! If there are a lot of items in your worklist it may be hard to keep track of. Therefore it is possible to reduce the number of currently displayed items. If you enter a number into the field *Items per page* only as many items as you specified are displayed at the same time. If your worklist contains more than those items you can browse through the list by activating the buttons |< < *1 2 3* > >|. In this example there are three pages containing your worklist items. By clicking the link *1* you can see the first page of your worklist, by clicking the link *2* you can see the second page, etc. So it is possible to navigate through the pages of your worklist in the following way:
  - **<:** Go to the previous page.
  - **>:** Go to the next page.
  - **|<:** Go to the first page.
  - **>|:** Go to the last page.
  - **1:** Go to page number one.
  - **2:** Go to page number two.
  - **...**
- Home page: The content of the URL entered into this field will be displayed on startup of the **@enterprise**–server.

Hint: The timezone setting is used for your date inputs and outputs. If no time zone is selected, the time zone of the client is taken (= time zone of operating system).

4.3.8 Tab: All Settings

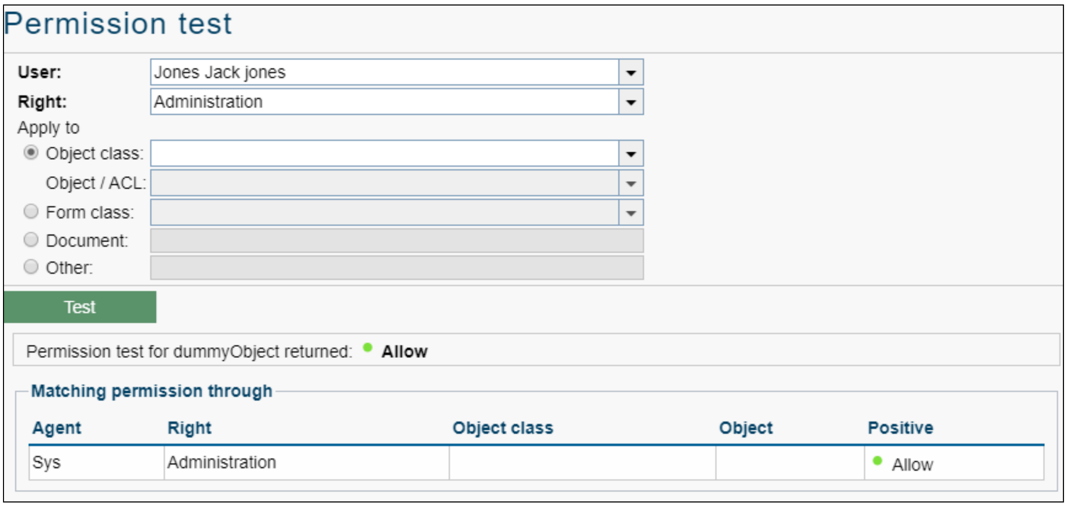
With the help of this function the system administrator is able to see and delete all settings of current user.

4.3.9 Toolbar function *GUI configurations*

This function allows to display all assigned GUI configurations to this user. The assignments are done in same named tab at a gui configuration object (see section 6.7.3). These assigned GUI configurations are offered for selection in user interface (but not in admin interface!) between help and logout function.

4.3.10 Permission test

With the help of this function you are able to detect if a certain permission has been assigned to a certain user. The informations of the corresponding HTML–page are described in detail in chapter 5. By clicking the button "Test" the system checks wheter the user has the permission or not and the result is displayed.



Permission test

User:	Jones Jack jones
Right:	Administration
Apply to	
● Object class:	
Object / ACL:	
○ Form class:	
○ Document:	
○ Other:	

Permission test for dummyObject returned: ● **Allow**

Matching permission through

Agent	Right	Object class	Object	Positive
Sys	Administration			● Allow

Figure 4.4: **Permission test**

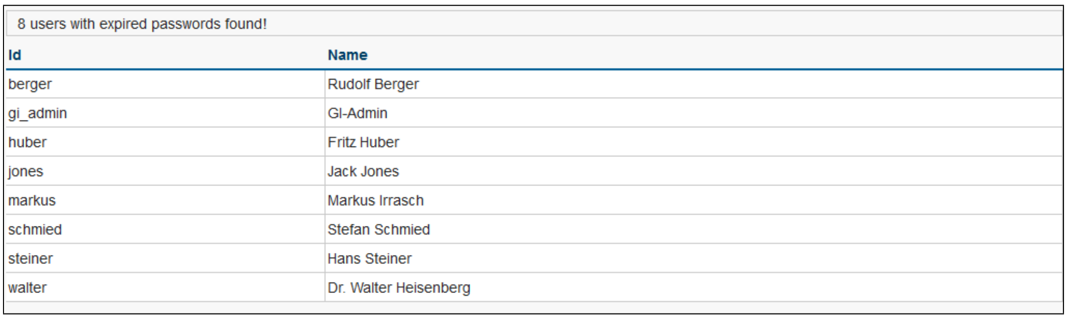
4.3.11 Expired passwords

If the password policy defines, when passwords are expired, the administrator can check, which users have expired passwords.

4.3.12 Data protection functions

This mask allows to perform following actions for the selected user:

- Display all occurrences where user is referenced by activating the button *References*. The result can be printed with toolbar function *Print view* and the print functionality of the Browser.



8 users with expired passwords found!

Id	Name
berger	Rudolf Berger
gi_admin	GI-Admin
huber	Fritz Huber
jones	Jack Jones
markus	Markus Irrasch
schmied	Stefan Schmied
steiner	Hans Steiner
walter	Dr. Walter Heisenberg

Figure 4.5: **Users with expired passwords**

- Make the selected user anonymous by activating the button *Anonymize user*, i.e.
  - its ID will be set to string "nn"+OID,
  - all its fields will be reset (surname, first name, telephone number, etc.),
  - the user will be set inactive,
  - its personally DMS folder will be set to the anonymized user-id and
  - all its history entries (log entries) will be deleted.

Hint: In case of using user information in project specific way (e.g. user data are stored in an own form field of a process form), the application developers are responsible to make the user information anonymous! For this purpose the interface com.groiss.wf.ApplicationAdapter provides the method public void onAnonymize(User u, String newId).

4.4 Organizational units

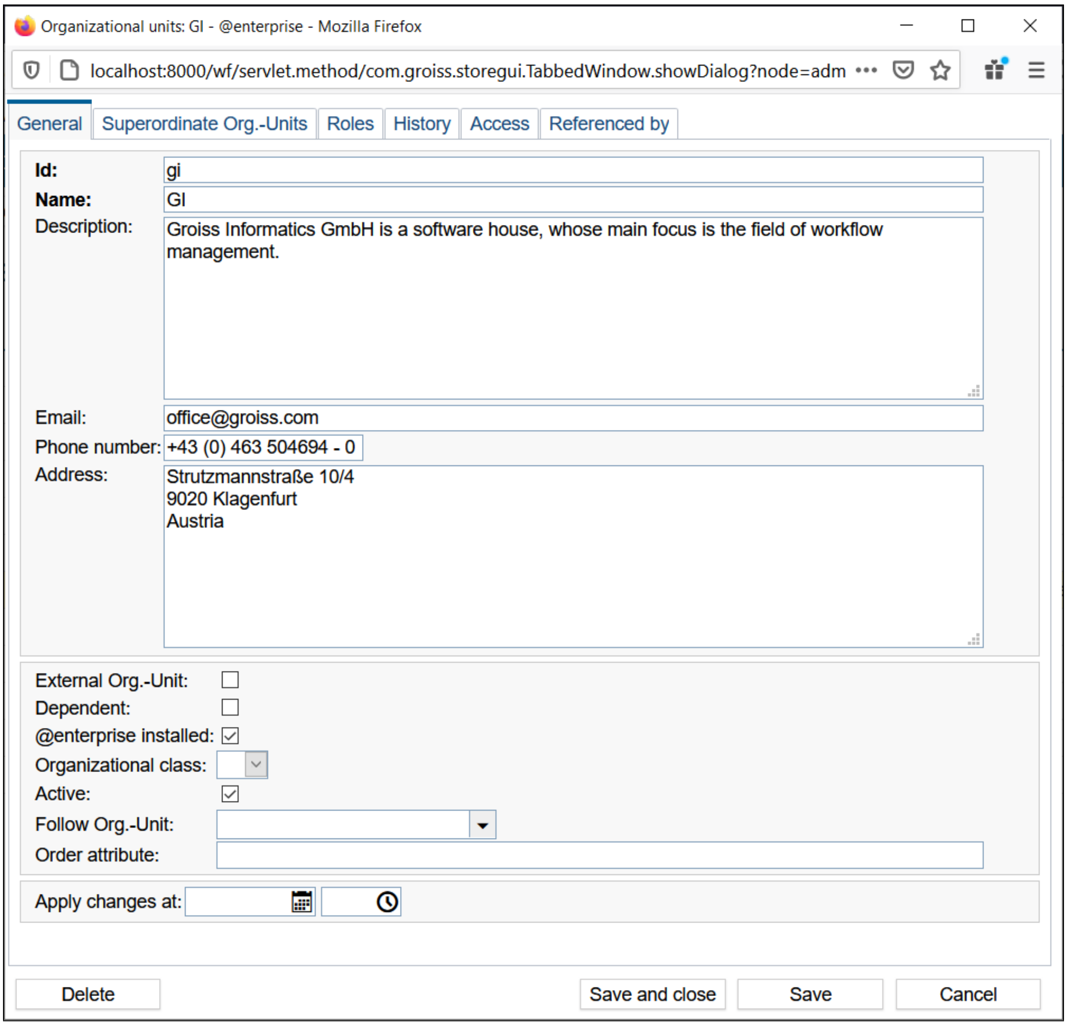
The structure of an organization can be modeled under the links *Organizational units* and *Organizational hierarchy*. The first allows the creation and administration of the units of your organization, the second is used to define the hierarchy between them.

Note, that it is possible to define more than one organizational hierarchy. Each application uses exactly one of these hierarchies, but one hierarchy can be used in several applications.

The object-details of organizational units contain the following tabs:

- General
- Superordinate Org.-Units
- Roles
- History
- Access
- Referenced by

4.4.1 Tab: General


Organizational units: GI - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=adm
General
Superordinate Org.-Units
Roles
History
Access
Referenced by
Delete
Save and close
Save
Cancel

Id: gi

Name: GI

Description: Groiss Informatics GmbH is a software house, whose main focus is the field of workflow management.

Email: office@groiss.com

Phone number: +43 (0) 463 504694 - 0

Address: Strutzmannstraße 10/4
9020 Klagenfurt
Austria

External Org.-Unit: □

Dependent: □

@enterprise installed: ☑

Organizational class:

Active: ☑

Follow Org.-Unit:

Order attribute:

Apply changes at:

Figure 4.6: **Objectdetails: Organizational Units**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the OU.
- **Name:** Name of the OU.
- Description: Free text.
- Email: Email address of the OU.
- Phone number: Phone number of the OU (or some other text, we don't use this field).
- Address: Address of the OU.

- External Org.-Unit: When checked, the OU is external which means that during processing a process no task can be assigned to this organizational unit or a role (user) of this OU.
- Dependent: This attribute is used in the permission system (see chapter 5) to restrict the OU scope of permissions and is used for marking organizational units which are part of an other organizational unit, but not subdivided (e.g. administrative department of an organization, etc.).
- @enterprise installed: Specifies whether the OU has **@enterprise** installed. External OUs and OUs where **@enterprise** is not installed can not be used in process instances.
- Organization Class: The organization class the OU belongs to.
- Active: see chapter 2.2.1.
- Follow Org.-Unit: It is possible that some organizational units are replaced by other organizational units due to some reorganization of your company. Through this field it is possible to adhere by which OU the current OU has been replaced during the reorganization.
- Order attribute: Here a free text can be entered. At the implementation of own application this text can be used for sorting organizational units independent of the available attributes.

Here you can also use the functions *Apply changes later* and *Activate*.

4.4.2 Tab: Superordinate Org.-Units

It is possible to add an organizational unit to several organizational hierarchies. Therefore a organizational unit can have more than one super (parent) OU, namely one per organizational hierarchic.

4.4.3 Tab: Roles

Here you can view the role assignments in the Organizational units. The table *Role assignments* shows which role is assigned to which user in the current OU.

The table *Roles inherited from superordinate organizational units* shows which hierarchical role was inherited by which user over which higher-level OU in the current OU. More detailed information on hierarchical roles and their scope can be found in chapter 4.1.

Note: If either the role assignment or one of the referenced objects (user, role, organizational unit) is inactive, the line is displayed in italics and gray.

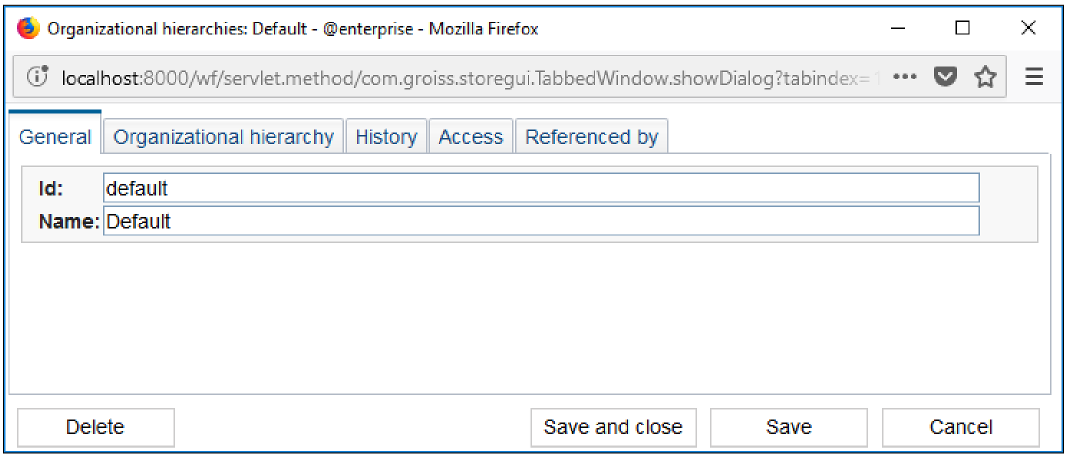
4.5 *Organization hierarchy*

After installation the system contains one hierarchy with name *default*. The *default* application uses this hierarchy.

The object-details of organization hierarchies contain the following tabs:

- General
- Organization hierarchy
- History
- Access
- Referenced by

4.5.1 Tab: General



Organizational hierarchies: Default - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?tabindex=
General
Organizational hierarchy
History
Access
Referenced by
Delete
Save and close
Save
Cancel

Id: default
Name: Default

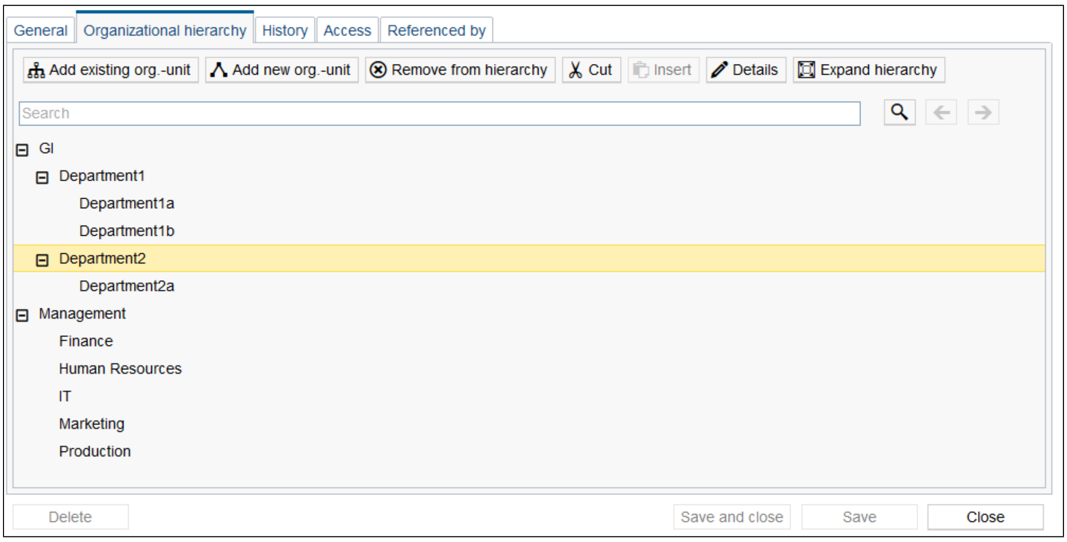
Figure 4.7: **Object details: Organizational Hierarchies**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the OU.
- **Name:** Name of the OU.

4.5.2 Tab: Organizational hierarchies

In this tab you can see the buildup of the hierarchy. Every organizational unit attached to the tree is displayed with its name.



- GI
  - Department1
    - Department1a
    - Department1b
  - Department2
    - Department2a
- Management
  - Finance
  - Human Resources
  - IT
  - Marketing
  - Production

Figure 4.8: **Tab: Organizational hierarchies**

Functions

All functions are located in a toolbar. Some functions are active by default, because no previous selection (action) is needed and some functions are inactive which need a previous selection (action).

- **Add existing org.-unit:** Select an OU and put it in the hierarchy. If another OU has been selected before in hierarchy, the new OU is added as child of this OU, otherwise the new OU is added on top level.
- **Add new org.-unit:** Create a new OU and put it in the hierarchy. If another OU has been selected before in hierarchy, the new OU is added as child of this OU, otherwise the new OU is added on top level.
- **Remove from hierarchy:** Remove the selected OU from the hierarchy.
- **Cut** and **Insert:** This functions allow to move an OU from one position to an other one. For this purpose
  - select a OU first in hierarchy,
  - activate toolbar function *Cut*,
  - select another OU in hierarchy where cutted OU should be inserted and
  - activate toolbar function *Paste*.

  Alternatively it is possible to use the drag & drop feature by selecting an OU and moving it to the desired position in hierarchy.
- **Details:** Edit the attributes of the selected OU.
- **Expand hierarchy:** Opens the whole hierarchy under this node.

If you have been searching for a certain OU with the help of the function **Search** in the toolbar, the first OU found in the hierarchy is selected. In addition there are the buttons *Previous* and *Next* which make it possible to navigate through the found OUs.

Hint: If an organizational hierarchy has been changed in the meantime (e.g. by moving an OU in hierarchy), the buttons *Previous* and *Next* become inactive and a new search must be performed.

The buildup of the hierarchy uses following symbols:

- *plus-sign:* If a plus is displayed in front of a organizational unit in the current hierarchy this means that it has at least one subordinate organizational unit. If you click onto the plus the organization hierarchy becomes expanded at this position and all subordinate OUs of the next level are displayed. Furthermore the plus is converted into a minus.
- *minus-sign:* If a hierarchy is already expanded you can collapse it by clicking on the minus in front of the corresponding hierarchy. By doing so the minus becomes converted into a plus.

4.5.3 Function *Merge organizational hierarchies*

With the toolbar function *Merge organizational hierarchies* it is possible to add an organizational hierarchy to an second one. This could be possible, if there are two @**enterprise** installations where the organizational hierarchies should be merged. In the first installation (A) the tree is managed and should be submitted to second installation (B) via XML export. Installation B contains also additional OUs with hierarchies which should be kept.
In installation B an own organizational hierarchy is created for the available OUs and relations. After synchronizing the organizational hierarchy with installation A (via XML import) the relations of installation B will be merged into the organizational hierarchy with this merge function..

Example:

```
Organizational hierarchy default (on A):
Dept. A
   Dept. A1
   Dept. A2

A1 and A2 are Sub-OUs of A.

In installation B the tree should look like this:
Dept. A
   Dept. A1
   Dept. A2
      Dept. X
Dept. Y
   Dept. Z
```

That means that X is under A2 and Z is under Y in an own tree.

For the usage of function "Merge organizational hierarchies" the private structure of B must be defined in an own organizational hierarchy:

Dept. A2
  Dept. X
Dept. Y
  Dept. Z

A merge of this structure in the default organizational hierarchy results in the desired structure.

4.6 Organization classes

Organization classes are used to classify the organizational units. This information is not used from **@enterprise**, but can be useful when modeling the structure of big organizations.

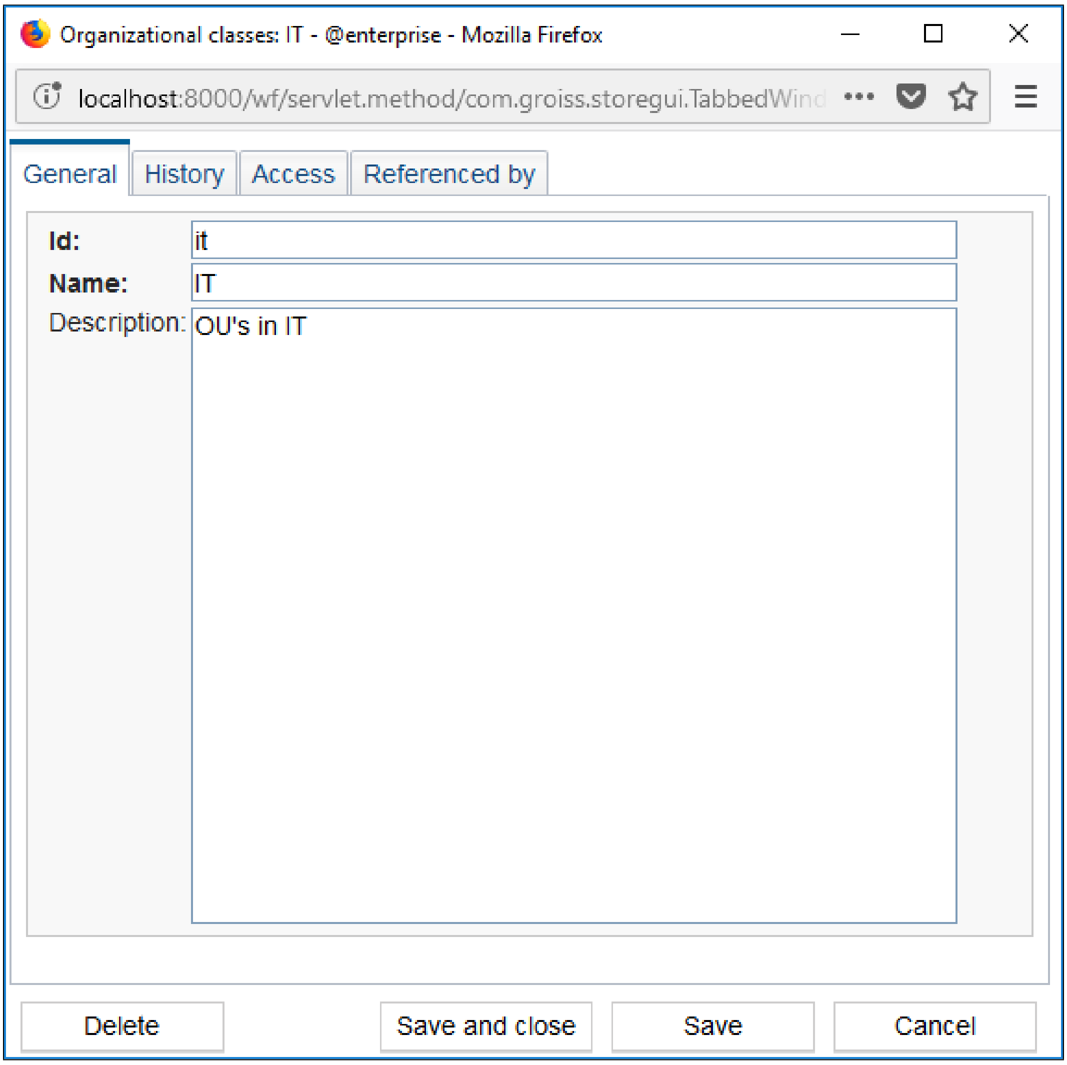
The object-details of organization classes contain the following tabs:

- General
- History
- Access
- Referenced by

4.6.1 Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the organization class.
- **Name:** Name of organization class.
- Description: Free text.



Organizational classes: IT - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWind
General
History
Access
Referenced by

Id: it

Name: IT

Description: OU's in IT

Delete
Save and close
Save
Cancel

Figure 4.9: **Object details: Organizational Classes**

5 The **@enterprise** *permission system*

5.1 Introduction

The permission system of **@enterprise**allows a very flexible assignment of rights to users. The central data structure of the permission system is the *permission*. A permission describes who has which right on which object.
Permissions can be grouped to so-called *permission-lists*. They can be used to group permissions together and use them for several objects.
Standard-permissions are used to assign permissions to new objects. You define standard-permissions for an object class. If a new instance of the class is created (an object) the defined standard-permission is assigned to this object.
In the following section we describe these concepts in detail.

5.1.1 Rights

For the administration of rights see section 4.2.

5.1.2 Object classes

Object classes define the classes which can be used in the permission system. The mask details of a object class are described in section 5.2.7.

For each object class you can define following things:

- The rights applicable for the object class. For example the right ’execute’ is useful for functions but not for persons. The rights specified here can then be selected when defining permissions.
- The standard-permissions: You can select a permission-list as standard permission for the object class. Moreover, if you select an organizational unit you can define a standard permission specific to an organizational unit. This would then be used, when a new object is created in the context of an OU, for example a document belonging to an OU.

5.1.3 Permissions

A permission describes WHO has which RIGHT on which TARGET. Therefore, it contains the following information:

- Who: a user, a role or a role together with an organizational unit. If this right should not be passed on, the checkbox *No substitution* should be activated.
- Right: a right
- Target: the object, on which the right will be applied or the object class, when the permission is for all objects of this class.
- The scope of the permission:
    1. The permission is for all objects, no target is specified.
    2. The permission is for all objects of a class, the target class is specified.
    3. The permission is for one object, which is specified as target.
    4. The permission is for all objects belonging to an organizational unit. As target the OU is specified.
    5. The permission is for all objects belonging to the organizational unit, where the agent has the role specified under "Who".
- The scopes 4 and 5 of the previous list can be refined with an OU-Scope. The set of OUs where the permission is valid can be modified or extended in the following ways:
    1. Local: The permission is given for the specified organizational unit.
    2. Hierarchic: The permission is given for the specified OU and all sub-OUs.
    3. Dependent hierarchic: The permission is given for the specified OU and all dependent sub-OUs.
    4. Independent: The permission is given for the next upper independent OU.
    5. Independent and dependent hierarchic: The permission is given for the next upper independent OU and all dependent sub-OUs.
    6. Superordinate OU: The permission is given for the next upper OU.
- Yes/No: The permission is given or not given.

To understand the different OU-scopes see the following example. Fig. 5.1 shows an organizational hierarchy with independent and dependent OUs. The grey circles represent the dependent OUs.
A permission for the organizational unit OE2 comprises the following units in the different scopes:

- Local: OE2
- Hierarchic: OE2, OE3, OE4, OE5, OE6, OE7, OE8, OE9

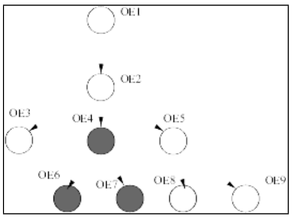


Figure 5.1: **Organizational hierarchy with independent and dependent OUs**

- Dependent hierarchic: OE2, OE4, OE6, OE7
- Independent: OE2
- Independent and dependent hierarchic: OE2, OE4, OE6, OE7
- Superordinate OU: OE1

5.1.4 Permission list

Permission-lists are aggregations of permissions. They can be attached to several objects to define identical access rights to this objects. For each object one permission list can be defined.
The permissions relevant to an object are therefore the permissions where the target is the object plus the permission where the target is a permission list and this permission list is used for this object.

5.2 *Definition of permissions*

In the **@enterprise**system administration permissions can be defined from two sides: The permissions of an agent (user or role) can be defined in the respective detail masks. The permissions applied to an object can be edited from the detail mask of the object ("Access" button). The permission-lists can be administrated from the link in the navigation frame of the administration main window. The standard-permissions can be edited via links in the tables of the object classes.

5.2.1 Permissions of users

In the table of users there is a link to the permissions of the selected user. If you click on the link a window opens with a list of the permissions of the user. Note that you only see the permissions directly assigned to a user, the permissions assigned to the user via the role assignments can be edited in the role administration.
You can insert, edit and delete table entries in the usual manner.

5.2.2 Permissions of roles

The permissions of roles are edited in the same way as the permissions of users.

5.2.3 Administration of permission lists

Click on the link "Permission list" in the navigation frame. You can create permission-lists when clicking at the add button, insert the name in the "General" tab and administrate the permissions in the second tab.
The permissions for the list can be created by clicking the link in the table line of a permission-list. But to assign a permission to a permission-list you must have right *edit-acl* for that list. See the next section for the usage of permission-lists.

5.2.4 Permissions for an object

Objects underlying the permission system have the tab "Access" in the detail mask. If you click the button, a window opens where you can see two frames:

- In the first frame you can edit the permissions for the object.
- In the second frame the permission-list of the object can be viewed and changed.

In the mask for the permission you can select the agent (user, role, organization) who has the permission, the right and the organization scope.

5.2.5 Permissions for permissions

To edit permissions which refer not to a specific object a agent must have the right *edit-acl* for all objects.
If a permission refers to an object, the agent must have the right *edit-acl* for the object or the object class.
Additionally, the agent needs the right *execute* for the right which is used in the permission. This allows to restrict the permission of assigning rights to specific rights.

5.2.6 Permissions for role assignments

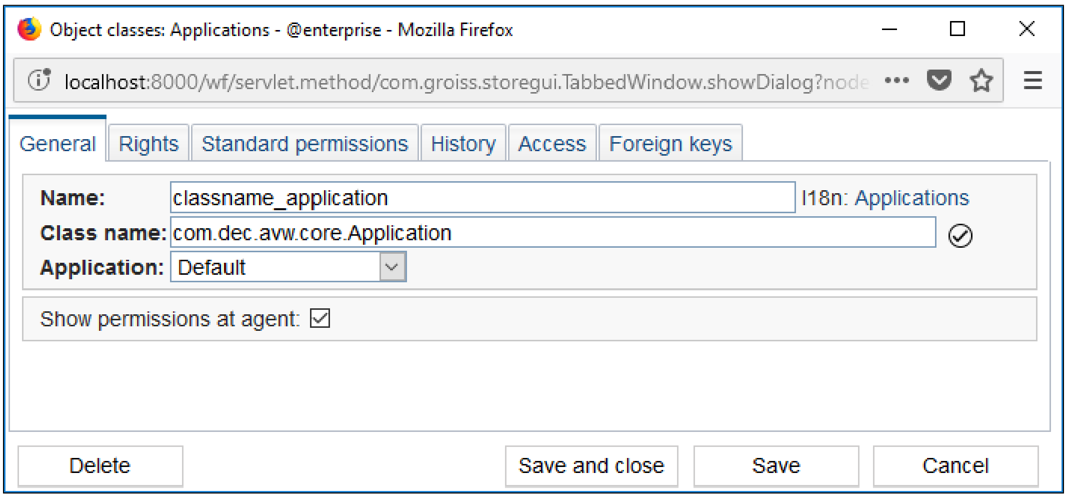
The manipulation of role-assignments is also a special case, because a user can change his permissions by adding roles. Therefore, for changing role assignments following rights are necessary:

- the right to *edit* the user
- the *execute* right for the role
- the *execute* right for the org-unit

5.2.7 Administration of object classes

Object classes are used to define the usability of rights to object classes. Only when a right is assigned to an object class, the right is usable for objects of this class.
Furthermore, the standard-permissions (see above) of object classes are defined here.
Informations of the Object Class detail window (required fields are bold):

- **Name:** The name of the object class. Detailed information to ids and names can be found under 3.



Object classes: Applications - @enterprise - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node

Name: classname_application I18n: Applications

Class name: com.dec.avw.core.Application

Application: Default

Show permissions at agent: ☑

Figure 5.2: **Update object class**

- **Class name:** The Java–class implementing the object class.
- **Application:** Application, the object class belongs to.
- Show permissions at agent: For object classes you can specify, if permissions for objects of such a class should or should not be shown by default at the permission list of a user or role. If there exists at least one object class for which hiding such permissions is specified the table for listing the permissions behaves as follows:

  1. The filter menu is provided for that list (tab *Permissions*)
  2. A default filter is automatically applied which filters out all permission records referencing an object of such an object class

  By default the field *Show permissions at agent* of all **@enterprise** object classes is active and no filter menu is displayed in permission tab of a user/role. Disable this field only, if performance problems occur at showing the permission table.

For object class objects the functions available under 2.2 are available. Furthermore it is possible to define rights and standard permissions respectively for object classes.

Tab: Foreign keys

In this tab you can see, if references to another table are available. If e.g. columns of the user table are referenced in another table, these columns will be listed in this tab. If a reference exists, the user object cannot be deleted via **@enterprise** administration.

5.3 Standard settings

The **@enterprise**standard rights are listed in section 4.2.

The role *sys* has the rights *edit*, *execute*, *edit-acl*, *create*, and *admin* for all objects. The user *sysadm* has the role *sys*. Additionally, *sysadm* has the right *conf*.

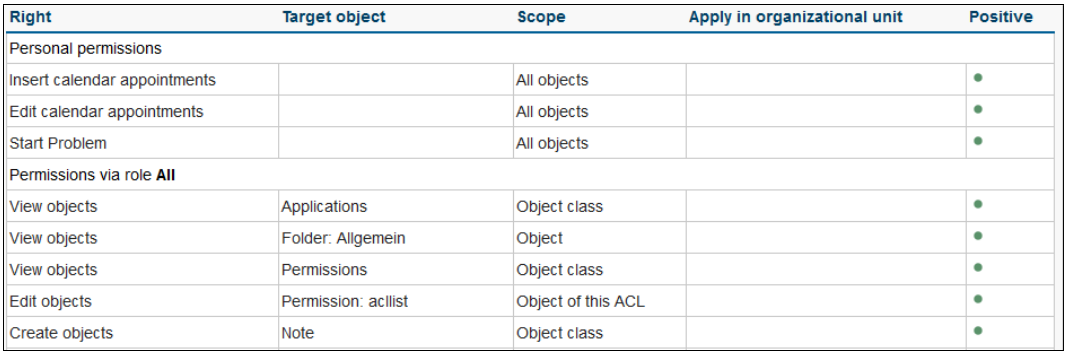
All changes of master data can be performed from users with the *sys* role.
For changing the configuration, viewing the logfile, shut down the server, and some similar tasks the *conf* right is necessary.

5.4 For what you need which rights?

The tables 5.1 and 5.2 will give you an overview for what you need which rights.

5.5 Example

This section contains an example for using the right-system.
Problem: The user John Smith should get the permission to administrate users of the organizational unit "Service". He should be allowed to edit the user attributes and the role-assignments.
For editing users he receives the right *edit* for objects of the organizational unit "Service". The admin right is needed to go to the administration.
For editing the role-assignments, we define the role edit-roles: With this role every role-assignment except for the role sys can be edited.



Right	Target object	Scope	Apply in organizational unit	Positive
Personal permissions				
Insert calendar appointments		All objects		●
Edit calendar appointments		All objects		●
Start Problem		All objects		●
Permissions via role **All**				
View objects	Applications	Object class		●
View objects	Folder: Allgemein	Object		●
View objects	Permissions	Object class		●
Edit objects	Permission: acllist	Object of this ACL		●
Create objects	Note	Object class		●

Figure 5.3: **Example: Permissions**

5.6 Permissions and substitutions

The behavior of the rights system in context for substitutions is worth considering. The implementation follows the following two basic rules:

1. If a user takes a substitution he should not loose rights.
2. After taking a substitution the user should not have more permissions than both users together.

The evaluation algorithm for permissions works as follows:

- Step 1: Evaluate the set of permissions without consideration of substitutions.
- Step 2: For all substituted users: Compute the set of all positive permissions (not "denies") for the substituted user in the substituted roles.

  Subtract all negative permissions of this user, regardless whether the right belongs to a substituted role or not. Add the resulting set to the result.

User A wants ...	Necessary Right (Id)	Apply ...
to create a new object	Create objects (create)	on all objects or the object class
to edit an object	Edit Objects (edit)	on the object, the object class, all objects or the OU (if the object is assigned to an OE). *True for all objects apart from OUs.*
to delete an object	Delete objects (delete)	on the object, the object class, all objects or the OU (if the object is assigned to an OE). *True for all objects apart from OUs.*
to edit an OU	edit	on all objects, the object class *Organizational Units* or a defined OU
to change into administration	Administration (admin)	on all objects
to view configuration, see server details under Admin tasks	Administration (admin) AND View configuration (view_conf)	on all objects
to edit configuration, do server control, perform import/export	Administration (admin) AND Edit configuration (conf)	on all objects
to view the log-file	Administration (admin) AND View configuration (view_conf)	on all objects
to enter, edit or delete a permission	Edit permissions (edit_acl) AND Execute objects (execute)	on the object, the object class or all objects (edit_acl); on the right (execute)
to enter, edit or delete a role assignment	Edit objects (edit) AND Execute objects (execute)	on user (edit); on the role and org-unit (execute)
to execute a function	Execute objects (execute)	on all objects, the objectclass *Application* or a defined application
to abort a process	Edit process instances (proc_inst)	on all objects or all OUs or the OU, the process is started in
to change the agent in the history	Edit process instances (proc_inst) OR Reassign (set_agent)	on all objects or all OUs or the OU, the process is started in
to view process history, list of documents and notes and all process forms and versions	View process instances (view_procinst)	on one process or all
to create process documents	Create objects (create) AND A is current agent of step OR if A is not step agent, A has right View process instances (view_procinst) + right *edit* on process instance	on the object
to edit process documents	Edit objects (edit) OR A is current agent of step	on the object
to archive processes	Administration (admin) AND Edit configuration (conf)	on all objects
to search for process instances	View objects (view) AND View process instances (proc_inst)	on all objects or all OUs or the OU, the process is started in
to create reports with report designer	Statistics (stat)	on all objects
to execute stored reports	Execute objects (execute) or Statistics (stat)	on all objects, the object class *Reports* or a defined report
to delete master data	Delete objects (delete)	on all objects, the object class
delete a standalone form	Delete objects (delete)	on the form class
see changes of forms in process instance	View process instances (proc_inst) OR Reassign (set_agent)	on the OU/process definition, where process instance is running
see changes of forms in process instance	View objects (view) OR user A is current agent of step	on the OU only, where process instance is running
define any substitute	Enter substitute (grant_subst)	on all objects, the object class OU
define substitute of a particular OU where substitute has role *home*	Enter substitute (grant_subst)	on object class OU and as object a particular OU
create calendar event with participants	Insert calendar appointments (insertCal)	on all objects OR restricted on user/org-units/resources
edit/delete calendar event with participants	Edit calendar appointments (editCal)	on all objects OR restricted on user/org-units/resources

Table 5.1: For what you need which right?

User A wants ...	**Necessary right (Id)**	**Apply ...**
to create an object	create AND edit	on the object class and edit on the folder
to edit an object, edit the metadata or replace a document	edit	on the object
to delete an object, delete a folder with content	delete	on the object, the folder and if the object is a folder on the whole content
to view an object	view	on the object
to move an object	edit	on the source-folder and the destination-folder
to copy an object	edit AND view	on the destination-folder (edit); on the object or the if the object is a folder on the whole content (view)
to rename an object	edit	on the object
to change the permissions on the object (access)	edit_acl	on the object
to create a version	edit	on the object
to view a version	view	on the object
to delete a version	edit	on the object
to view the properties	no right necessary	
to delete a form	delete AND edit	on form class (*delete*), on the folder which contains the form (*edit*)
to delete a subform	delete AND edit	on form class (*delete*), on the parent/main form (*edit*)

Table 5.2: For what you need which right in the DMS?

6 Workflow modeling

In the following chapter we describe the object classes necessary to define processes. In principle, the definition of a process is the answer to the following question:
WHO does WHAT WHEN with WHAT?

- WHO: Who is responsible for the processing of a workflow? The agents must be defined for every single activity in a workflow. It is usually defined using roles.
- WHAT: What is done in the workflow? The work is decomposed in activities, which are done by one agent. The description of the tasks answer the WHAT question.
- WHEN: If you know which activities have to be done and who performs these activities, the order of execution must be defined. Often it is a simple sequence but can have a complex structure containing loops, branches, and parallelism.
- WITH WHAT: For performing the activities some informations are necessary. It must be defined, which activity needs which information and what new information is produced in an activity.

  We use forms to structure the information and describe the information exchange between the activities.

The definition of workflows contains the following objects:

- **Applications:** Applications group processes belonging together.
- **Tasks** elementary activities in processes.
- **Functions** are representations of interactive Java-methods used for execution of activities.
- **Forms** contain the local data of a process.
- **Processes** describe the structure of a business process.

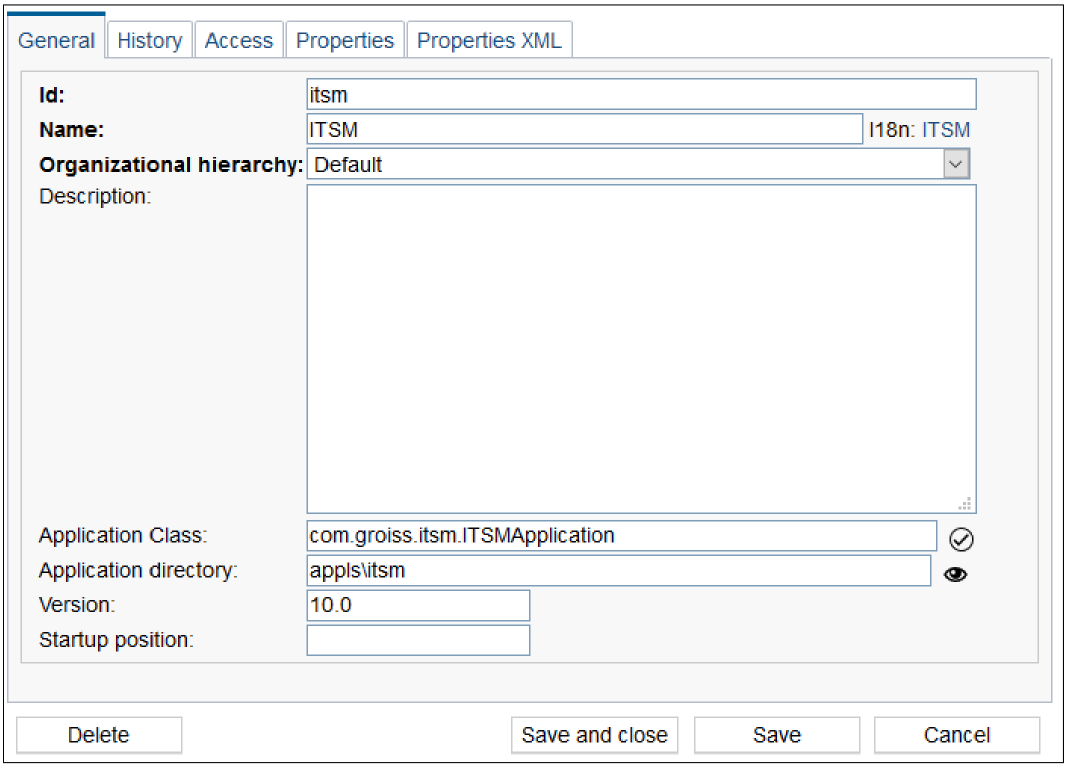
6.1 *Applications*

Applications group processes belonging together. All workflow elements belong to an application. An overview about all elements of an application can be displayed by clicking the application link in navigation tree.

The object-details of application contain the following tabs:

- General
- History
- Access
- Properties
- Properties XML

6.1.1 Tab: General



Id:	itsm
Name:	ITSM I18n: ITSM
Organizational hierarchy:	Default
Description:	
Application Class:	com.groiss.itsm.ITSMApplication
Application directory:	appls\itsm
Version:	10.0
Startup position:	

Figure 6.1: **Object-Details: Applications**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the application.

- **Name:** Name of the application. By activating the I18n-link beside this field, the translations (if defined in tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Organization hierarchy:** The hierarchy used for resolving hierarchic roles and rights.
- Description: Free text.
- Application class: A class, which implements the interface com.groiss.wf.ApplicationAdapter can be specified. See the API documentation and the Programming Guide for details.
- Application directory: where the application is installed. Activate the icon *View Configuration* to display the content of the appropriate configuration file.
- Version: Version of the application. It could be helpful in case of an upgrade to differ applications of an older version of @**enterprise**.
- Startup position: Applications are loaded due to this position in ascending order. It could be necessary, if application A2 has references in application A1 and application A1 has to be loaded before A2.
- Button *Upgrade*: This button is visible only, if a newer version of the application has been found on the file system. By activating this button all defined upgrade-actions will be performed. For further information about upgrading applications, please take a look in the API of @**enterprise** (*ApplicationAdapter.getVersion()* and *ApplicationAdapter.upgrade()*).

6.1.2 Tab: Properties

In this tab it is possible to define properties for this application. You can edit following attributes:

- Resource Strings: Enter a path to a resource-bundle (*.xls- and/or *.properties-files) which is used by this application, e.g. *com.groiss.itsm.resource.Strings*. If no resource-bundle exists on file-system, the resource editor is able to create a new one (see chapter 6.8). Further information about resource-bundles are available in *Application Development Guide* - chapter *Internationalization of Applications*.
- Application parameter: Here you can define parameters (in grouped way), which are used by this application. These parameters are stored in a XML-file (*properties.xml*) within application classpath and are accessible by the *Configuration* of @**enterprise** (see section 10). If more groups are defined, these groups are displayed as tree in navigation of *Configuration* section. The checkbox *Visible* is activated by default. If this checkobox is deactivated, the application parameter group is not visible in the @**enterprise** configuration.
- User parameter: In this area you can define parameters for users, who use this application. These parameters are also stored in a XML-file (*properties.xml*) and are accessible by the *Settings* of each user (see *User Manual*).

- Upgrade path: This part allows to define the upgrade path for an application. The necessary steps to configure a path are:
  - On tab *General* set the version to a new value (e.g. from 1 to 1.1).
  - On tab *Properties* create a new upgrade step and enter the same version number in the *Target version* field as entered in field version of tab *General*.
  - If the checkbox *Groovy* is activated, a Groovy script must be entered in the *Method/Script* field, e.g.:

    ```
    admin.importXML("<appl-id>/exports/<appl-id>.xml")
    ```

    If the checkbox is not activate, a JAVA method, which defines exactly one parameter of the *com.groiss.org.Application* type, must be entered, e.g.:

    ```
    com.acme.myappl.Upgrades.upgradeToVersion1Dot1(Application appl)
    ```

    This method returns a *String* value. In this *String* you can then describe what the upgrade did. This is then logged and displayed in the GUI (if the upgrade is performed via GUI). The class checker beside the field allows to check, if the entered method/script is correct. Please note that the upgrade path follows the order as defined in the properties file, from top to bottom, with the lowest version listed first and the latest version listed last.

  The defined path is stored in *properties.xml* of that application and is stored in the ZIP archive initiated by an application export (see section 9.2.3). This approach allows to upgrade the application on target system in an easy way (see *Installation and Configuration* manual, section *Upgrading/Patching an* **@enterprise** *Application*).

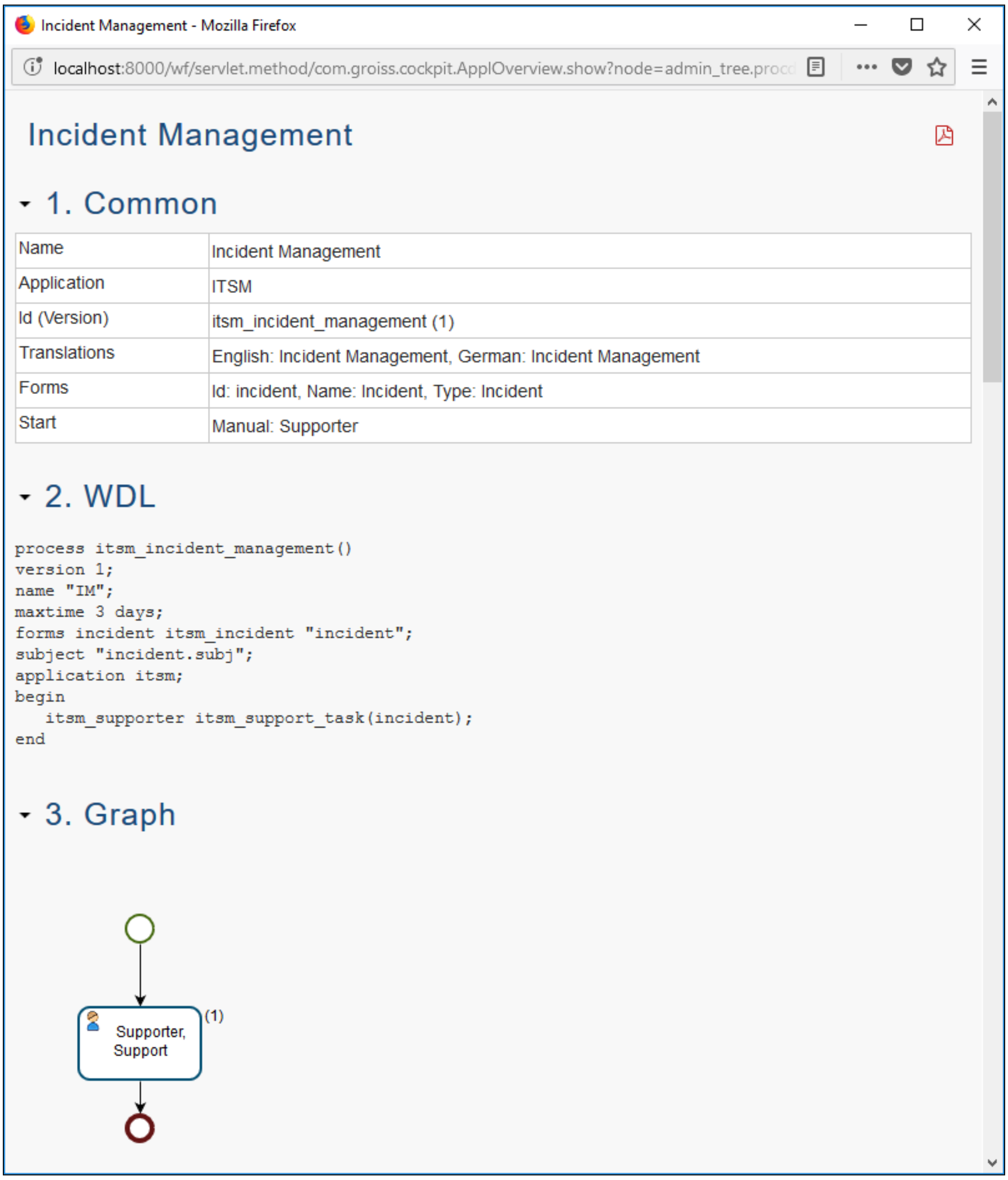
Hint: The functions of this tab are available only, if an *Application Directory* has been specified. This tab does not allow the creation of all possible HTML elements(e.g. text fields, radio-buttons, multiline default values etc.). Details for such elements of the *properties.xml* file can be found?in chapter *Structure of Applications in* **@enterprise** of the *Application Development Guide*. We provide an editor for the file in the *Properties XML* tab (see below).

6.1.3 Tab: Properties XML

After activating this tab, the Editor for direct editing of the XML file will be opened. The XML schema can be opened using the keyboard key *F6*.

6.1.4 Report

This function shows an overview of all used components of the selected applications (see Fig. 6.2). Each component is divided in blocks which can be hidden or displayed. Furthermore it is possible to generate a PDF of the report.
A report can be created for processes (see section 6.5.14) or forms (see section 6.4.5) only.


Incident Management - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.cockpit.ApplOverview.show?node=admin_tree.proc

Incident Management

1. Common

Name	Incident Management
Application	ITSM
Id (Version)	itsm_incident_management (1)
Translations	English: Incident Management, German: Incident Management
Forms	Id: incident, Name: Incident, Type: Incident
Start	Manual: Supporter

2. WDL

```
process itsm_incident_management()
version 1;
name "IM";
maxtime 3 days;
forms incident itsm_incident "incident";
subject "incident.subj";
application itsm;
begin
   itsm_supporter itsm_support_task(incident);
end
```

3. Graph

Figure 6.2: **Report detail**

6.2 Tasks

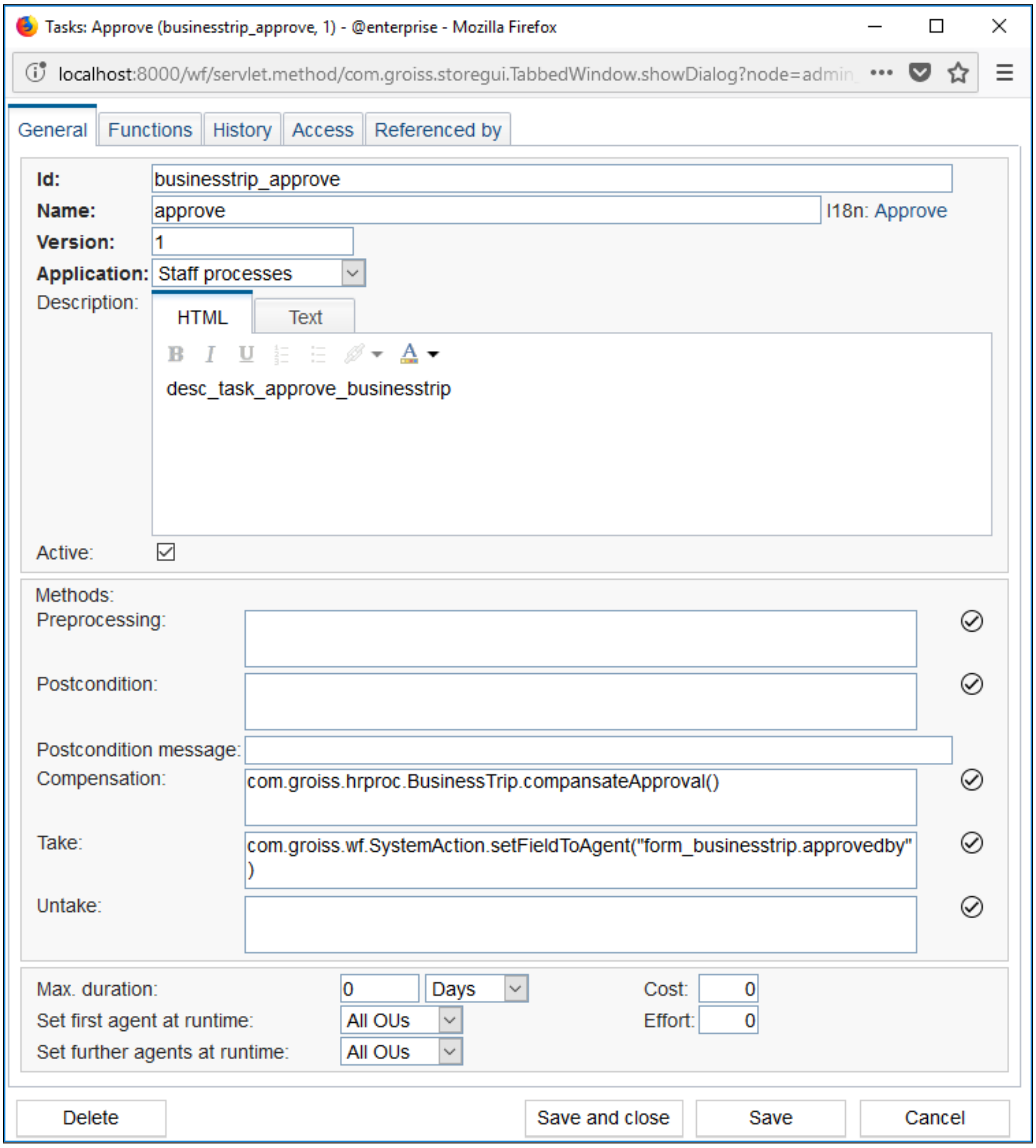
Tasks are the elementary activities in processes. The can appear in different processes of the same application and on different positions in one process.

The object-details of tasks contain the following tabs:

- General

- Functions
- History
- Access
- Referenced by

6.2.1 Tab: General


Tasks: Approve (businesstrip_approve, 1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_
General
Functions
History
Access
Referenced by
HTML
Text
B
I
U
Delete
Save and close
Save
Cancel

Id:	businesstrip_approve
Name:	approve I18n: Approve
Version:	1
Application:	Staff processes
Description:	desc_task_approve_businesstrip
Active:	☑

Methods:

Preprocessing:	
Postcondition:	
Postcondition message:	
Compensation:	com.groiss.hrproc.BusinessTrip.compansateApproval()
Take:	com.groiss.wf.SystemAction.setFieldToAgent("form_businesstrip.approvedby"))
Untake:	

Max. duration:	0 Days	Cost:	0
Set first agent at runtime:	All OUs	Effort:	0
Set further agents at runtime:	All OUs		

Figure 6.3: **Object-Details: Tasks**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the task.
- **Name:** The name of the task. This name is shown in the task column in the worklist. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Version:** Version number of the task, a positive integer.
- **Application:** Application, the task belongs to.
- Description: Free text, visible in the worklist via the link to the task details. It can contain a short help text or instructions to the task. The tab *HTML* contains a WYSIWYG-Editor to format HTML. The tab *Text* shows the generated HTML source.
- Active: Indicates, whether the task is active. Further information about (de)activation of objects can be found under 2.2.1.
- Preprocessing: Enter the call of a Java-method (or a sequence of Java-methods separated by ";"). The code is executed, before the task is put into the worklist of a user. It is also possible to use a GROOVY script - enter *groovy:* <groovy-script> in this field. See the Programming Guide for details of such methods.
- Postcondition: The condition which is entered here is checked at run-time when a user finishes the task (sends it to the next agent). If the condition is not true, finishing the task is not possible.

  The syntax of such WDL conditions is described in section 7.1.5.

  It is also possible to enter a sequence of calls of Java-methods (separated by ";"). The methods are executed from left to right. They do not need to return a boolean value. The result of the condition is the last boolean value that has been returned from any method. If none of the methods returned a boolean value, the condition evaluates to false.
- Postcondition message: In this field you can insert the text of an error message, which will be shown when the postcondition evaluates to false.
- Compensation: A sequence of Java-methods or a GROOVY script. It is executed when the activity is passed when going back to an earlier step in the process. It can be used to reestablish a consistent state.
- Take: A sequence of Java-methods or a GROOVY script. It is called when the task is taken (from the role-worklist to the personal worklist).
- Untake: A sequence of Java-methods or a GROOVY script. It is called when the task is given back to the role worklist.
- Max. duration: The maximum duration of the task (in days, hours, or minutes).

- Cost: The costs of the task. This field is not used from **@enterprise**, but can be used in some statistics.
- Effort: The effort of the task in minutes. This field is not used from **@enterprise**, but can be used in some statistics.
- Set first agent at runtime: specifies, whether the agent can be set at run-time.
- Set further agents at runtime: specifies, whether further agents can be specified at run-time.

  Hint: The last two attributes have the value ranges "none" "within Dept.", "all Depts.". That means, no agents can be set at run-time, only agents belonging to the same organizational unit can be set, or no restrictions apply.

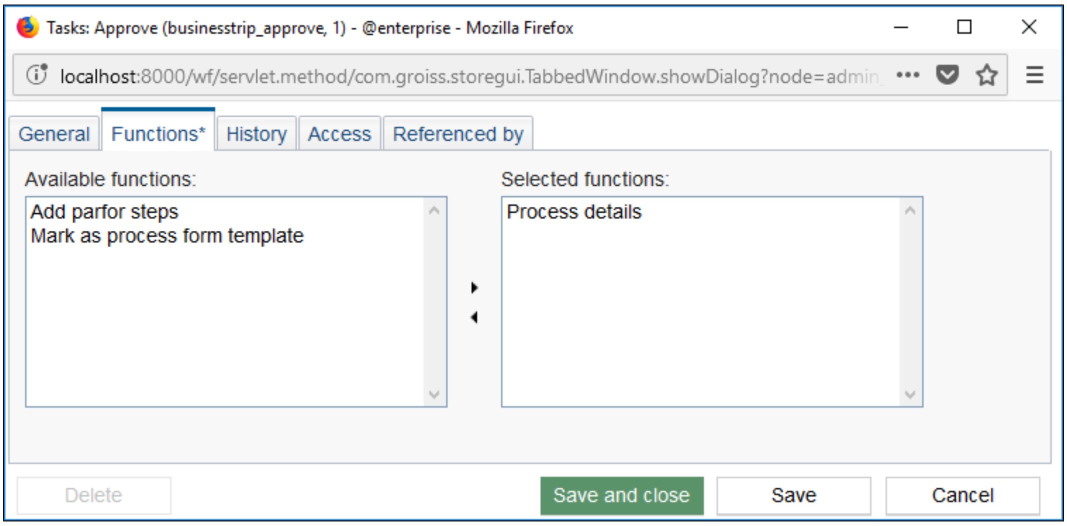
Hint: If you delete one task the assigned functions are deleted also.

6.2.2 Tab: Functions

In this tab you can define relations of the task to functions (see Fig. 6.4). General informations about functions can be found in section 6.3.

You can add all functions of the list **Available functions** to the task. The functions of the list **Selected functions** are already assigned to the task. To add a function select a function of the list *Available Functions* and activate the button **>**. To remove a function select a function of the list *Selected Functions* and click the button **<**.

Your changes are saved after activating the button **Save and close**, **Save** or when changing the tab.


Tasks: Approve (businesstrip_approve, 1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin
General
Functions*
History
Access
Referenced by
Available functions:
Selected functions:
Delete
Save and close
Save
Cancel

Available functions:
Add parfor steps
Mark as process form template

Selected functions:
Process details

Figure 6.4: **Object details: Functions**

6.2.3 Supplement of forms

Forms are typically editable by the current users of a process step corresponding to the form visibilities. The most simplest corrections (e.g. setting another value in a read-only field) needs to go-back to the appropriate agent/step.
With the aid of the predefined *Supplement-Task* the handling can be simplified. This task will be assigned to the process definition *Process editor: Process → Tasks* . Now forms can be assigned to this task and also form-field visibilities can be defined.
Users with right *proc_inst* or *set_agent* are able to edit forms via the process history.
The process history contains a toolbar function *Supplement* which allows to start a supplement task for the current process instance. This task is displayed in the worklist of the current user who is able to change the form and finish the task. The changes are displayed in the process history.
If the user is not the current agent of the process instance (but contains one of the rights above), then the creation of supplement task (and also finishing) can be triggered by changing and saving the form directly via the process history.

6.3 Functions

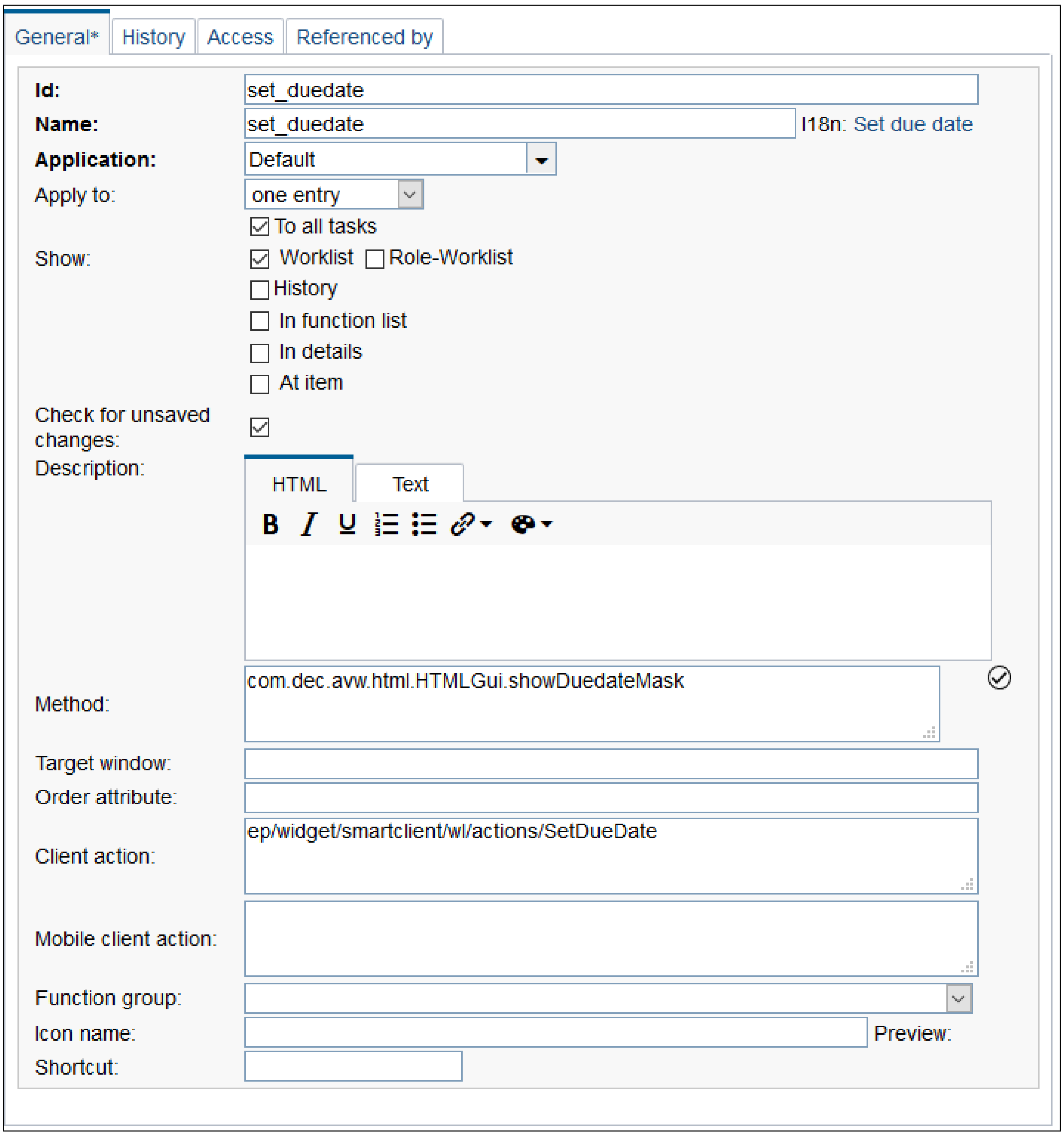
Task–Functions (or Functions) are representations of interactive Java-methods used for execution of activities. Links to the functions appear in the worklist when working on a task. The object-details of task-functions contain the following tabs:

- General
- History
- Access
- Referenced by

6.3.1 Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the function.
- **Name:** Name of the function. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Application:** Application, the function belongs to.
- Apply to: Here you can select the type, if the function is a global or local function.
  - No entry: The function is a global one, i.e. no entry must be selected (e.g. worklist entry)
  - One entry: The function is a local one, i.e. only one entry must be selected



Id: set_duedate

Name: set_duedate I18n: Set due date

Application: Default

Apply to: one entry

☑ To all tasks

Show: ☑ Worklist □ Role-Worklist

□ History

□ In function list

□ In details

□ At item

Check for unsaved changes: ☑

Description:

Method: com.dec.avw.html.HTMLGui.showDuedateMask

Target window:

Order attribute:

Client action: ep/widget/smartclient/wl/actions/SetDueDate

Mobile client action:

Function group:

Icon name: Preview:

Shortcut:

Figure 6.5: **Object-Details: Task-Functions**

  - Multiple entries: Analog to *One entry*, but more than one entry can be selected

- Show:
  - To all tasks: The function is automatically assigned to all tasks of the application. If this function is stored in application *default*, it is assigned to tasks of every application (incl. default application).
  - Worklist: The function appears in the function menu of (role-)worklist.
  - Role-Worklist: The function is applicable also in the process form of role-worklist.
  - History: The function appears (corresponding to its type) in the process history.

  - In function list: The function can not be assigned to a task, for example an administration or search function. This task function appears in the main frame, when the link *Functions* will be activated in the navigation tree.
  - In details: If checked, the function is displayed in toolbar of detail view of a worklist entry. Additionally the checkbox *Worklist* must be activated to use this option in worklist. This option is applicable in smartclient only!
  - At item: If this checkbox is activated, the function is displayed inline of a worklist entry. This is possible only, if attribute *showInlineDetailsAt* is set in xml file. Detailed information can be found in *Application Development Guide*. Additionally the checkbox *Worklist* must be activated to use this option in worklist. This option is applicable in smartclient only!
  - Check for unsaved changes: If checked, a warning message is displayed if changes are not saved before the function is executed.

- Description: Free text. The tab *HTML* contains a WYSIWYG-Editor to format HTML. The tab *Text* shows the generated HTML source.

- **Method:** The signature of the Java–method implementing the function. Parameters can be added by adding a ? and the parameterlist.
  Example: com.groiss.DemoClass.demoMethod?param1=val1&param2=val2

  Furthermore it is possible to enter a GROOVY script in this field - enter *groovy:* <groovy-script> in this field.

- Target window: The content of this field contains the name of the window or the frame where the output of the function will be placed. If the field is empty, the output is sent to the frame where the worklist resides. If you enter another name, the output is sent into a separate window with this name. In addition to this name you can add several parameters like width, height etc. by adding a semicolon and write the parameters like the Javascript method *window.open* syntax. If you specify the target "_top" the output will be shown in the current browser window.

- Order attribute: Enter an attribute as order attribute.

- Client action: If this function should work with new GUI, a DOJO widget must be defined here which implements *ep/widget/smartclient/_Action*. Detailed information can be found in *Application Development Guide*.

- Mobile client action: If this function should work with mobile GUI, a DOJO widget especially for mobile GUI must be defined here analog to *Client action*.

- Function group: Select a self defined function group here.

- Icon name: Define a icon for the function. Enter a absolute path name or a relative path name in the classpath.

- Shortcut: An arbitrary shortcut can be defined here by entering the appropriate keys. A list of keys is listed on http://dojotoolkit.org/reference-guide/1.10/dojo/keys.html.

Example: CTRL+SHIFT+D
If these keys are pressed at once in appropriate context, the action will be performed. The appropriate context depends on the availability/visibility of the function, e.g. if function is a toolbar function of the worklist, the worklist must be displayed first (and maybe a worklist entry must be selected) before the shortcut can be used.

Hint: Note, that a user must have the right "execute", to execute a function.

6.3.2 Standard functions

@enterprise contains the following predefined functions:

- **toggle_seen – Set read/unread:** Mark an worklist item as read/unread.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist, to Role Tasks

- **clipboard – Clipboard:** Add the content of the clipboard to the process documents.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist

- **into_clipboard – Into clipboard:** Copy the process instance into the clipboard.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist

- **make_copy – Copy to ...:** Send a copy of the worklist entry to another user in read-only mode.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist

- **attach_note – Process note:** Add a private or public note to the process instance.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist

- **note_global – Process note:** Same as note_all, but applicable when the task is not in the worklist

  Apply to: No entry, **Show:** Worklist, in Function List

- **set_duedate – Set due date:** Set the due-date of the process or the current activity.

  Apply to: One entry, **Show:** Worklist

- **addRelation – Add relation:** Add a relation between two processes.

  Apply to: One entry, **Show:** Worklist. More information about how to configure the relations between processes, can be found in the *Installation and Configuration* Guide, Section *Search*, parameter *Process relations*.

- **setPriority – Set priority:** Set the priority of a process instance.

  Apply to: One entry, **Show:** assign to all Tasks, Worklist Further informations belonging to this function can be found in the programming guide of **@enterprise**.

- **copy_process – Create process copy:** This function can be used to create a copy of the current process instance. By default all form data and all DMS objects of tab *Documents* of the origin process instance are copied and the process instance copy will always start from the first process step. Furthermore a system note is created and attached to the begin step of a process which contains the information about the origin process. This standard behavior can be changed with following parameter at the end of the *Client action*:

- Form data: Either a defined set of form data from origin process should be copied (allow list [include]) or not (disallow list [exclude]). For this purpose either *include=<params>* or *exclude=<params>* must be added. The parameter (<params>) are defined as a comma-separated list in following format:
  - <form_id>.<formfield_name>: The value of the form field of (main-) form. The form id is defined in the process definition tab *Forms* (see section 7.2.4).
  - <form_id>.subform_<subformid>: All subform entries (incl. form field) of the (main-) form.
- DMS object: With parameter documents=true|false you are able to define, if DMS objects should be copier or ignored.
- System note: Parameter duplicationNote=true|false indicates, if a system note should be attached to the begin step of the copied process.

For example, you can enter the following in the *Client action* field:

```
ep/widget/smartclient/wl/actions/CopyProcess?include=form0.field1,
 form0.field3,form0.subform_1,form1.field1
 &documents=false&duplicationNote=false
```

Apply to: One or more entries, **Show:** Everything is possible.

- **process_templates – Process templates:** This function can be added as form toolbar function and takes the form data of selected process to current displayed one with some restrictions:

  - Works with XForms only
  - Works in context of a process form toolbar only - add it with appropriate <script id="toolbarfunctions"> block in the form
  - Supports only inline subforms
  - No support for sub-subforms

  By default all form data are taken from selected origin process to the process form of current process. This standard behavior can be changed by adding following parameter at the end of the defined *Client action*:

  - <form_id>.<formfield_name>: The value of the form field of (main-) form. The form id is defined in the process definition tab *Forms* (see section 7.2.4).
  - <form_id>.subform_<subformid>: All subform entries (incl. form field) of the (main-) form.

For example, you can enter the following in the *Client action* field:

```
ep/widget/smartclient/wl/actions/SelectProcessTemplate?include=form0.field1,
  form0.field3,form0.subform_1
```

Apply to: No entry, if the process start node FORM is used(see Application Development Guide, section *Start process (<processStart>)*)! Otherwise any value.

- **follow_process – Follow the process:** This function allows to activate a notification (email) for the process or the selected tasks when they are finished. The appropriate message template with id *processTracker* is stored in application *default*. This message is sent only, if the process or tasks are finished by another user than the current one.

  Apply to: One entry, **Show:** Assign to all tasks, Worklist, Role worklist, History

- **Subscrube report**: This function can only be used in reporting. In order to see this function in the reporting results it is necessary to have the *execute* right on the function. With this function it's possible to create the subscriptions to reports. You can find more information about report subscriptions in the reporting manual.

- **Add to favorites**: This function can only be used in reporting. In order to see this function in the list of executeable reports it is necessary to have the *execute* right on the function. With this function it's possible to favorite a report. You can find more information about report favorites in the *reporting manual* in the section *Report Favorites*.

  Apply to: One entry

Further information to this functions can be found in the @**enterprise** Users Guide, section *Task Functions in* @**enterprise**.

6.4 Forms

Forms contain the local data of a process. In the user interface they are represented as HTML forms. Besides the functions described in chapter 2.1.2 the following functions can be found in the toolbar:

- Create new form type
- Edit form type
- View
- Create view
- Report

If the form classes of a form cannot be loaded, it will be shown as inactive table entry. Creating and editing a form is done using the form-editor described in the following section.

6.4.1 Form-Editor

The form editor is used for creating and editing forms, see Fig. 6.6.

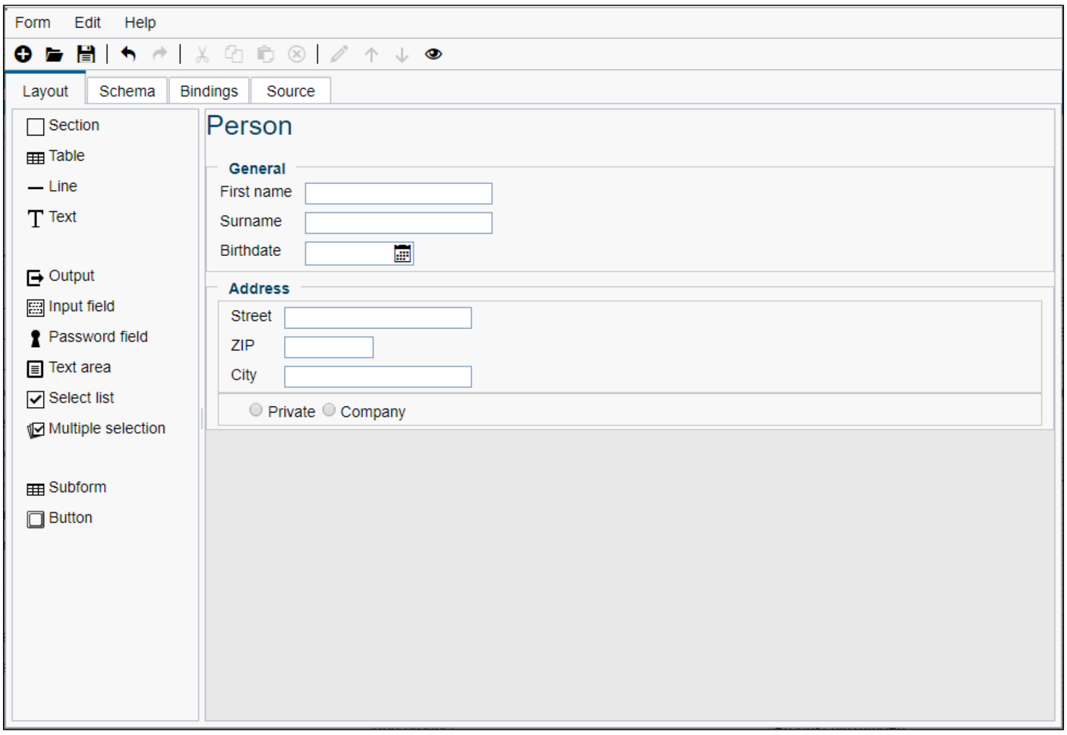


Figure 6.6: **Form-Editor**

The main area contains four tabs:

- Layout: create and edit the form layout here
- Schema: contains the information about the database schema of the form
- Bindings: XForms Bindings (visibilities, mandatory fields, etc.)
- Source: view and edit the HTML-source

Hinweis: Editing a form in the layout tab is not supported in *Internet Explorer 11*.

Create a new form

There are two possibilities for creating a new form:

- Open the tab Schema and create the form-fields you need, fill in Id, Label and Type. With the menu-function *Create new layout* you can create a standard layout for the form. Open the Layout tab to view it and change if necessary.
- Alternatively, you can add the necessary form elements in the Layout tab by drag-and-drop. When dropping, the field properties mask is opened, where you can select or create a database field for the form element.

Finally, you define id and name of the form in the Properties dialog or when saving the form.
In the following we describe the different functions of the form editor:

Tab: Layout

The form elements can be added by drag-and-drop from the left pane. For elements, that refer to a database field, the field properties dialog is opened, where the database field must be selected or defined.

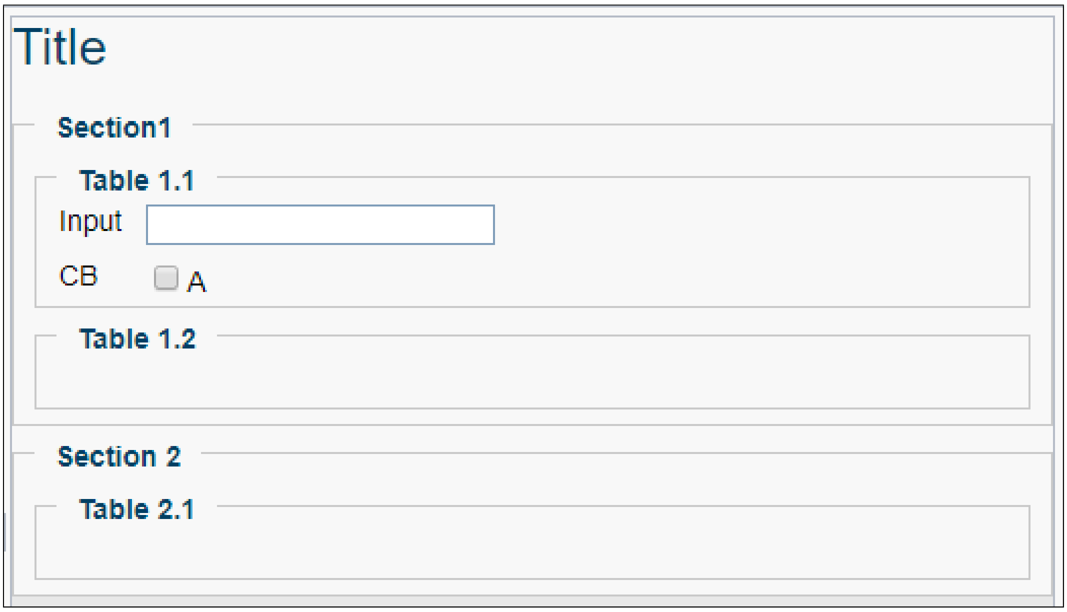


Figure 6.7: **Form structure**

The general structure of a form created by the editor is as follows (see Fig. 6.7): A form contains one or more sections, each of them containing one or more tables. The tables contain the form elements. Sections and tables have a title and a border and can be styled with CSS classes.
The other form elements are:

- Line: a horizontal line
- Text: a static text
- Output: an output field for showing the value of a form field
- Input field: field for text input
- Password field: field for entering a password (value is not shown)
- Text area: multi-line text field
- Select list: a value can be selected from a list

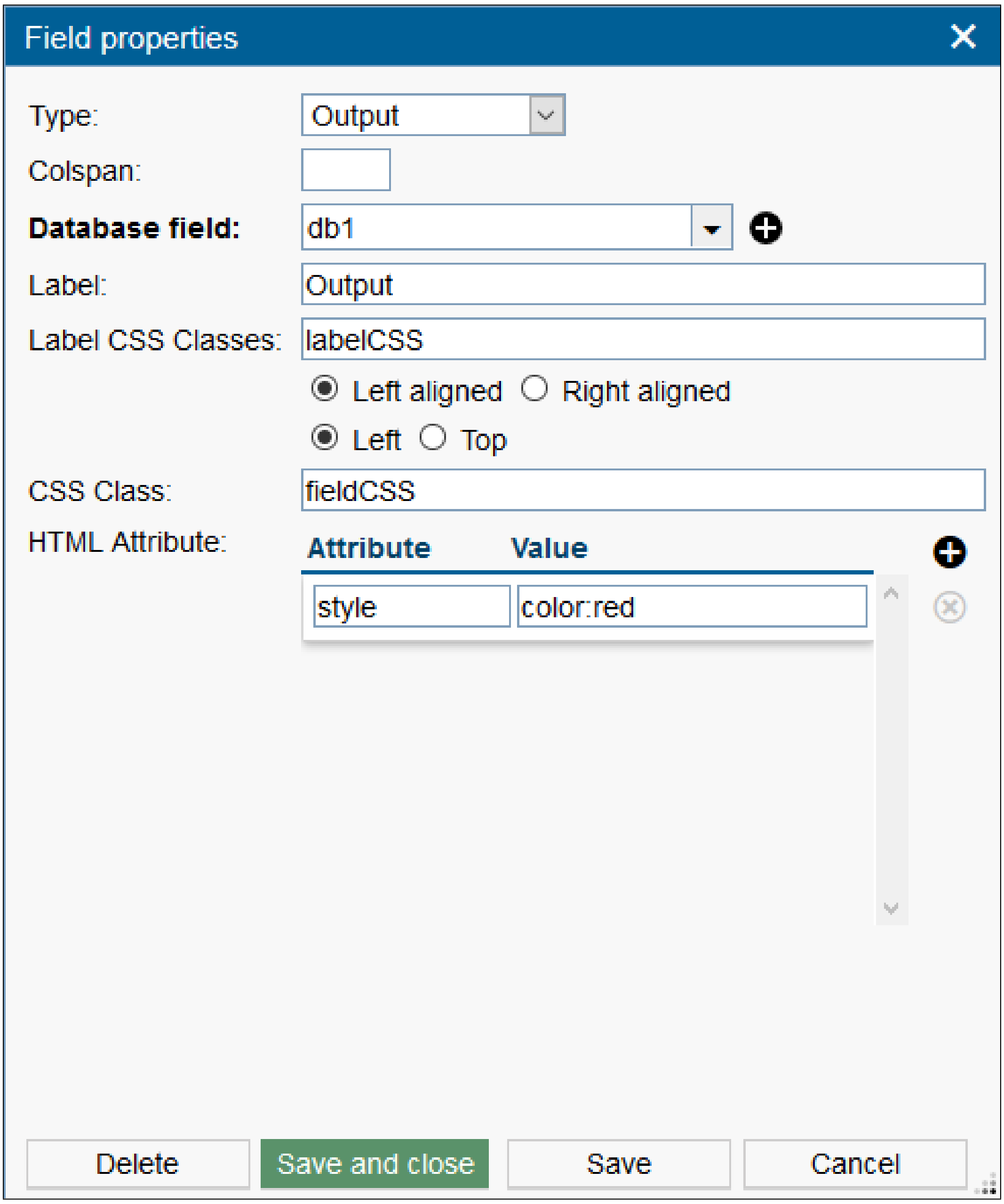
- Multiple selection: several values can be selected from a list
- Subform: an embedded table (1:n relation to the current form)
- Button: a button with an action

For each element a detail mask is defined (double-click on the element or function “Field properties”), where the label, the label position, the database field, and other HTML attributes can be defined (see Fig. 6.8).

Field properties mask

The following can be defined:

- **Section, Table**:
  - Title: Here you can define a heading for the section or table.
  - Collapsible: With this checkbox you can define whether the section or the table would be collapsible or not.
  - Border: If the checkbox is activated, the element is displayed with a border.
  - CSS-Classes: Here you can specify the CSS classes for the element.
  - Columns (only available for Table): Defines *grid-template-columns* CSS style property. More information under the following link: https:://www.w3schools.com/cssref/pr_grid-template-columns.asp
  - Group: A *block* can be selected. More about *block* can be found in the section 6.4.1.
- **Text**:
  - Colspan: This attribute specifies the number of columns a cell should span to the right.
  - Label: Defines a text *label* for the given Element or in this case just an ordinary text.
  - CSS-Class: Here you can specify the CSS classes for the element.
  - HTML Attribute: This table allows an HTML element to be defined via the HTML attributes. Attributes are usually defined as name/value pairs like: *name="value"*.
- **Output, Input field, Password field, Text area**:
  - Type: Defining of the element type.
  - Colspan: Analog to *Text*.
  - Database field: Here you can select or add a database field.
  - Label: Analog to *Text*.
  - Label CSS-Classes: Here you can set the CSS classes for the *label* element. In addition, you can easily define the position of the caption by selecting a different radio buttons (*Left aligned, Right aligned, Left, Top*.



Field properties

Type: Output

Colspan:

Database field: db1

Label: Output

Label CSS Classes: labelCSS

● Left aligned ○ Right aligned

● Left ○ Top

CSS Class: fieldCSS

HTML Attribute:

Attribute	Value
style	color:red

Figure 6.8: **Field properties**

- CSS-Class: Analog to *Text*.
- HTML Attribute: Analog to *Text*.

- **Select list, Multiple selection**: The additional fields for these elements are:
  - Appearance: Defines how the selection lists will be displayed.
  - Rows: Is offered only if radio button *Select list* is activated and defines the *size* of the select list (the number of displayed elements).

- **Subform**: The additional fields for this element are:
  - Subform: Here you can select or add a subform.
  - Editable: If the checkbox is activated, the subform is defined as editable. In this case you can also specify the visible columns. If the checkbox is not activated, the subform is defined as not editable. For non-editable subforms it is possible to define a *Node Id*. This is a *configid* element that is the reference to a table defined in GUI configuration XML.
- **Button**: The additional field for this element is:
  - Action: In this table the actions for the button can be specified(*send, setvalue, reset*).

Tab: Schema

The fields of the form (upper table) and the subforms (lower table) are shown in tabular form. Editing is done directly in the table, adding and deleting with the toolbar, moving entries in the upper table by using the functions in the main toolbar.
Columns of the form field table:

- Id: The name of the field in the database table and the Java class.
- Label: The name in the UI, is used as default when creating the layout, as header in form tables, and for column selection in reporting.
- Description: Free text which describes the current field.
- Type: The type for the field. Note that the type information is used for creating a Java class and a database table. Table 6.1 shows to which Java type the entered type will be converted at the creation time of the Java class for the form. The restrictions of the database, for example length of varchar fields, have to be considered. A special value is "block": fields with this type are not added to the Java class or database table, they are used for structuring the form (for example to set parts of the form invisible).
- Values: Define the values for select lists. You can edit the list by clicking on the values (initially "-", means no values defined).
- Length: The length of the field in the database.
- Foreign key: This checkbox can be activated to create a foreign key on field OID of another form or persistent of package com.groiss.org. The checkbox is active only, if a form class (e.g. *com.groiss.forms.myform_1*) or a persistent (e.g. *com.groiss.org.User*) is entered as type.
- Index: Activate this checkbox to create an index on the selected field.

Hints: A special case are the *java.lang* types explained at example *int* and *java.lang.Integer*: Both types are created as decimal(10) in database, but *int* has the default value 0 and *java.lang.Integer* the value null. The advantage of *java.lang.Integer* is that e.g. form fields of this type are not pre-filled and a must-field check can be performed (but 0 is a valid value and in this case must-field check ignores this field).
Ordinary date fields (*date* and *dateTime*) do not save the timezone information which could lead to different values in different timezones. If this behavior is not desired, the special types *UTCdate* and *UTCdateTime* can be used which allow to store and retrieve a calendar date independent of server or client time zone. This kind of date is saved with timezone UTC.
In the subform table the Type is a form type, the Id an integer, label and description as above.

Type (xmltype)	DB–Type	Java–Type	Short description
string	VARCHAR	java.lang.String	Text up to 4000 characters
date	DATE (Oracle) DATETIME (SQL–Server)	java.util.Date	Only date is displayed incl. datepicker
UTCdate	DATE (Oracle) DATETIME (SQL–Server)	java.util.Date	Only date is displayed incl. datepicker, but independent of time-zone (see *Hints* for more details)
dateTime	DATETIME	java.util.Date	Date with time is displayed incl. datepicker
UTCdateTime	DATE (Oracle) DATETIME (SQL–Server)	java.util.Date	Date with time is displayed incl. datepicker, but independent of time-zone (see *Hints* for more details)
time	VARCHAR(8)	java.lang.String	Time as text (e.g. 15:00:00)
int	DECIMAL(10)	int	Whole number (32 bit), default value is 0
long	DECIMAL(20) BIGINT (SQL–Server)	long	Whole number (64 bit), default value is 0
double	DOUBLE PRECISION	double	Real number (64 bit), default value is 0
decimal	DECIMAL	long[a] double[b]	Fixed point real number, default value is 0
boolean	DECIMAL(1)	boolean	0 or 1, default value is 0
longString	CLOB (Oracle) VARCHAR(MAX) (SQL–Server)	java.lang.String	Text with more than 4000 characters
binary	BLOB (Oracle) VARBINARY(MAX) (SQL–Server)	byte[]	XForms allow to define fields of type *binary*; should be filled via API only
java.lang.Integer	DECIMAL(10)	java.lang.Integer	Whole number (32 bit), default value is NULL (see *Hints* for more details)
java.lang.Long	DECIMAL(20) BIGINT (SQL–Server)	java.lang.Long	Whole number (64 bit), default value is NULL
java.lang.Double	DOUBLE PRECISION	java.lang.Double	Real number (64 bit), default value is NULL
java.lang.Boolean	DECIMAL(1)	java.lang.Boolean	0 or 1, default value is NULL
Class name	DECIMAL(20) – oid[c] VARCHAR(200) – Class name[d]	Class	This class has to implement the interface *com.groiss.store.Persistent* or it has to be a subclass of a class which implements this interface

[a] If just a precision and no scale was specified in attribute *Length* (e.g. 3).

[b] If precision as well as scale were specified in attribute *Length* (e.g. 3,4).

[c] The oid is kept in the form. The result of the method "toString()" of the corresponding object is shown.

[d] optional, an additional database column (named *column*_class) with this type is generated if a java-class has been specified, which implements an interface, an abstract class or the interface *com.groiss.store.HasSubclasses*.

Table 6.1: **Type of a form-field and its representation in the database and in the corresponding Java class respectively**

Tab: Bindings

In this area you can define XForms bindings, see the XForms documentation for details. Each binding entry has the following attributes:

- Sub-binding of: used for nested bindings. In the main binding the nodeset expression selects some part of the model, the nodeset of the sub-bindings restrict the selection further.

  Example:

  ```
  <xf:bind nodeset="/data/form/subform[@id=1]/form[position() != last()]">
  <xf:bind nodeset="timehours" ...
  ```

  The first binding selects the first subform of the form, the sub-binding selects a field in this form.

- Nodeset: the form fields, that are affected by the binding
- Id: optional id of a binding
- Required: an XPath Expression, that defines when the field is mandatory
- Readonly: an XPath Expression, that defines when the field is readonly
- Relevant: an XPath Expression, that defines when the field is visible
- Constraint: an XPath Expression that defines which values are valid
- Calculate: an XPath Expression that computes the field value

Tab: Source

Here you can directly edit the HTML source of the form. Note, that changes can cause that the form can no longer be edited in the layout tab. Form editor checks syntax of forms, if the layout has been changed manually to a structure not supported by the editor, the layout functions are disabled.

The Menu

The first menu, “Form” mainly contains the standard functions for opening, saving and closing.

- **New:** A new empty form is created.
- **Open:** An existing form can be selected for editing.
- **Parse HTML:** The HTML source is parsed and the schema is modified accordingly: If an existing field is no longer in the form, it is removed from the schema; if a new field has been found, it is added to the schema. The field type and other schema attributes must be edtied manually.

  Executing this function is necessary, it the form is not edited using the layout tab and fields should be added or removed.

- **Save:** When saving a form the following actions are performed: If no form name or id has been defined, a dialog is opened for entering the name, id, version and type (process form, document form, or folder form). Afterwards the following actions are performed on the server:
  - a Java class is created and put into the *forms* directory of **@enterprise** ,
  - the HTML source is saved in the application directory under classes/appl-id/forms/formid_formversion.xhtml (if no other path has been defined),
  - the database table is created or modified.
- **Save As..:** as above, but a copy with a new id and name is created
- **Preview:** a preview of the form is shown in a popup window
- **Properties:** The properties window is opened - the same that is opened when invoking the toolbar function "Edit" in the list of form-types (see section 6.4.4).
- **Table columns:** Here you can define the columns for the table view (subform or form table).
- **Download HTML:** download the HTML source
- **Exit:** Closes the form editor

The "Edit" menu contains the standard actions Undo, Redo, Cut, Copy, Paste, and Delete. Moreover you can find:

- **Field properties:** Opens the properties window for the selected element.
- **Up, Down:** Moves the selected element up or down (in Layout or in the form field table).
- **Layout:** A form title can be defined, in a Scripts area you can write Javascript code and in a Style area you can write CSS statements.
- **Create new layout:** A standard layout with the defined form fields is generated.
- **Properties:** Two form editor settings can be set: Avoid SQL: if set, the database operations are omitted (when saving the form). Execute form handler: The form handler methods beforeShow and onShow are executed.

The help menu opens the help page for the form editor.

Create a view form with form editor

To create a new view form (= a form that derive from a base form) with the form editor, you have to follow the steps:

- Create a new form with the form editor
- Open the properties via menu item *Form*

- Define the ID and name and enter the ID and version number of the base form in the *Base form* field:

```
<formId>_<version number>
```

- Save the form and open the *Schema* tab in form editor
- Add new form fields whereby the fields must have the same IDs as the fields in the base form.
- Finally create a new layout via the menu item *Edit* and then save the form.

6.4.2 View

After activating this function the object-details of the selected form opens and the tab *Preview* is active.

6.4.3 Create view

In @**enterprise**it is possible (via the extended search) to search for form field contents independent of the form versions. Therefore it is necessary to create a database view over all version of the form. This database view contains all form field which exist in all form versions.

By clicking this function a HTML–page is shown which contains the following informations (required fields are bold):

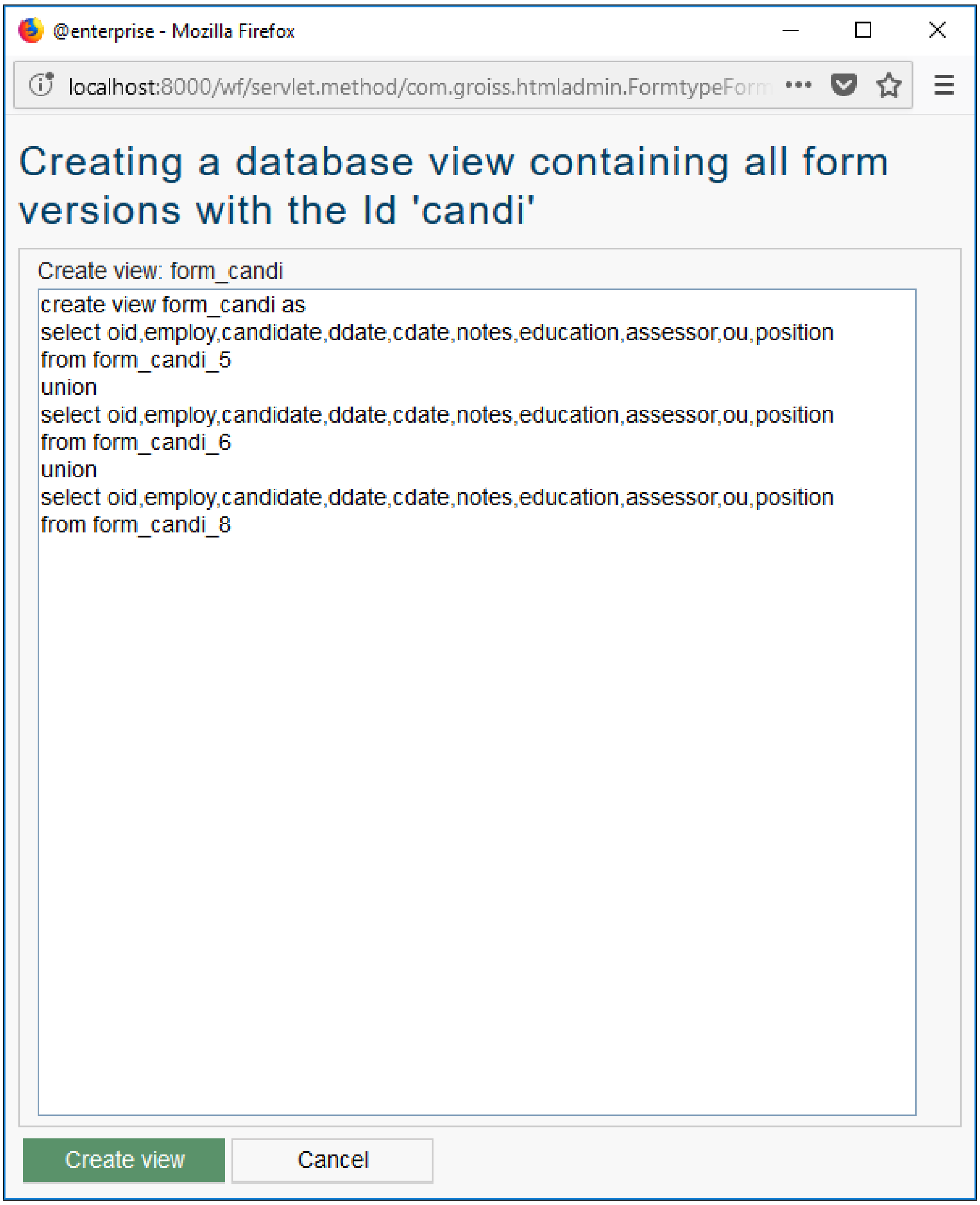
1. **Create view: *formid*:** The SQL–statement which will be used to create the database view. By clicking the button "Create View" the view is created.
2. **Replace existing view: *formid*:** The SQL–statement which will be used to replace the current database view by a new one. By clicking the button "Replace existing view" the old view is replaced by the new one.

Hint: Depending upon whether there exists already a database view or not, you can either use the function *Create View* or the function *Replace existing View*.

6.4.4 Edit

The object-details of forms contain the following tabs:

- General
- Java class
- Database table
- Rights
- Standard permissions



@enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.htmladmin.FormtypeForm

Creating a database view containing all form versions with the Id 'candi'

Create view: form_candi

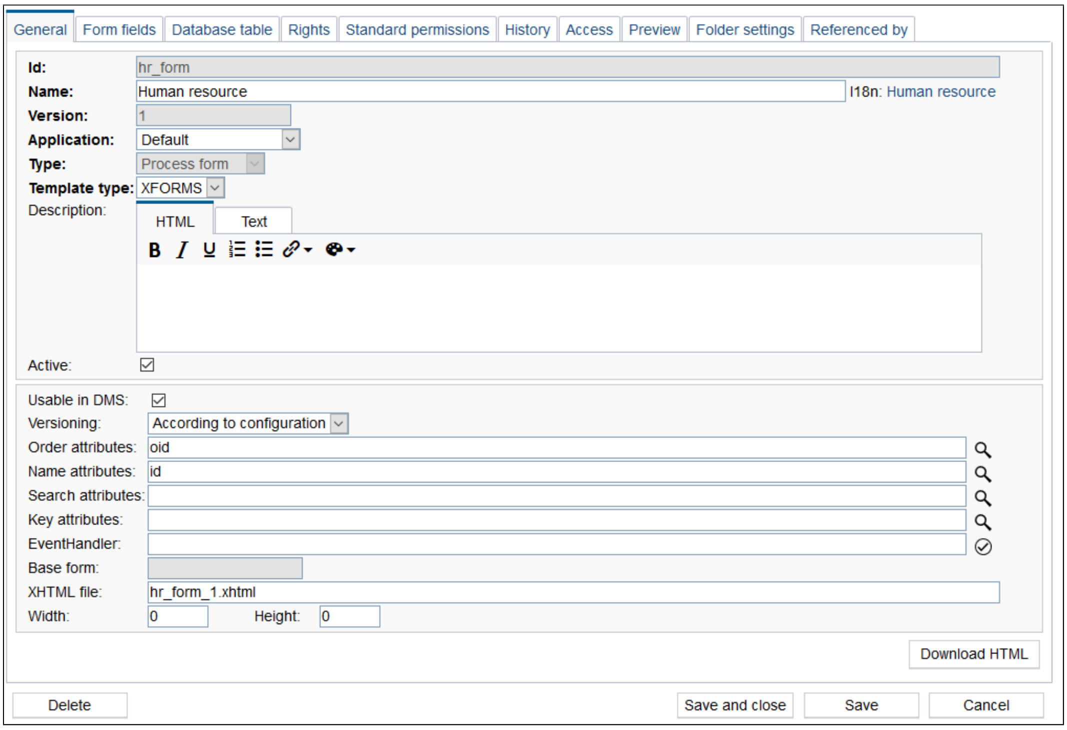
```
create view form_candi as
select oid,employ,candidate,ddate,cdate,notes,education,assessor,ou,position
from form_candi_5
union
select oid,employ,candidate,ddate,cdate,notes,education,assessor,ou,position
from form_candi_6
union
select oid,employ,candidate,ddate,cdate,notes,education,assessor,ou,position
from form_candi_8
```

Figure 6.9: **Function: Create view**

- History
- Access
- Preview
- Folder settings

- Referenced by

Tab: General



Id: hr_form
Name: Human resource — I18n: Human resource
Version: 1
Application: Default
Type: Process form
Template type: XFORMS
Description:
Active: ☑
Usable in DMS: ☑
Versioning: According to configuration
Order attributes: oid
Name attributes: id
Search attributes:
Key attributes:
EventHandler:
Base form:
XHTML file: hr_form_1.xhtml
Width: 0 Height: 0

Figure 6.10: **Object details: General**

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the form (cannot be changed in GUI).

  Hint: If the Id should be changed, use the servlet method *com.groiss.upgrade.FormIdChange.showMask*. If the checkbox *keep old class* is activated, the version entries of the form will be preserved.

- **Name**: Name of the form. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).

- **Version:** Version number of the form, a positive integer.

- **Application:** The form belongs to this application.

- **Type:** With the help of this attribute you can define in which context the form should be used. There are three different possible usages:

  - Process form: The form is attached to a process and can be used at corresponding tasks.
  - Document form: This form is used to describe the meta data of documents within the DMS.
  - Folder form: This form is used to describe the meta data of folders within the DMS.

- **Template type:** Here you can define one of the following formats:

  - XHTML
  - XFORMS

  Hint: If HTML forms should be used, enter *ep.use.htmlforms=true* in the configuration file *avw.conf.*

- Description: Free Text which is displayed as tooltip at formtype selection of DMS function *New* and Drag & Drop dialog. The tab *HTML* contains a WYSIWYG-Editor to format HTML. The tab *Text* shows the generated HTML source.

- Active: see chapter 2.2.1

- Usable in DMS: If this checkbox is checked the form can be used within the DMS. Please note that only base forms (not view forms) can be used in DMS!

- **Versioning:** Here it is possible to define when a version of the form should be created. This setting is only relevant for forms which can be used within the DMS. Furthermore this setting takes effect only if the form is not used as a process form, because in this case a new version is created automatically every time when the function "finish" is carried out. There are four possibilities to configure the versioning:

  - according to configuration: the versioning happens as defined in the system configuration under section "DMS" (see the installation guide of **@enterprise**).
  - Not automatically: in this case the user has to create a version manually with the function "Make Version".
  - On agent change: the versioning happens every time when the agent of the form has changed.
  - On every change: the versioning happens every time when the form has been changed.

- Order attributes: This attribute is used to define the order of the entries in the table which represents a subform of a form. A list of column ids separated by comma can be entered, each column id may have the prefix + (for ascending search, the default) or "-" for descending search. Syntax:

  ```
  [ "+" | "-"] colid { "," [ "+" | "-"] colid }*
  ```

  Sorting the tables by clicking on the table header is still restricted to one column.

- Name attributes: The content of this field is shown as form name, for example in selection windows or in a DMS folder. Furthermore a regular expression can be entered, e.g. {formfield} (display_text), {formfield2}. The curly brackets are necessary to show values of formfields, i.e. the previous example could generate following output: Joe (firstname), Russel. *Jose* and *Russel* are values of the entered formfields, *firstname* is a free defined text (= display_text). Further possibility is the definition of a formatter, e.g. {datefield, date} or {datefield, datetime}. This definition allows to display the date field as date with/without time. More information can be found in **@enterprise** APIDoc under com.groiss.ds.StringExpression.
- Search attributes: Here you can define the attributes which are used for quick search. It is possible to define the quick search function for each DMS folder (see section 6.4.4). If no search attributes are entered, the name of the DMS object is used by default.
- Key attributes: Here you can define the form fields as keys which are used for duplicate checks (e.g. at XML export/import).
- EventHandler: A Java–class or a comma-separated list of Java–classes implementing the interface

  - com.groiss.dms.FormEventHandler,
  - com.groiss.dms.XHTMLFormEventHandler or
  - com.groiss.dms.DocumentEventHandler.

  So the application programmer has the possibility to react on several events which are triggered during the manipulation of the form. If available, it is recommended to extend one of the appropriate adapter classes located in com.groiss.dms package (e.g. com.groiss.dms.XHTMLFormEventAdapter)!
- Base form: The current form can be derived from a base form, whereas this field contains the name of the base form.
- XHTML file: A reference to the XHTML-Page in the Classpath.
- Width and Height: Specifies the size of the page.
- File filter: This field is available for form type *Document form* only and allows the definition of a comma-separated list of extensions and/or mimetypes which are used as filter for file selection (in DMS functions *New* and *Replace* via button *Browse*). Extensions must begin with a dot! The advantage of mimetypes is the definition of wildcards (*) as shown in the examples beneath. It is also possible to mix extensions and mimetypes. Examples:

  - .doc,.docx => shows MS Word documents
  - image/png => shows PNG files
  - image/* => shows all images files
  - application/msword,.docx => shows all Word documents

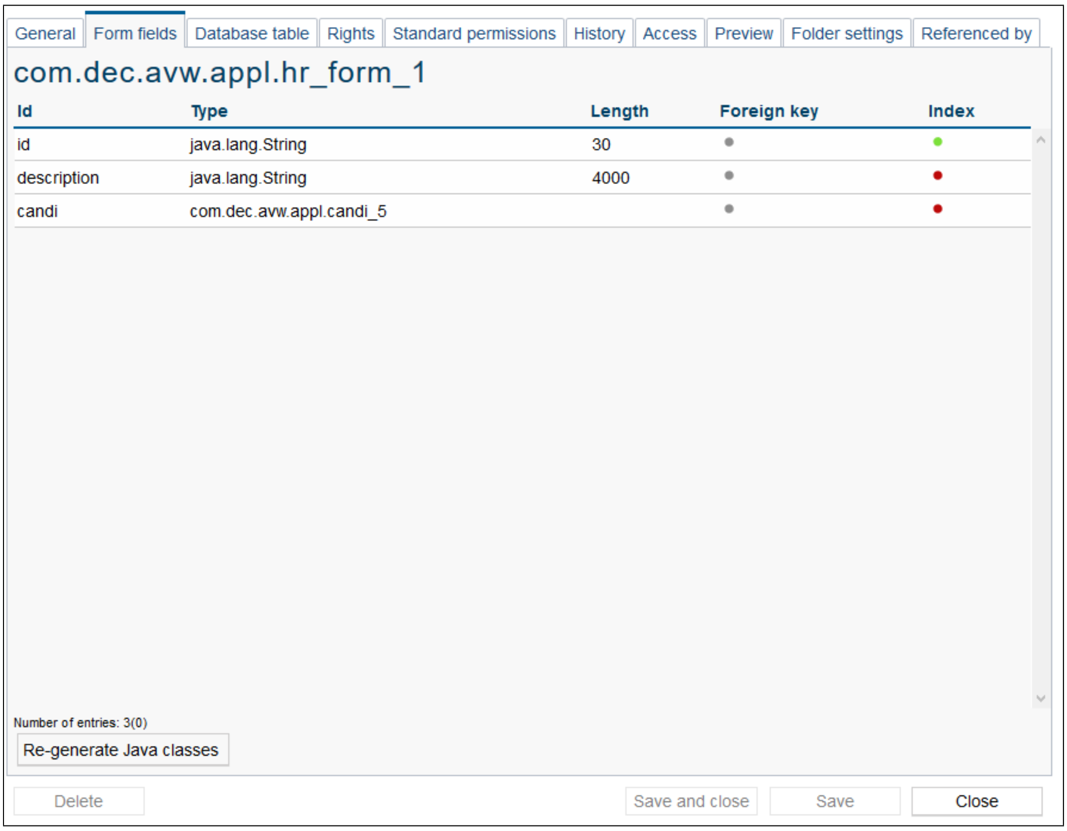
By clicking the button **Download HTML** you can store the HTML–form of the current form to your local file system. There you can edit it and afterwards you can upload it to the system via the function *Parse HTML* (see form editor).

Tab: Form fields

This tab shows the fields, types, length, foreign key and Index of the Form fields which represents the new form in **@enterprise**.
The icons for *Foreign key* and *Index* are defined in following way:

- Red Icon: No Index/foreign key has been created for this field
- Green Icon: Index/foreign key has been created for this field
- Grey Icon: No foreign key can be created for this field

The button *Re-generate Java classes* creates/regenerates a new Java class of this form (regenerating is also possible without existing java class) and stores it in the *forms* directory of your **@enterprise**installation.



com.dec.avw.appl.hr_form_1

Id	Type	Length	Foreign key	Index
id	java.lang.String	30	●	🟢
description	java.lang.String	4000	●	🔴
candi	com.dec.avw.appl.candi_5		●	🔴

Number of entries: 3(0)

Figure 6.11: **Object details: Form fields**

Tab: Database table

This tab shows the database statement which has been used to create the table of the form. Furthermore information about created foreign keys and "Create Index" statements are displayed (see step 3 of form-wizard). The are *Referenced by* contains information about foreign keys (defined in other forms) which references on current form. In area *Foreign keys* the foreign keys (on other forms or persistents of package com.groiss.org) of current form are displayed.

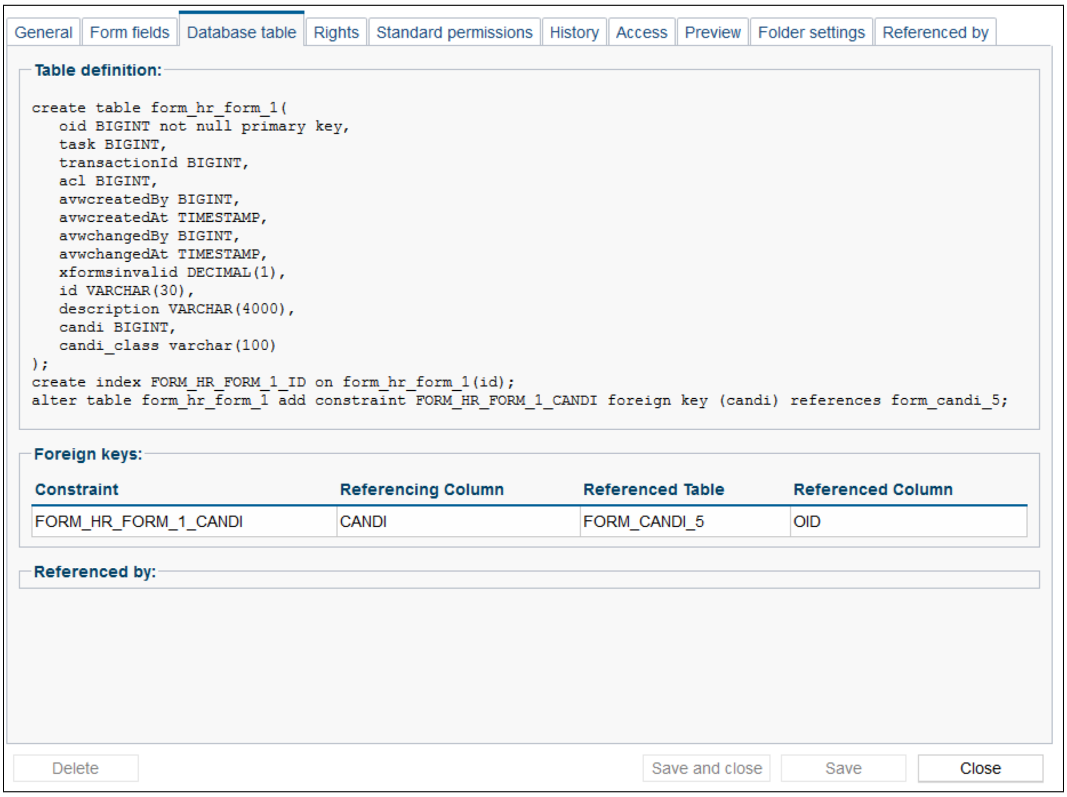


Table definition:

```
create table form_hr_form_1(
   oid BIGINT not null primary key,
   task BIGINT,
   transactionId BIGINT,
   acl BIGINT,
   avwcreatedBy BIGINT,
   avwcreatedAt TIMESTAMP,
   avwchangedBy BIGINT,
   avwchangedAt TIMESTAMP,
   xformsinvalid DECIMAL(1),
   id VARCHAR(30),
   description VARCHAR(4000),
   candi BIGINT,
   candi_class varchar(100)
);
create index FORM_HR_FORM_1_ID on form_hr_form_1(id);
alter table form_hr_form_1 add constraint FORM_HR_FORM_1_CANDI foreign key (candi) references form_candi_5;
```

Foreign keys:

Constraint	Referencing Column	Referenced Table	Referenced Column
FORM_HR_FORM_1_CANDI	CANDI	FORM_CANDI_5	OID

Referenced by:

Figure 6.12: **Object details: Database table**

Tab: Rights

see chapter 5

Tab: Standard permissions

see chapter 5

Tab: Preview

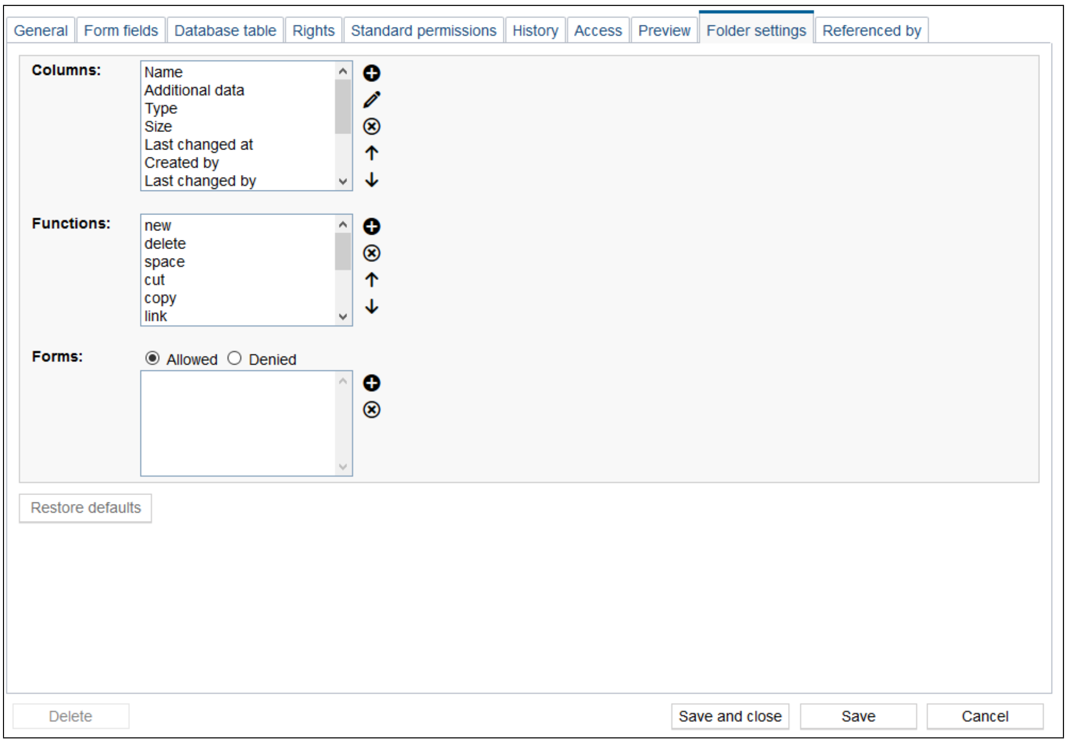
This tab displays the HTML-view of the form.

Tab: Folder settings

If the form is a folder, you can modify the design, how the folder content is displayed, in this tab (see figure 6.13). It is possible to

- Add columns, edit and delete them and change the order
- Add functions, delete them and change the order
- Add forms, delete them and set their allowance (*allowed* or *denied*)

The changes of this page are used for all folder instances of this formtype.



Columns: Name, Additional data, Type, Size, Last changed at, Created by, Last changed by

Functions: new, delete, space, cut, copy, link

Forms: ● Allowed ○ Denied

Figure 6.13: **Form details: Folder settings**

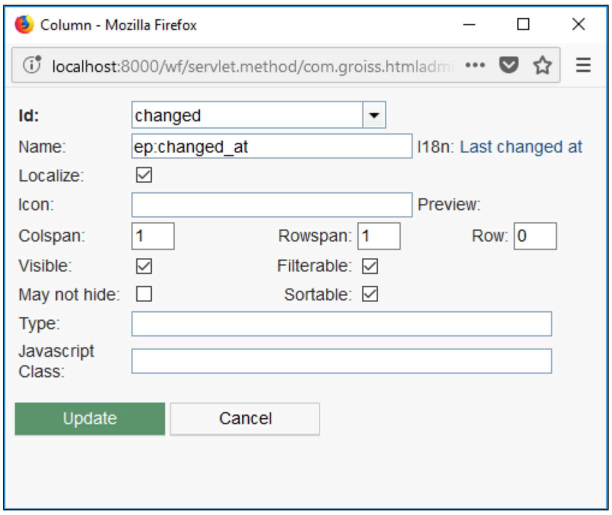
Content of the HTML–page *Folder Settings*:

- **Columns:** Columns, which should appear in your folder
- **Functions:** Toolbar functions, which should appear in your folder
- **Forms:** Forms, which are allowed or not allowed in your folder
- **Add:** Activating this button displays a HTML–page, where you can add new columns to the DMS–Object–Table of the current folder. How you can do this and other operations is explained beneath.

- **Edit:** This function is available at *Columns* only and allows to edit entries of this list (analog to function *Add*).
- **Remove:** Activating this button deletes all entries which have been selected before.
- ↑ **Up:** Activating this function moves up the selected column for one position. Because of that the *column* or *function* is moved one position to the left of the current folder.
- ↓ **Down:** Analogous to *Up*, but one position to the right.

Add column This function can be activated by clicking the button *Add* beside the *Column* list in the HTML–page *Folder Settings* (see figure 6.13).

The function *Add column* can be used to add new columns to the table design for the DMS–Object– Table of the current folder.



Column - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.htmladm

Id: changed

Name: ep:changed_at I18n: Last changed at

Localize: ☑

Icon: Preview:

Colspan: 1 Rowspan: 1 Row: 0

Visible: ☑ Filterable: ☑

May not hide: □ Sortable: ☑

Type:

Javascript Class:

Figure 6.14: **Column**

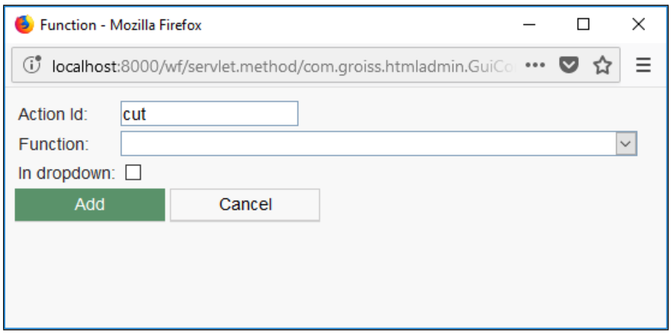
Content of the HTML–page *Column*:

- **Id:** Here you can enter columns which are predetermined by the system, and correspond to properties of DMS–Objects.
- **Name:** The caption for the column. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of the appropriate application (for more information see section 6.8). This link appears only, if the current user has the right *admin* and the checkbox *Localize* is activated!
- **Localize:** If this checkbox is activated, the *Name* will be localized (if available in resource-bundle).

- **Icon:** Here you can enter a path for displaying an icon instead of the name.
- **Colspan, Rowspan and Row:** These attributes allow to define the style of the column in table, e.g. column should be displayed in second row over two columns of first row.
- **Visible:** If this checkbox is activated, the column is displayed at the first call, otherwise you can add it by using the column picker.
- **Filterable:** If activated, the filter mechanism can be used for this column.
- **May not hide:** This checkbox indicates, if the column can be faded out via column-picker (only in smartclient).
- **Sortable:** If activated, the column can be sorted.
- **Type:** Definition of following column types is possible: string, date, dateTime, number (for numbers without comma) or decimal (for numbers with comma + appropriate representation according to decimal formatter configuration).
- **Javascript Class:** It is possible to enter a path to a js class (widget) which is responsible for the representation of a column. An example widget is *ep/widget/smartclient/dms/columns/N*

Add function This function can be activated by clicking the button *Add* beside the *Function* list in the HTML–page *Folder Settings* (see figure 6.13).

The function *Add function* can be used to add new toolbar functions to current folder.


Function - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.htmladmin.GuiCo
Add
Cancel

Action Id: cut

Function:

In dropdown: □

Figure 6.15: **Functions**

Content of the HTML–page *Functions*:

- **Action Id:** Enter an action key, which is defined in **@enterprise** (e.g. cut, insert, copy, link, paste, startProcess, etc.). It is also possible to add a quick search function by adding the id *search* which generates the input field, the functions *Search* and *All entries*.
- **Function:** A task–function can be selected here.
- **In dropdown:** If this checkbox is activated, the function is displayed within a dropdown menu (only in smartclient).

Add form This function can be activated by clicking the button *Add* beside the *Forms* list in the HTML–page *Folder Settings* (see figure 6.13).

The function *Add form* can be used to add forms which are allowed or not for this folder. If the radio–button *Allowed* is activated, only these forms are selectable in dropdown-list for creating a DMS form. If the radio–button *Denied* is activated, all forms which are not added to this list are selectable in dropdown-list.

6.4.5 Report

For one or more forms a report can be created analog to an application report (see section 6.1.4).

6.5 *Processes*

Processes describe the structure of business processes. Besides the functions described in chapter 2.1.2 the following functions can be found in the toolbar:

- Create new process with the process editor
- Edit a process with the process editor
- Load WDL / XWDL
- Report

The object-details of application contain the following tabs:

- General
- Source
- Graph
- Components
- Visibility of forms
- Escalation
- Functions
- History
- Access
- Folder settings
- Referenced by
- Document permissions

6.5.1 Create new process with the process editor

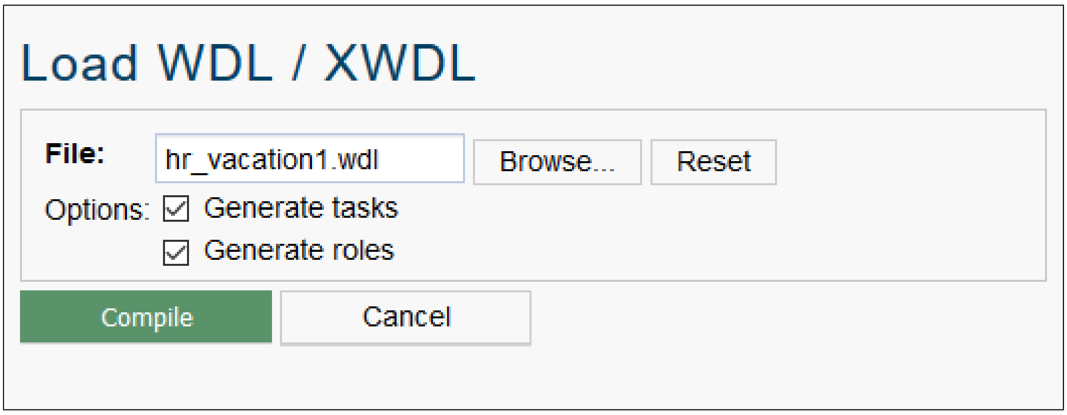
After activating this function, the process-editor starts. You can create a new process. Detailed information about the process-editor can be found in chapter 7.2.

6.5.2 Edit a process with the process editor

By clicking this function the process editor is started with the selected process as argument. With the help of the process editor you can edit the process graphically.

6.5.3 Load WDL / XWDL

With this function you can load a process from a WDL or XWDL script file. A window is shown where you may enter the following information (see Fig. 6.16):



Load WDL / XWDL

File: hr_vacation1.wdl

Options: ☑ Generate tasks
☑ Generate roles

Figure 6.16: **Load WDL / XWDL**

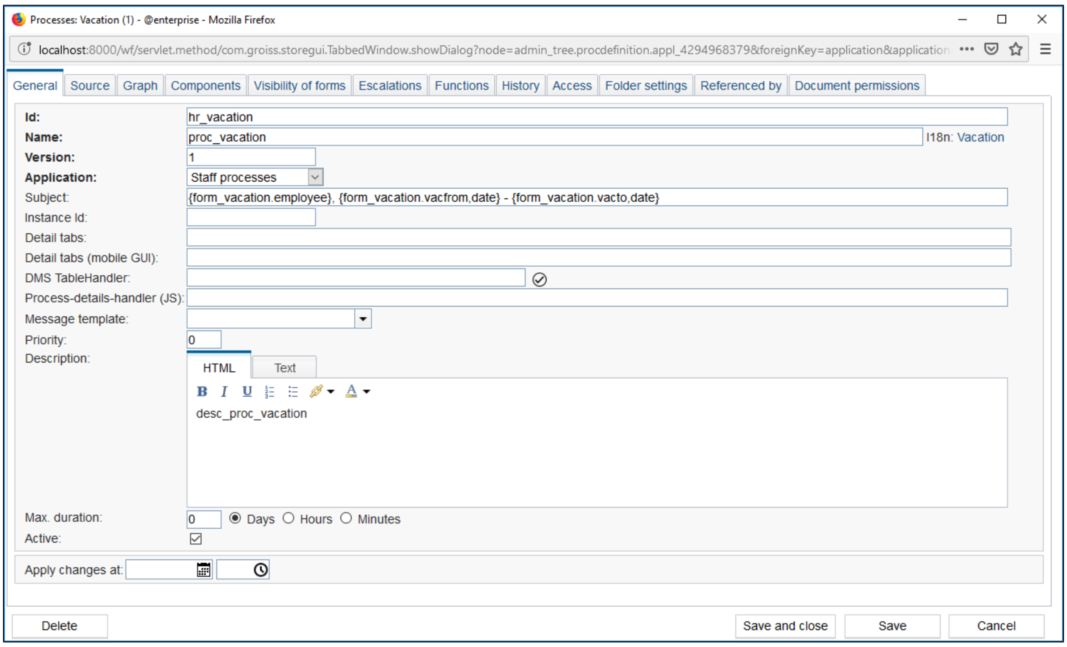
- Select the file containing the process specification.
- The checkboxes *Generate tasks* and *Generate roles* allow you to specify whether tasks and/or roles unknown to the system should be generated automatically.
- Click "Compile" to load the script file and save the process in the database.

After the compilation the system informs you whether the operation has been successfully or whether errors have occurred.

6.5.4 Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Unique identifier of the process.
- **Name:** Name of the process. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).


Processes: Vacation (1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_tree.procdefinition.appl_4294968379&foreignKey=application&application
General
Source
Graph
Components
Visibility of forms
Escalations
Functions
History
Access
Folder settings
Referenced by
Document permissions
HTML
Text
B
I
U
Apply changes at:
Delete
Save and close
Save
Cancel

Id: hr_vacation
Name: proc_vacation I18n: Vacation
Version: 1
Application: Staff processes
Subject: {form_vacation.employee}, {form_vacation.vacfrom,date} - {form_vacation.vacto,date}
Instance Id:
Detail tabs:
Detail tabs (mobile GUI):
DMS TableHandler:
Process-details-handler (JS):
Message template:
Priority: 0
Description: desc_proc_vacation
Max. duration: 0 ● Days ○ Hours ○ Minutes
Active: ☑

Figure 6.17: **Object details: General**

- **Version:** Version number of the process, a positive integer.
- **Application:** The application, where the process is running.
- Subject: A form field, which content is used as subject of the process instance at runtime. @**enterprise** offers the possibility to enter a pattern (regular expression).
- Instance Id: Here you can define an Instance Id which identifies the started process instance uniquely. It is also possible to enter a pattern (regular expression) in following format:

  { letter* "{" ("n" | "nn" | "ny" | "nny" | "y" | "yy" | "ou") ["," formatter] "}" letter* }*

  Explanation:

  - letter: arbitrary character
  - n: next number
  - nn: next number for this process
  - ny: next number per year
  - nny: next number for this process for this year
  - y: year with last 2 digits only
  - yy: year
  - ou: organizational unit
  - formatter: "date", "datetime" or a Java decimal-format-pattern (optionally)

Hint: If the Instance Id contains spaces and the parameter *webdav.show.subject* is set to 1 in configuration file *avw.conf*, attached dms-documents of the process instance cannot be opened and following error occurs: Error 1002: The document could not be found!

- Detail tabs: A comma-separated list of tab id's can be defined here which tabs should be displayed in process instance view. If nothing is entered, the standard tabs *Form*, *Documents*, *Notes*, *History* and *Process* are displayed. Default ID's are (see also class *ApplicationAdapter* in APIDoc):
  - forms: Process form(s)
  - documents: Documents
  - notes: Notes
  - history: Process history
  - process: Process picture
  - mails: Mail tab for reading/writing emails
  - plantab: Process plan view
  - info: Info area which contains information about current task and process; is displayed in every tab
- Detail tabs (mobile GUI): A comma-separated list of tab id's can be defined here which tabs should be displayed in mobile version of process instance view. If nothing is entered, the standard tabs *Form*, *Documents*, *Notes*, *History* and *Process* are displayed. Default ID's are (see also class *ApplicationAdapter* in APIDoc):
  - forms: Process form(s)
  - mblDocuments: Documents
  - mblNotes: Notes
  - mblHistory: Process history
  - mblProcess: Process picture
  - mblMails: Mail view for reading emails
- DMS TableHandler: The representation for DMS table of the process can be definied here (tab *Documents* of the process instance). Further details can be found in section *Using the DMS API* of Application Development Guide.
- Process-details-handler (JS): Enter an own DOJO widget for loading process detail tabs. This widget must implement *ep/widget/smartclient/wl/ProcessDetailsHandler*. More details can be found in *Application Development Guide*.
- Message template: This field allows to select a message template which is used for sending notification emails. More information can be found in user manual under keyword *Email notification*. If no message template is selected, the template with id *notification* is used by default (located in application *default*). Alternatively own message templates can be defined which can be used by this process (see section 6.11 for template definition).

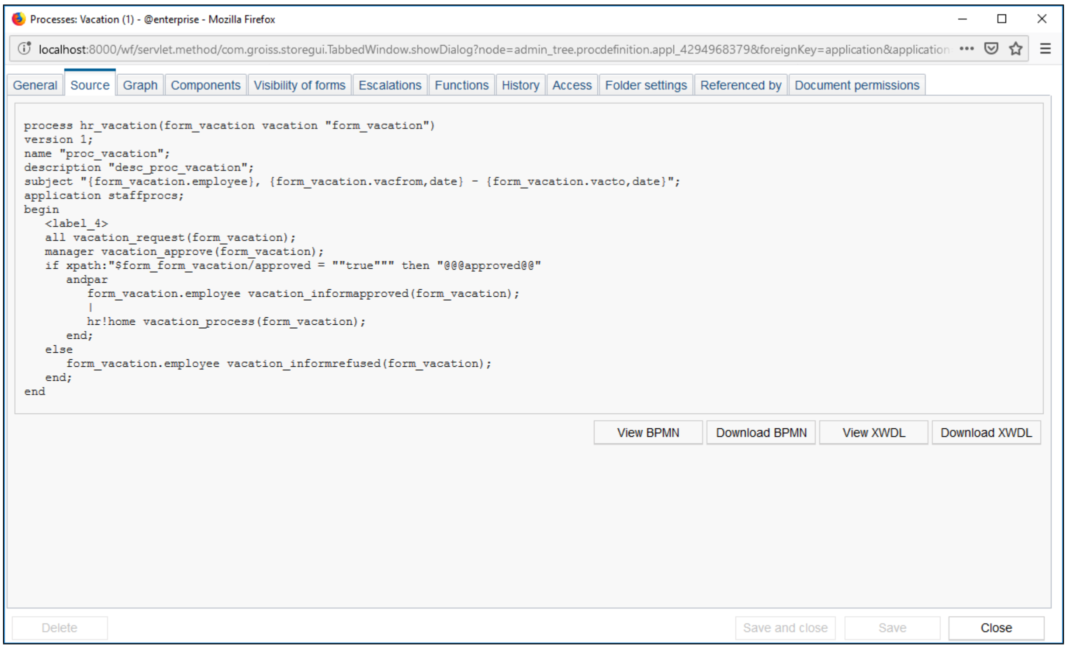
- Priority: The priority of the process.
- Description: Free text. The tab *HTML* contains a WYSIWYG-Editor to format HTML. The tab *Text* shows the generated HTML source.
- Max. duration: Maximum running time of the process, specified in days, hours or minutes.
- Active: see chapter 2.2.1
- Apply changes at: see section 2.2.1

6.5.5 Tab: Source

In this tab the WDL-Script of the selected process is shown (see Fig. 6.18).

The button **View BPMN** opens a new window with the BPMN definition of the process. By activating the button **Download BPMN** the BPMN defintion of the process can be downloaded to your local file system. More information concerning this topic can be found in *Application Development Guide* in chapter *BPMN*.

By clicking the button **View XWDL** the XWDL definition of the process is shown in a new window. Activating the button **Download XWDL** you can download the XWDL definition of the process to your local file system.


Processes: Vacation (1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_tree.procdefinition.appl_4294968379&foreignKey=application&application
General
Source
Graph
Components
Visibility of forms
Escalations
Functions
History
Access
Folder settings
Referenced by
Document permissions

```
process hr_vacation(form_vacation vacation "form_vacation")
version 1;
name "proc_vacation";
description "desc_proc_vacation";
subject "{form_vacation.employee}, {form_vacation.vacfrom,date} - {form_vacation.vacto,date}";
application staffprocs;
begin
   <label_4>
   all vacation_request(form_vacation);
   manager vacation_approve(form_vacation);
   if xpath:"$form_form_vacation/approved = ""true""" then "@@@approved@@"
      andpar
         form_vacation.employee vacation_informapproved(form_vacation);
         |
         hr!home vacation_process(form_vacation);
      end;
   else
      form_vacation.employee vacation_informrefused(form_vacation);
   end;
end
```

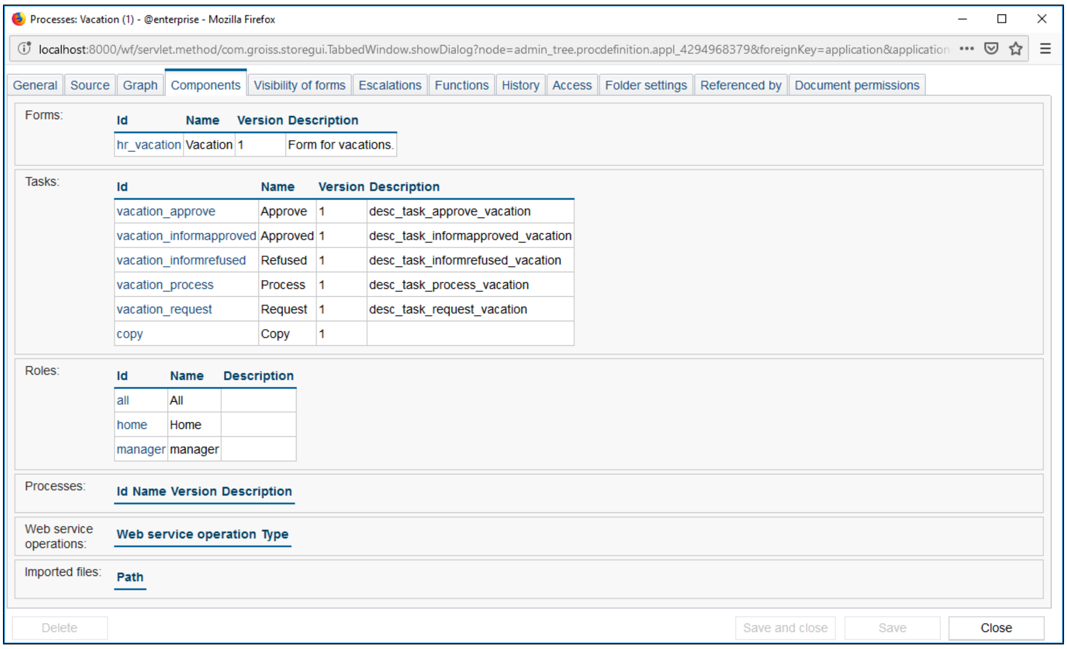
Figure 6.18: **Object details: WDL view**

6.5.6 Tab: Graph

This tab shows the graphical representation of the process like in the process editor. By activating the right mouse key a context menu is displayed with function *Download graphic* which allows to download a picture of the process.

6.5.7 Tab: Components

This tab lists the version of the tasks and forms used in the process (see Fig. 6.19). Furthermore roles, subprocesses, webservice operations and imported files by the web service are shown. By activating a link (e.g. task) within the tab a new detail-window of the object is opened.


Processes: Vacation (1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_tree.procdefinition.appl_4294968379&foreignKey=application&application
General
Source
Graph
Components
Visibility of forms
Escalations
Functions
History
Access
Folder settings
Referenced by
Document permissions
Delete
Save and close
Save
Close

Forms:

Id	Name	Version	Description
hr_vacation	Vacation	1	Form for vacations.

Tasks:

Id	Name	Version	Description
vacation_approve	Approve	1	desc_task_approve_vacation
vacation_informapproved	Approved	1	desc_task_informapproved_vacation
vacation_informrefused	Refused	1	desc_task_informrefused_vacation
vacation_process	Process	1	desc_task_process_vacation
vacation_request	Request	1	desc_task_request_vacation
copy	Copy	1	

Roles:

Id	Name	Description
all	All	
home	Home	
manager	manager	

Processes:

Id	Name	Version	Description

Web service operations:

Web service operation	Type

Imported files:

Path

Figure 6.19: **Object details: Components**

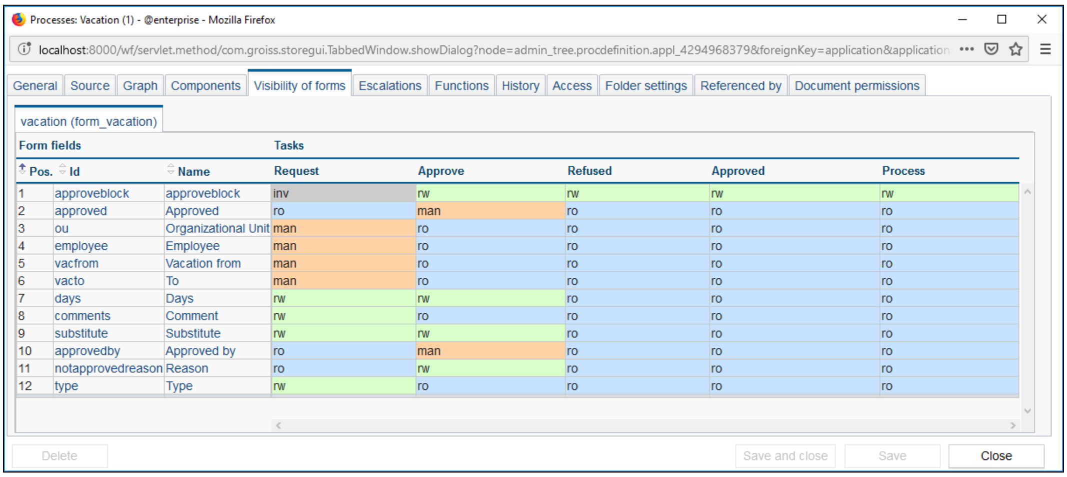
6.5.8 Tab: Visibility of forms

The tab *Forms* gives you an overview about all forms, which are assigned to the process. For each form a further tab is displayed, where the visibilities are listed of the individual tasks. In this overview a task appears only, if a form was assigned at the process definition.

If you want to change the visibility of a form field in a task, activate the link of the appropriate task. The HTML–page *Form field modes* will be shown.

Information of the HTML–page *Form field modes*:

- Form Type: The listed form fields under *Form field* refer to this form.



Processes: Vacation (1) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node=admin_tree.procdefinition.appl_4294968379&foreignKey=application&application
General
Source
Graph
Components
Visibility of forms
Escalations
Functions
History
Access
Folder settings
Referenced by
Document permissions
vacation (form_vacation)
Delete
Save and close
Save
Close

Form fields			Tasks				
Pos.	Id	Name	Request	Approve	Refused	Approved	Process
1	approveblock	approveblock	inv	rw	rw	rw	rw
2	approved	Approved	ro	man	ro	ro	ro
3	ou	Organizational Unit	man	ro	ro	ro	ro
4	employee	Employee	man	ro	ro	ro	ro
5	vacfrom	Vacation from	man	ro	ro	ro	ro
6	vacto	To	man	ro	ro	ro	ro
7	days	Days	rw	rw	ro	ro	ro
8	comments	Comment	rw	ro	ro	ro	ro
9	substitute	Substitute	rw	rw	ro	ro	ro
10	approvedby	Approved by	ro	man	ro	ro	ro
11	notapprovedreason	Reason	ro	rw	ro	ro	ro
12	type	Type	rw	ro	ro	ro	ro

Figure 6.20: **Object details: Process forms**

- Task: The form is assigned to this task.
- Process: The previous mentioned tasks is assigned to this process.
- Take visibilities from..: The visibility of an other task in this process can be taken, if there are differences between the tasks with reference to the visibility of forms.
- Form field: Name of the form field, whose visibility should be specified.
- Invisible: If this radio–button is activated, the form field will not be shown.
- Read only:
  1. Disabled: If this radio–button is activated, the form field can not be changed and it will dye grey.
  2. Text: If this radio-button is activated, the form field can not be changed, but it will not dye grey. This option does not work with XForms, because it is not supported!
- Writeable:
  1. Optional: If this radio-button is activated, the form field can be changed.
  2. Mandatory: If this radio-button is activated, the form field is changeable and must be filled.

If a subform is existing, whose visibility should be set, the information on the HTML–page *Formfield Modes* looks as follows:

- *Form type*, *Task*, *Process* and *Take visibilities from* are the same.
- Table: Name of the subform, whose visibility should be set.
- Invisible: If this radio-button is activated, the table of the subform will not be shown.

- Read only: If this radio–button is activated, the table of the subform will be shown, but cannot be changed.
- Optional: If this radio–button is activated, the table of the subform will be shown and can be changed by the button *New Table Entry*.
- No Insert/Delete: If this radio–button is activated, no further entries can be added or deleted.

Additional you have the possibility to set the visibility of a form field for all tasks. You have to click on the link of the adequate form field and the HTML-page *Form field modes* will be shown. This site is analogue to the HTML–page for form fields, but the visibilities will be set for tasks and not for form fields.
By clicking the button **Preview** a new window will be opened, where the form with the made settings will be shown.
By clicking the button **Ok** your changes, which belong to the visibilities of the form fields, are saved.
By clicking the button **Close** your changes are not saved and the current HTML–page will be closed.

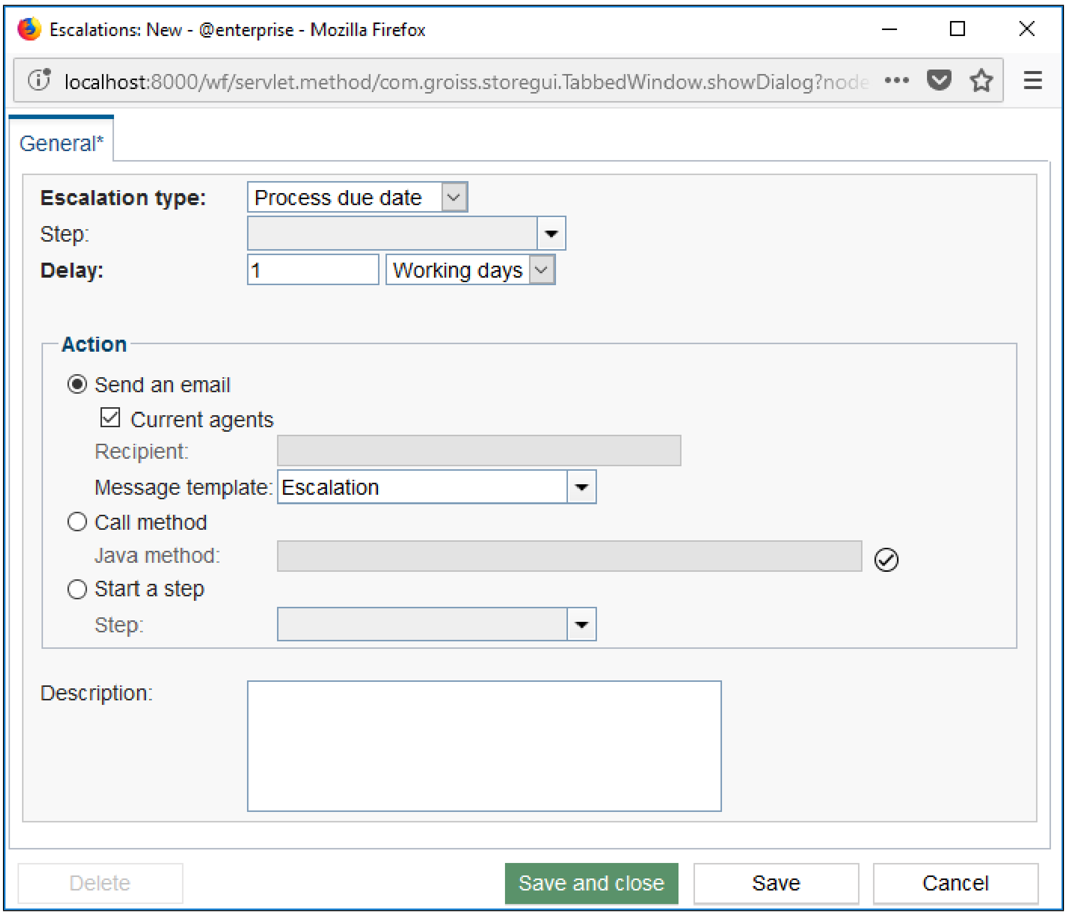
6.5.9 Tab: Escalation

With the help of escalations it is possible to react on timeouts during the execution of processes. It is possible to define four different types of actions which determine what should happen in the case of a timeout. The system timer "Escalations" of @**enterprise** is responsible for checking the timeouts. If this timer is not running the system does not check if timeouts occur or not!

This tab shows all already defined escalation-objects. You can edit them or add new one by activating the functions in the toolbar.

You can edit the following attributes (required fields are bold):

- **Escalation type:** Here you can select between following escalation types:
  1. Process due date: This escalation relates to the due date of a process, which was entered at the process-start.
  2. Activity due dates: If this type is selected, the escalation will be fired for any task of the process when the due date (of the active task) will be transcended. For each task the *Maximum Duration* in the tab *Common* can be set.
  3. Activity due date: In comparison to escalation type *Activity due dates* this one will be triggered for the selected step (task) only defined in the same named field on this mask.
  4. Activity idle time: This kind of escalation will be triggered, when the task remains for a while (*Delay*) in the Role–Worklist. This type works in the Role–Worklist **only**.
  5. Activity unseen: This escalation type will be triggered, when the current task is unseen in worklist or role-worklist.



Escalations: New - @enterprise - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node

General*

Escalation type: Process due date

Step:

Delay: 1 Working days

Action

● Send an email

☑ Current agents

Recipient:

Message template: Escalation

○ Call method

Java method:

○ Start a step

Step:

Description:

Figure 6.21: **Object-Details: Escalations**

6. Activity unfinished: If a task has been started and it is not finished in given time (= delay), this escalation type can be used to handle this case. This escalation type will be triggered for the selected step in the *Worklist*, *Role-Worklist*, *Suspension List* or *Role Suspension List*.
7. Batch unfinished: This escalation relates to unfinished batch-steps within this process. The step is specified via the steplabel.
8. Sync unfinished: Analog to *Batch unfinished*, but for Sync-step.
9. Receive unfinished: This escalation type relates to unfinished Receive-steps within this process. The step is specified via the steplabel.

- **Step:** If more steps are using the same task in process definition, you can define one step which will be triggered. Steps are not selectable for escalation types *Process due date* and *Activity due dates*.

- **Delay:** The period of time going by after the timer "Escalations" has noticed a timeout (in hours or days). This value can be negative to react early enough on a deadline, but makes only sense for *Process due time*, *Activity due dates* and *Activity due time*!

You can select between *hours*, *days* and *Working days*. Non-working days are Saturday and Sunday. It is also possible to specify additional non-working days under *Configuration* → *Calendar* (see chapter 10).
Example:
If 2 working days (48h) are entered, today is Thursday at 4pm and the process has the due date at the following Monday at 4pm, the escalation must be triggered (Assumption: Only Saturday and Sunday are non-working days).

- **Action:** In **@enterprise** three kinds of actions are distinguished:
  - Send an Email: An email is send to the recipient entered in the field "Recipient". If the option *Current Agents* is selected, an e–mail to the agents of the current task will be sent (if a valid e–mail address is entered on user detail-mask). If the current agent of the task is a role, all users which have the role (in this organizational unit) will be informed per e–mail. If no *Message template* is selected, the template with id *escalation* is used by default. Alternatively you can define own message templates which can be used by this escalation (see section 6.11 for template definition).

    In order to function properly a valid mail server has to be entered into the field "SMTP Host" in the section "Communication" of the server configuration (see Installation Guide of **@enterprise**). As sender of the mail appears either the default value "enterprise@hostname" whereas the host name is the host name of the **@enterprise**–server. If you don't want to use the default sender enter the desired sender into the field "Mail sender" which can be found beneath the field "SMTP Host".
    Example: enterprise@lima.groiss.com
  - Call method: A Java–method which will be started at timeout. The package name has to be specified too. See the example in the Application Development Guide. There are two standard functions which are mentionable: *SystemAction.increasePriority(String offset)* which allows to increase the process priority by using an offset and *SystemAction.untake()* which allows to move a task from worklist to role-worklist.
    Example: com.groiss.wf.SystemAction.increasePriority("2")
  - Start a step: Starts the selected step. Escalation steps can be defined in process editor under *Process/Escalations* (see section 7.2.6).
- Description: Free text.

6.5.10 Tab: Functions

This mask is quiet similar to 6.2.2. But functions which are assigned on this mask are visible in *History* of a process only, i.e. the function is not assigned to all tasks of this process, even not if checkbox *To all tasks* of the function is activated!

6.5.11 Tab: Folder settings

This tab offers the possibility to adapt the DMS folder settings for this process. This function is equal to the folder-form settings in section 6.4.4. It is possible to

- Add columns, edit and delete them and change the order
- Add functions, delete them and change the order
- Add forms, delete them and set their allowance (*allowed* or *denied*)

6.5.12 Tab: Document permissions

In this tab permissions for documents per process step can be defined which changes the standard permission behavior of **@enterprise** for this process. Beside the standard functions for creating, editing and deleting permission entries a copy function is available to duplicate entries.

Subsequent the semantics of document permissions is described:
An entry in this table is equal to a permission entry with the notional role *Process-agent-of-step-x-in-process-y*. If the user is agent of step x, then the defined document permissions come into effect. During evaluation of permissions negative ones overrule the positive ones. Furthermore there are 2 distinctive features:

1. If no document permissions are defined, the standard permission behavior of **@enterprise** is used.
2. Step and right can be empty with the meaning that the permission is used for all steps respectively rights.

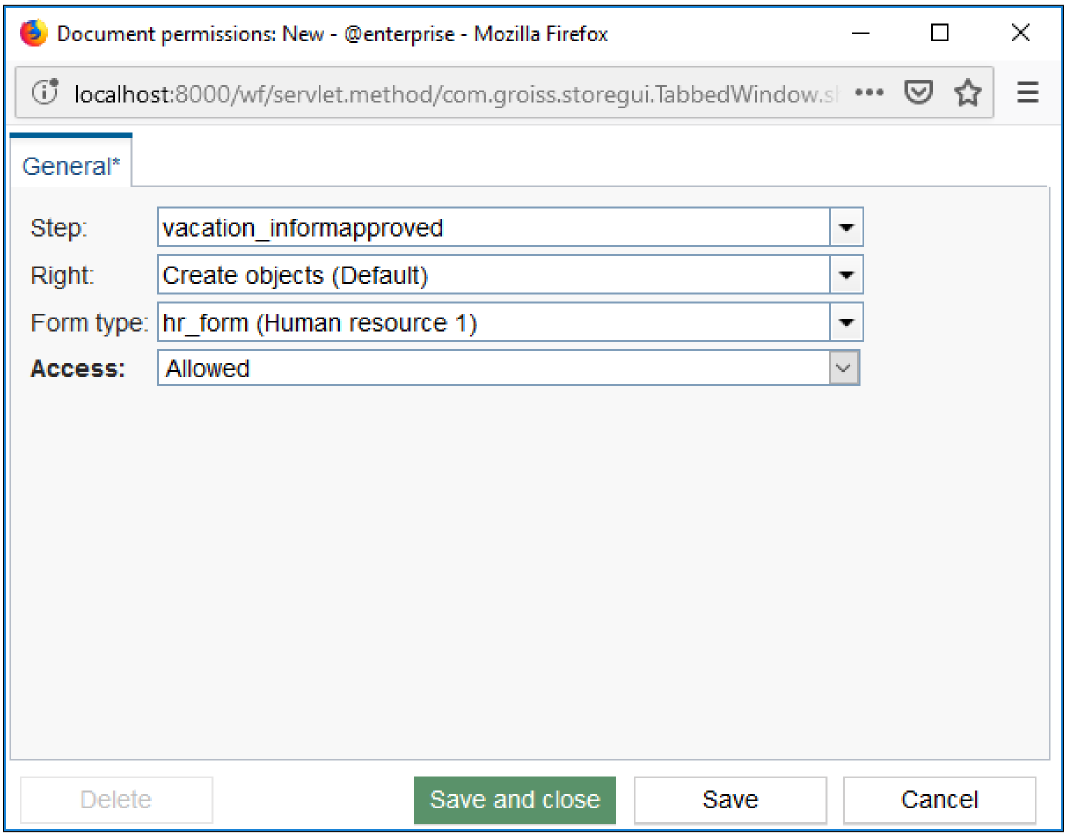
Following attributes can be defined for a document permission entry:

- **Step:** Optional selection of interactive process steps only, i.e. no selection of system steps which are executed automatically by the workflow engine (system, batch, etc.). The subsequent defined right is used for this process step only. If no step is selected, the subsequent defined right is used for all steps of this process.
- **Right:** The right which is used for the document (= form type) in the optional selected process step. If no right is selected, all selectable rights are used for the selected step.
- **Form type:** The permission entry is used for the form type which is chosen here.
- **Access:** Either *Allowed* for the definition as positive permission or *Not allowed* for negative permission.

Examples:

Definition of permission entry: docperm(step, right, formtype, access)

1. In step inform all documents can be looked, but not modified:
   - docperm(*, *, *, allowed)


Document permissions: New - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.s
General*
Delete
Save and close
Save
Cancel

Step: vacation_informapproved

Right: Create objects (Default)

Form type: hr_form (Human resource 1)

Access: Allowed

Figure 6.22: **Object-Details: Document permissions**

- docperm(inform, edit, *, not allowed)
- docperm(inform, delete, *, not allowed)

2. All documents are always read-only, excepting documents of type x:

   - docperm(*, view, *, allowed)
   - docperm(*, edit, x, allowed)
   - docperm(*, delete, x, allowed)

3. In step2 all documents of type y can be added:

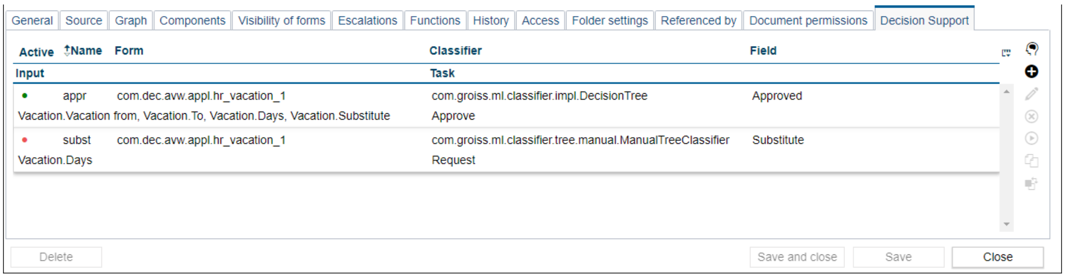
   - docperm(*, edit, *, allowed)
   - docperm(*, delete, *, allowed)
   - docperm(step1, create, *, allowed)
   - docperm(step2, create, y, allowed)
   - docperm(step3, create, *, allowed)

6.5.13 Tab: Decision Support

Classifier asssignments describe how a particular form field should be classified. They describe which fields should be considered for each output field, for which tasks this should be the case and what classifier should be used.
Classifier assignments are persistent objects and therefore get stored in the database. After a restart of the system they are still available.

Managing Classifier Assignments for a Process Definition

When editing a process instance in the administration interface it can be seen that the tab at right-most position is responsible for managing the classifier assingments related to the current process definition.



Active	↑Name	Form	Classifier	Field
Input			Task	
●	appr	com.dec.avw.appl.hr_vacation_1	com.groiss.ml.classifier.impl.DecisionTree	Approved
Vacation.Vacation from, Vacation.To, Vacation.Days, Vacation.Substitute			Approve	
●	subst	com.dec.avw.appl.hr_vacation_1	com.groiss.ml.classifier.tree.manual.ManualTreeClassifier	Substitute
Vacation.Days			Request	

Figure 6.23: The Classifer Asssignments

It can be seen in figure 6.23 that classifier assignments can be added, edited and deleted. It is also possible to build or rebuild classifiers related to the selected assignments. Exactly one classifier belongs to each classifier assignment.

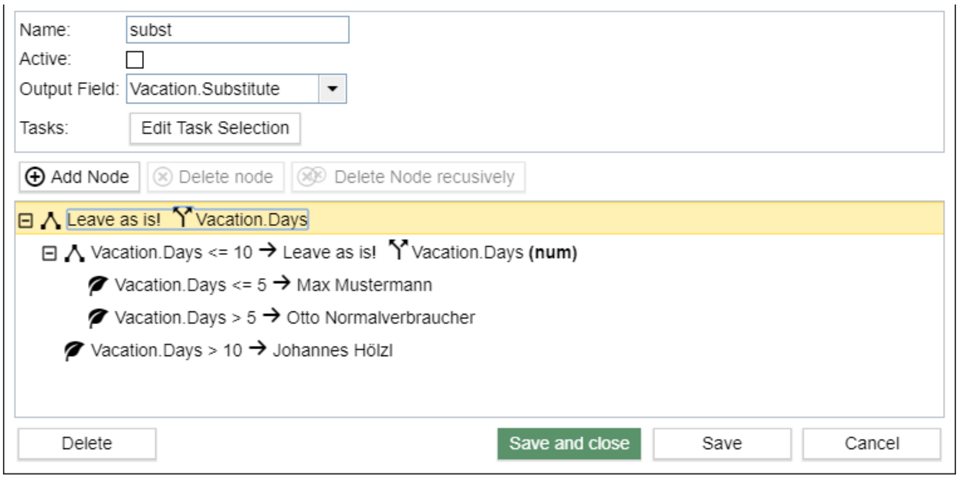
Adding new Classifier Assignments

There exist two different kinds of classifier assignments which can be added:

- The first one describes a classifier which has nothing to do with machine learning. The knowledge is added by some expert. Represented in a tree structure, the rules are quite similar to a decision tree.
- The second one is for adding a generic assignment based on the machine learning approach. It is not possible to define exact rules, but to set the fields and classifier related variables. More on this can be read in 6.5.13.

Editing Classifier Assignments

The editing process for classifier assignments which classifier is based on the machine learning approach is different than the editing of classifier assignment which classifier is based on the manual rules approach.



Name: subst

Active: □

Output Field: Vacation.Substitute

Tasks: Edit Task Selection

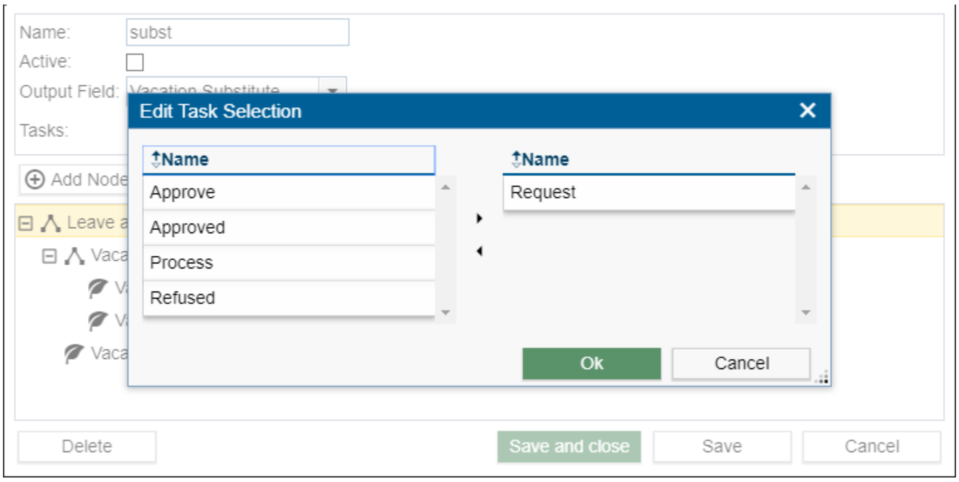
- ⊟ Leave as is! Vacation.Days
  - ⊟ Vacation.Days <= 10 → Leave as is! Vacation.Days **(num)**
    - Vacation.Days <= 5 → Max Mustermann
    - Vacation.Days > 5 → Otto Normalverbraucher
  - Vacation.Days > 10 → Johannes Hölzl

Figure 6.24: Classifier Assignment using Manual Rules Trees

Classifier based on manual Rules

Figure 6.24 shows the editing interface for manual rules tress. In the top section there can be found input elements for the following parameters.

- Name: the name of the classifier assignment
- Active: an input stating if this classifier assignment should actually be used at the moment.
- Output Field: the which is to classify.
- Tasks: Selection of the tasks for which this classifier assignment should be applied. When pressing the corresponding button, a dialog (figure 6.25) appears showing an input element for selecting the tasks.



Edit Task Selection

↑Name
Approve
Approved
Process
Refused

↑Name
Request

Figure 6.25: Task Selection for the Manual Rules Tree

The semantics of the rows can be described as following:

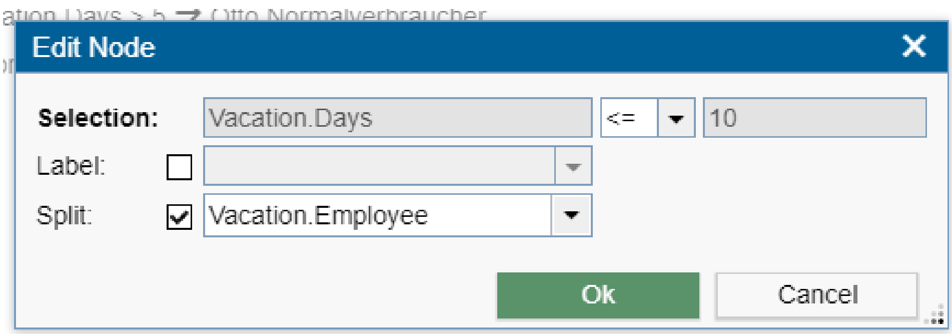
- Branch node: The selected node specifies a split attribute. When this is the case, the node has to have at least on child node.
- Split attribute: Shows on which attribute the split should be performed.
- Leaf node: The node does not specify a split attribute and therefore does not allow any child nodes.
- Branch selection: On the left side of the arrow, the selection on which the branch is selected, is stated. The root node never has any selection.

Editing the Tree

An additional input element has been added for editing the rules of this classifier assignment. The following actions can be used.

- Add Node: adds a child node to the selected tree node. This is only possible when the selected node specifies a split attribute.
- Delete Node: Removes the currently selected node from the tree. This action is only allowed when the node has at most on child. If the there is a child, this child is raised to position where deleted node previously was. The values of the child node might be adjusted after this step.
- Delete Node recursively: Removes the selected node and all of it's descendants.

To edit the nodes themselves, a double click on the specific items should be performed. A dialog window pops up when doing so.



Selection: Vacation.Days <= 10

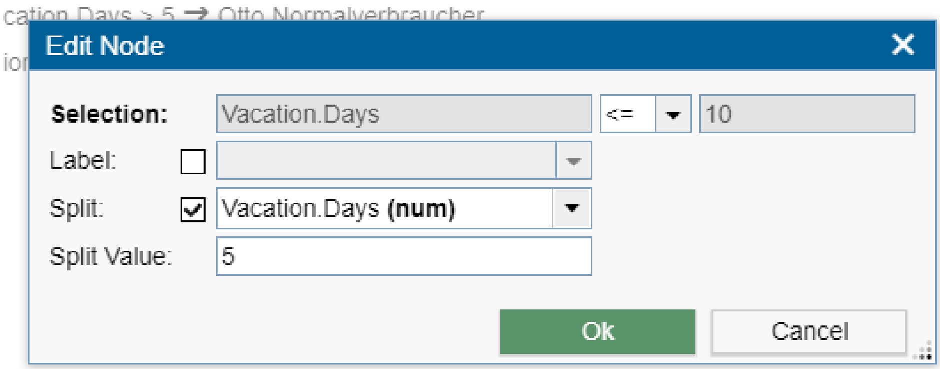
Label: □

Split: ☑ Vacation.Employee

Figure 6.26: Edit Leaf Node in Manual Rules Tree

Figure 6.26 shows the editing pane of a leaf node. In this case the split is performed on the nominal field*Vacation.Employee*. Figure 6.27 shows the editing pane of a split node which uses a numeric attribute. A special case for a numeric split can be seen in figure 6.28 where date and time values are used for splitting. In the case of numeric attributes the split gets performed on the split value ($\leq$, $>$).

- Selection: Describes how this branch gets selected. For nominal attributes the operator is fixed and only the value can be changed. On the other hand, for numeric attributes, only the operator can either be $\leq$ or $>$.



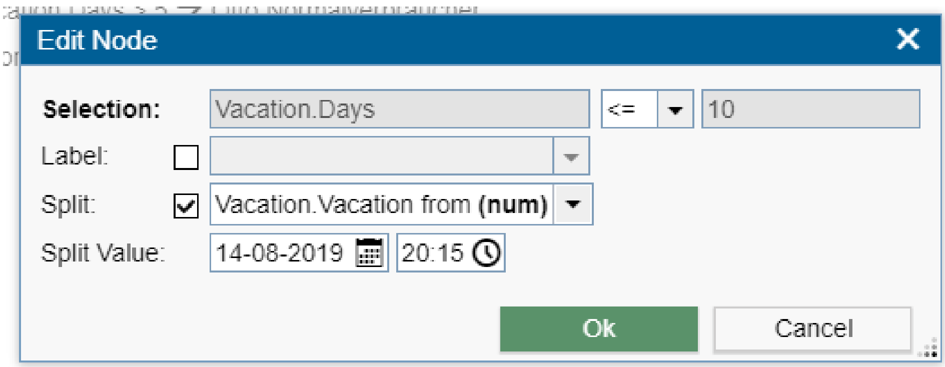
Selection: Vacation.Days <= 10

Label: □

Split: ☑ Vacation.Days **(num)**

Split Value: 5

Figure 6.27: Edit Split Node with numeric Attribute in Manual Rules Tree



Selection: Vacation.Days <= 10

Label: □

Split: ☑ Vacation.Vacation from **(num)**

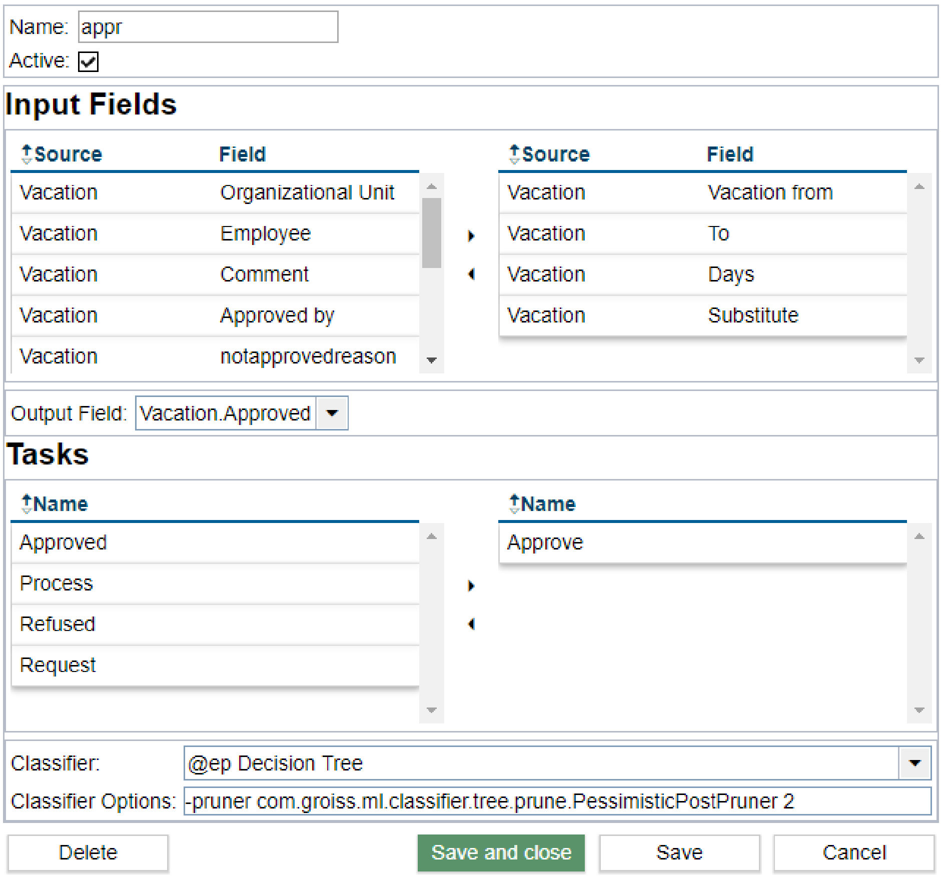
Split Value: 14-08-2019 20:15

Figure 6.28: Edit Split Node with Date Attribute in Manual Rules Tree

- Label: Selection on which label this should be assigned to the output field when this node happens to be the last one in the path. When the checkbox is not ticked, the value of the output field will not be affected.
- Split: Used for showing that node is branch node. When selecting a value for this field, the node must have at least one child node.
- Split Value: Shown when split attribute is numeric attribute. For regular numeric attributes a text box is shown. Date and time picker get shown when split attribute is a date attribute.

Machine Learning Classifier

As the list of possible input fields changes when selecting the output field, it is not possible to select a form field as both input and output field.
There is a similar situation for the tasks. It is not allowed to have multiple classifier assignments for an output field for a given task. When selecting the output field, the grids responsible for the task selection get updated to only show the tasks for which there does not exist a classifier assignment with the given output field. When an output field is used for every task of the current process definition, then the field is not even offered as an output field to the administrator. It also has to be mentioned that the output field does not have



Name: appr

Active: ☑

Input Fields

Source	Field
Vacation	Organizational Unit
Vacation	Employee
Vacation	Comment
Vacation	Approved by
Vacation	notapprovedreason

Source	Field
Vacation	Vacation from
Vacation	To
Vacation	Days
Vacation	Substitute

Output Field: Vacation.Approved

Tasks

Name
Approved
Process
Refused
Request

Name
Approve

Classifier: @ep Decision Tree

Classifier Options: -pruner com.groiss.ml.classifier.tree.prune.PessimisticPostPruner 2

Figure 6.29: A Classifier Assignment

to be nominal. When it is not nominal it gets converted to a nominal field as classification algorithms are not able to work with numeric output fields.

In figure 6.29 can be seen that the name of the current classifier assignment is *appr* and it uses four form input fields to classify *Vacation.Approved* in the task *Approve*.

The classifier option is set as a String containing various names (which are prefixed by a hyphen) and arguments. When using a decision tree classifier, the pruning algorithm to use is set using the classifier options field.

Copying Classifier Assignments

The currently selected classifier assignments are exactly copied and stored in the database. Stored PMMLs and PMML assignments are also copied and stored in the database. To avoid invalid states, the new classifier assignment is set to be inactive.

Converting Classifier Assignments

It is possible to convert a classifier assignment based on the machine learning approach, more specifically on decision trees, to one based on the manual rules approach and vice versa. For example, this can be used to edit (or fine-tune) and freeze a tree built by a

decision tree implementation.
The classifier class used when converting to the machine learning approach is ImportablePMMLTree, although this class does do machine learning by itself.

Options for Pruning

As described before, pruning is configured using an option in the *Classifier options* field. The following describes how the different already implemented pruning methods are to be configured.

- **Pessimistic Post Pruning**

  For this kind of pruning the penalty multiplier can be provided as an argument in the option. This has to be a positive double value. The default value is set in the decision support configuration.

- **Reduced Error Pruning**

  Here it is possible to pass the percentage of how much of the training set should actually be used for training. This value has to be given as an positive integer which is smaller or equal to 100. The other part is used for pruning the trained tree. The default value for the percentage is set in the properties of this application.

- **Minimal Error Pruning**

  For this type of pruning it is also possible to pass the type of estimate which should be used as an argument. Each estimate requires a different amount of additional arguments.

Using Classifier Assignments in process flow

Classifier Assignments may be integrated into the process flow fully automated, either as system step or as pre-process-/postcondition method of a manual task. Therefore the @**enterprise**-API provides class com.groiss.ml.classifier.ClassificationAction. A detailed description of the methods of this class can be found in the API documentation as well as in the method selection of the system step editor within the process editor.

6.5.14 Report

For one or more processes a report can be created analog to an application report (see section 6.1.4). For processes following starting possibilities are displayed:

- *Manual:* Process start is done as known via function *Start process*.
- *Mailbox:* The process will be started via a mailbox. Details for definition can be found in section 9.6.1.
- *Timers:* The process will be started by timer *ProcessStartTimer*. Details for definition can be found in section 9.1.8.

6.5.15 Milestones

A milestone allows the definition of a pre-defined date (fix or relative to process start/calculated process due date) which can be used for a process step in a process plan. A milestone contains following attributes:

- **Id:** Unique identifier of the milestone.
- **Name:** Name of the milestone. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- **Application:** he application where the milestone belongs to.
- Interval: An interval which is calculated *Form start* or *From due date* of a process. The calculation is done for process instances for those process steps where a milestone has been assigned in process plan. The value *Form start* uses the process start date, the value *From due date* uses the (calculated) process due date. Subprocesses are a special case: the value *Form start* uses the calculated process start date of subprocess according to the process plan, the value *From due date* uses the calculated process due date of the subprocess. If the value is an integer, the unit s for seconds will be added. It is also possible to define the unit(s) directly like in following example: 3d 4h 30m (= 3 days, 4 hours and 30 minutes).
- Calculation model: The calculation model refers to the value of field *Interval*:
  - Working time: The calculation of the working time is done by the settings *Start of worktime*, *End of worktime*, *Worktime per day* and *Non working day* under *Configuration/Calendar*.
    Let us give an example: The working time is defined from 09:00 to 17:00 with 8 hours worktime per day. For the first process step in process plan a milestone with interval 1 hour from start has been defined. The process has been started at 5 pm - therefor the due date for this process step is 10 am at the next working day.
  - Calendar time: The whole day (24 hours) is used as calculation model.
    Let us give an example: The working time is defined from 09:00 to 17:00 with 8 hours worktime per day. For the first process step in process plan a milestone with interval 1 hour from start has been defined. The process has been started at 5 pm - therefor the due date for this process step is 6 pm.
- Form field: Definition of a form field which must be a *date* or *dateTime*; this date object is used as fix time stamp for the milestone. Definition: <procform_id>.<formfield>

Hint: The process editor allows the definition of process plans (see section 7.2.7)!

6.5.16 Plan types

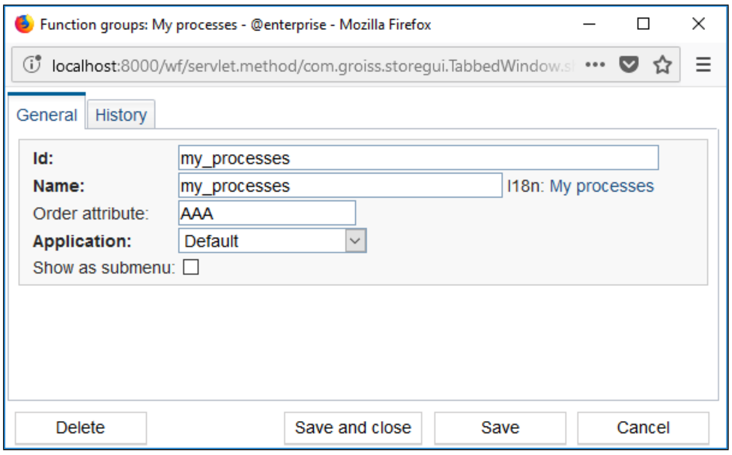
Plan types are used to classify process plans. A plan type object contains following attributes:

- **Id:** Unique identifier of the plan type.
- **Name:** Name of the plan type. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- Position: The position in the selection list of plan types of a process plan.
- **Application:** The application where plan type belongs to.

Hint: The process editor allows the definition of process plans (see section 7.2.7)!

6.6 *Function groups*

Function Groups allows the grouping of (task–)functions and reports. A function group can be deleted only, when it is not assigned to a *Function* or a *Report*.


Function groups: My processes - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.s
General
History
Delete
Save and close
Save
Cancel

Id: my_processes
Name: my_processes I18n: My processes
Order attribute: AAA
Application: Default
Show as submenu: □

Figure 6.30: **Function group**

A function group object has following attributes (tab *General*):

- **Id:** Unique identifier of the function group.
- **Name:** Name of the function group. By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- Order attribute: Define an arbitrary order attribute here which is used for sorting function groups. If function group F1 has order attribute B and function group F2 has order attribute A, then function group F2 is displayed as first and F1 as second item in list (e.g. in global function list of smartclient).

- **Application:** The application, where the process is running.
- Show as submenu: If this checkbox is activated, all assigned (task–)functions are displayed in a submenu of function group. If not activated, only a separator is shown between the group without displaying the function group name. The settings of this checkbox are used by global function list and task functions in smartclient only!

6.7 *GUI configurations*

With GUI configuration it is possible to define masks for users (worklist, dms, etc.) and the appropriate rights via the tab *Assignments* to users or rights. The elements of the mask are stored as XML files in *classes* directory of the current **@enterprise** installation or in *classes* directory of the application directory. With **@enterprise** it is possible to

- create new masks
- edit and delete available masks
- copy available masks

Hint: The description of the XML structure can be found in Application Development Guide in section *The Elements of the Configuration File*.

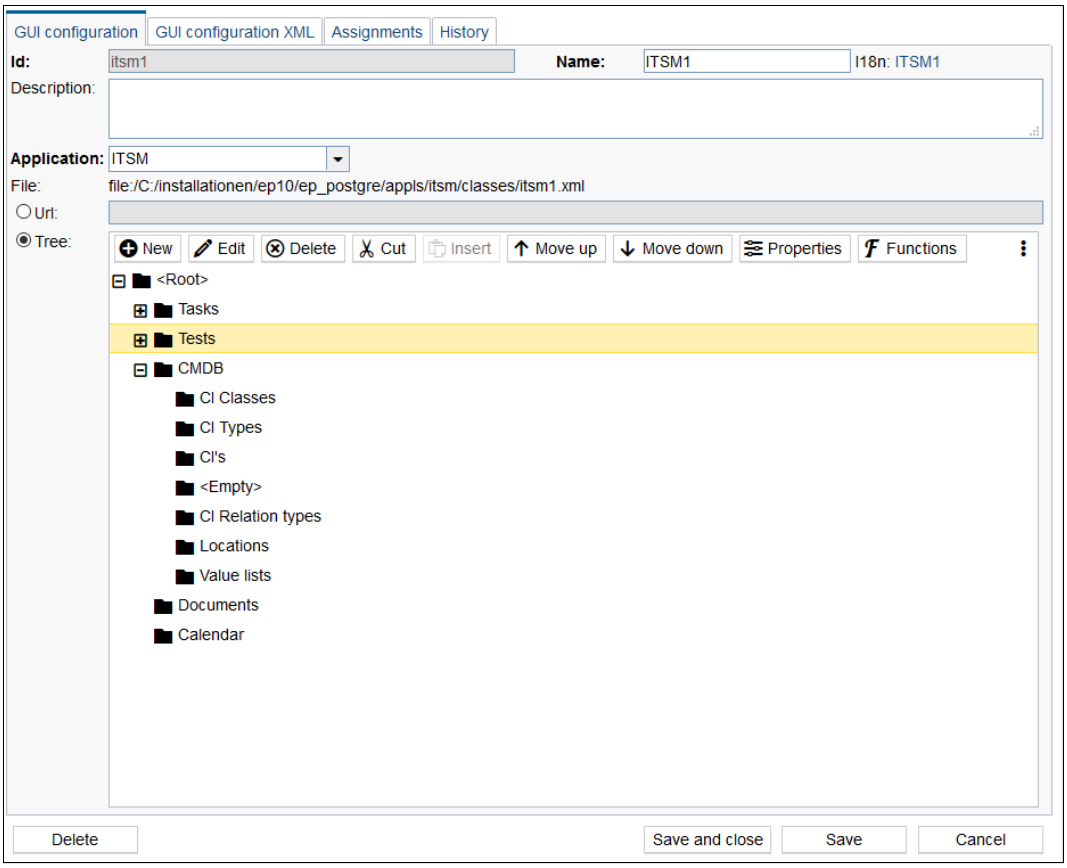
6.7.1 Tab: GUI configuration

This tab allows to create and adapt masks for users. New masks need an *Id* and a *Name*. Furthermore a *Description* can be entered. Selecting an *Application* is mandatory and also setting an *URL* or selecting the radio-button *Tree* for creating a XML-tree (see fig. 6.31). The *Id* is the filename of the XML, which is stored in *classes* directory.

The toolbar for creating a XML-tree offers following possibilities:

- New: Add a new node for example worklist, dms, functions, etc. (see section 6.7.1).
- Edit: Adapt an existing nodes; double-click on the element result in the same function.
- Delete: Remove existing nodes and their subnodes.
- Cut and Insert: These functions allow to take a selected tree node and insert it at an arbitrary place in tree.
- Move up: Selected node is moved one position upwards on the same level.
- Move down: Selected node is moved one position downwards on the same level.
- Properties: In this window it is possible to set diverse properties for the current mask (see section 6.7.1).

- Functions: This are allows to create functions which are not visible in navigation tree. These can be actions, object selections, tables and additional data (see section 6.7.1).
- Preview: Displays the adapted mask like the users would it see.



Id: itsm1

Name: ITSM1 I18n: ITSM1

Description:

Application: ITSM

File: file:/C:/installationen/ep10/ep_postgre/appls/itsm/classes/itsm1.xml

○ Url:

● Tree:

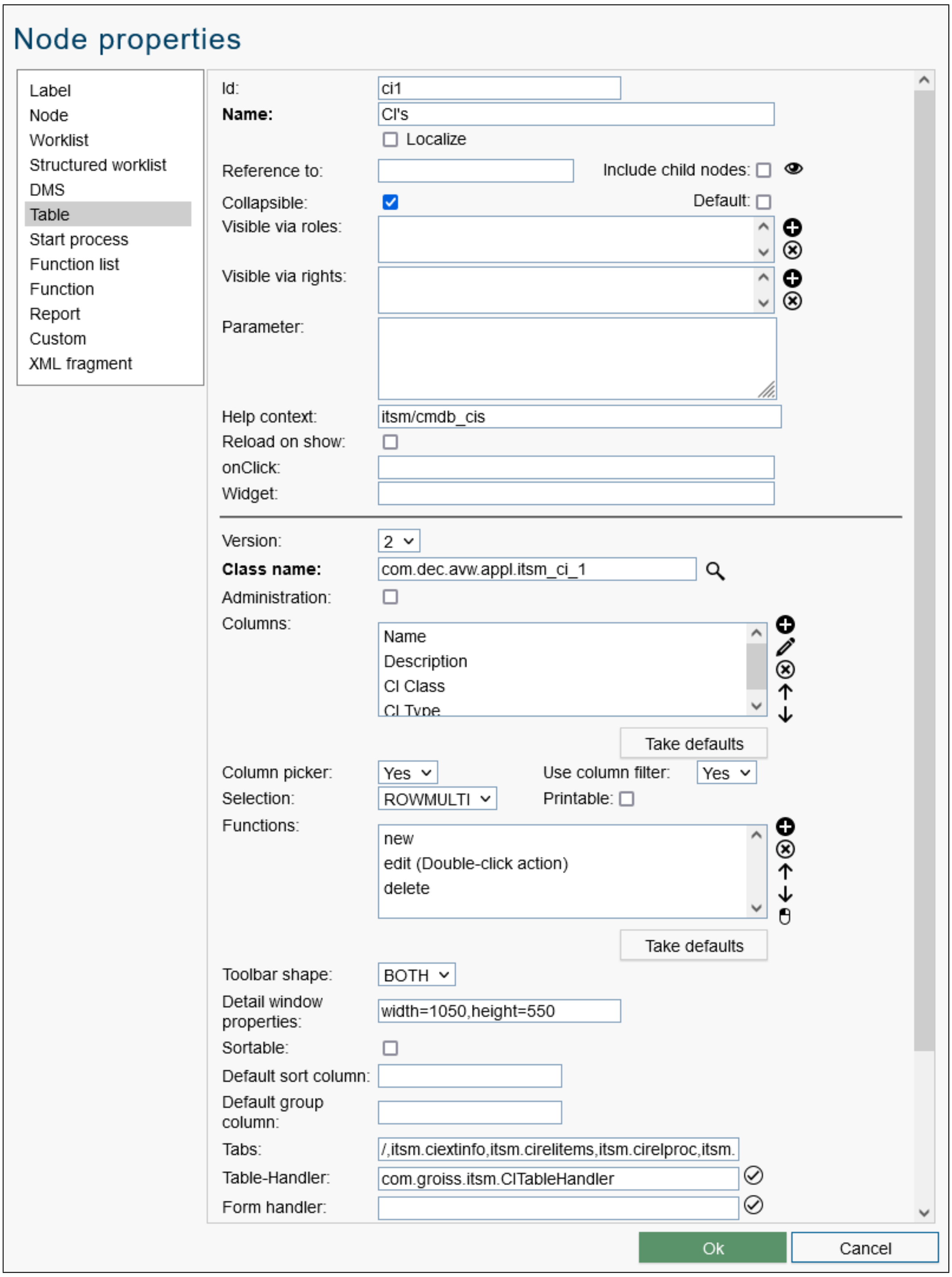
Figure 6.31: **Tab: GUI configuration**

Node properties

By choosing the function *New* or *Edit* a new window is opened, where a new node can be added or an existing node can be edited (see fig. 6.32). Nodes always contain an *Id* (see below) and a *Name*.

There are fix elements for each node:

- Id: Unique identification of the node. If no Id is entered, **@enterprise** will assign an Id automatically.
- **Name:** Name which is displayed (in most cases must field).



Id: ci1

Name: CI's

□ Localize

Reference to: Include child nodes: □

Collapsible: ☑ Default: □

Visible via roles:

Visible via rights:

Parameter:

Help context: itsm/cmdb_cis

Reload on show: □

onClick:

Widget:

Version: 2

Class name: com.dec.avw.appl.itsm_ci_1

Administration: □

Columns: Name, Description, CI Class, CI Type

Column picker: Yes Use column filter: Yes

Selection: ROWMULTI Printable: □

Functions: new, edit (Double-click action), delete

Toolbar shape: BOTH

Detail window properties: width=1050,height=550

Sortable: □

Default sort column:

Default group column:

Tabs: /,itsm.ciextinfo,itsm.cirelitems,itsm.cirelproc,itsm.

Table-Handler: com.groiss.itsm.CITableHandler

Form handler:

Figure 6.32: **Node properties**

- Localize: If this checkbox is activated and the entered string of the label is found in the default- or a specified resource bundle, the name will be translated (name must not contains @). By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).

- Reference to: This attribute allows the definition of a reference to another node in current or another gui configuration. For this purpose enter the ID of the gui configuration and the node-id which should be referenced in following way: <xmlid>.<nodeid> If a reference is entered, all settings of reference node will be loaded at runtime. These referenced attributes can be overwritten with the attributes defined in the current node. On the right side the view-icon is displayed which allows to open a dialog read-only with the attributes of the referenced node.
- Include child nodes: This attribute is part of a defined node-reference (see attribute above) and refers to whole subtrees and not only single (pruned) nodes.
- Collapsible: If this checkbox is activated, the node and its sub-nodes will be displayed as tree.
- Default: If this option is activated, the page of this node is loaded in the right frame when the frameset is initially loaded (after login). This option should be assigned to one node in navigation tree. The *Structured worklist* node doesn't support this option!
- Visible via roles: The select list *Visible via roles* allows to set roles. Users, who have this roles, are permitted to access this node, i.e. the node is visible and/or selectable on the mask. Additionally the visibility of the node can be limited to a role in a particular OU.
- Visible via rights: The select list *Visible via rights* allows to set rights. Users, who have this rights, are permitted to access this node, i.e. the node is visible and/or selectable on the mask. It is possible to select several roles and rights at the same time. Please note that for the node to be visible when both fields (*Visible via roles* and *Visible via rights*) are specified, the current user must at least be granted one of the rights **and** be assigned to one of the roles.
- Parameter: This attribute allows you to define your own parameters (<params>) that are added to the URl.
- Help context: Add a context help to a node. The context consists of the application-id and the anchor defined in help-page. For more informations please take a look *Application Development Guide*, Section *5.4.1 Using context sensitive help in applications*.
- Reload on show: This parameter should be used for nodes which are reloaded on each click.
- **onClick:** An onClick action an be defined here which is executed in work area.
- **Widget:** A widget for navigation area can be defined here (only for smart client GUI).

You can select between following node types:

- Label: Free text, which is displayed in the navigation tree; could be used for making groups.

- Node: Creates a link in the navigation tree. Following attributes can be set:
  - **Standard nodes:** Activating this button opens a list of standard nodes. If a node is selected, the settings will be taken.
  - **Target window:** The content of this field contains the name of the window or the frame where the output of the function will be placed. If the field is empty, the output is sent to the frame where the worklist resides (work area). If you enter another name, the output is sent into a separate window with this name.
  - **URl:** This field offers the possibility to enter an URL. This URL is used, if no onClick action (for new smart client GUI) has been entered.
  - **Refresh button:** Activating this checkbox displays an refresh icon in the custom node.
- Worklist: Defines the worklist with following attributes:
  - **Shortcut:** An arbitrary shortcut can be defined here by entering the appropriate keys. A list of keys is listed on http://dojotoolkit.org/reference-guide/1.10/dojo/keys.html.

    Example: CTRL+SHIFT+A
    If these keys are pressed at once, this worklist-node will be displayed.
  - **Application:** Depending on selected application these processes are displayed in this worklist. If not set, all processes are shown.
  - **Type:** Set the worklist-type (e.g. worklist, role-worklist, suspension, role-suspension, etc.). It is possible to select more types simultaneously for a node. More information about the different types can be found in Application Development Guide (table *Worklist types*).
  - **Columns:** The columns, which are displayed in the table. You can add, edit and delete columns and change their order. Columns contains following attributes:
    - Id: An own ID can be entered or a pre-defined ID selected. If a pre-defined ID is selected, the fields *Name* and *Localize* will be filled. This field is a must-field! The *Id* can contain the option, which tab should be opened when activating the link in the worklist, e.g. *process-form0* means, that the column *Process* is displayed with a link to the first form in the tab view (default is a link to process history).
    - Name: Free text which is displayed in table header.
    - Localize: If this checkbox is activated and the entered string of the label is found in the default- or a specified resource bundle, the name will be translated (name must not contains @). By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
    - Icon: Define a path to an icon which is displayed instead of the name.
    - Colspan, Rowspan and Row: These attributes allow to define the style of the column in table, e.g. column should be displayed in second row over two columns of first row.

    - Visible: If this checkbox is activated, the column is displayed at the first call, otherwise you can add it by using the column picker.
    - Filterable: If activated, the filter mechanism can be used for this column.
    - May not hide: This checkbox indicates, if the column can be faded out via column picker.
    - Sortable: If activated, the column can be sorted.
    - Type: Definition of following column types is possible: string, date, dateTime, number (for numbers without comma) or decimal (for numbers with comma + appropriate representation according to decimal formatter configuration).
    - Form fields: Here you can define form fields which are used as representation value. The syntax is described in the Application Development Guide, chapter *Configuring the Worklist Client*. If the worklist contains an instance of a process not listed in the field specification the column will remain empty.

      Hint: The definition of only one form-path per process definition/version is allowed, i.e.:
        - *myproc:1:myf:field1;myproc:1:myf:field2* is **not** possible, because field1 and field2 are read from the same process definition/version.
        - *myproc:1:myf:field1;mypproc2:1:myf:field2* is possible, because field1 and field2 are read from different process definitions/versions.
    - Javascript Class: It is possible to enter a path to a js class (widget) which is responsible for the representation of a column.
  - **Column picker:** This parameter allows the definition, if a column picker should be provided in table. If no value is selected, the default settings will be used.
  - **User column filter:** This parameter allows the definition, if the filter mechanism of **@enterprise** for the current table should be provided. If no value is selected, the default settings will be used.
  - **Paging:** If this checkbox is activated, the paging mechanism of **@enterprise** for the table is used (only for legacy GUI).
  - **Items per page:** Individual paging size for this table (only for legacy GUI). If not set, the user parameter is used and as default the configuration parameter.
  - **Selection:** Definition of a selection type for worklist table. Following entries are available:
    - HIDDEN: no checkboxes will be displayed in the table
    - ONE: radio-buttons will be displayed instead of checkboxes
    - MULTI: checkboxes will be displayed (default, if the attribute selection is not set)
    - ROWONE: one row can selected only (no checkboxes or radio-buttons)
    - ROWMULTI: multiple rows can be selected (no checkboxes or radio-buttons)
  - **Printable:** If checked, a print function will appear above the table which allows to print the current displayed table content. This checkbox is used by smartclient only!

- **Show inline details:** Here you can define how the inline details will be shown. Following entries are available:
    - COLUMN:ID: The inline details can be reached by clicking on the arrow next to the process ID
    - ROW: The inline details can be reached by clicking on the row
    - OFF: The inline details are not reachable
- **DnD handle:** Here you can define the drag and drop (DnD) behavior for the worklist entries. Following entries are available:
    - HANDLE: The entries are dragable only over the DnD icon. The icon is located on the left to the process ID.
    - ROW: DnD is activated for the whole row
    - OFF: DnD is inactive
- **Functions:** Here you can add available *Functions* or set *Action-Id*s (e.g. new, cut, copy, myconfig.myaction, etc.). The checkbox *In dropdown* indicates that function is available in context-menu of worklist entries. Furthermore it is also possible to change the order of the functions.
- **Toolbar shape:** Definition how functions in toolbar are displayed:
    - TEXT: Only name of function is displayed
    - ICON: Only icon of function is displayed
    - BOTH: Icon and name of function are displayed (only in smartclient usable)
- **Folder functions:** Allows the definition of *Action-Id*s which are displayed in a dropdown menu beside the worklist node. A well-known example is the creation/adaption of user folders of a worklist (action-id: newUserFolder, deleteUserFolder, editUserFolder, etc.) whereby the actions can be loaded with button *Take defaults*.
- **Process detail functions:** Analog to *Functions*, only here you define the functions that are displayed in the process detail view.
- **Default sort column:** This parameter allows to define a column which is sorted by default. If a user is changing the order in table, the new order is stored in the user properties table (and read from there). The element *defaultSortColumn* must contain the sort direction (+ or -) and the column-id as value (see example below). The sort direction + defines ascending order, descending order is -. If one attribute is missing, the first (or given) column will be sorted (by default in ascending order).
- **Default group column:** This parameter allows to define a column which is taken as default group-by-column. If a user is changing the group-by-column in table, the new setting is stored in the user properties table (and read from there). This element must contain the column-id as value and optional the descending sort direction (see example below). The sort direction-defines descending order, the column-id without sort-direction defines ascending order.
- **Filter-Id:** The id of another worklist can be entered here. All stored filers of referenced worklist can be used in current worklist.

  - **Table-Handler:** Enter your own worklist adapter here. For further information about worklist adapter please take a look into the *Application Development Guide* - chapter *Customizing the Worklist*.
  - **No documents/notes:** Activating this checkbox avoids selection of documents and notes of processes when worklist is displayed. Activate this checkbox only, if no documents or notes are used in processes and the performance of the worklist table should be optimized!
  - **No userfolder filter:** Activating this checkbox avoids filtering by userfolder contents when worklist is displayed. Activate this checkbox only, if no userfolders are used and the performance of the worklist table should be optimized!

- Structured worklist: Definition of a worklist/user folder (type *user*) or a substitution folder (type *user substitutes*) in the navigation tree, which is a placeholder. Attributes are analog to node type *Worklist*, with the possibility to set an *Application*. The type *user substitutes* offers a selection of *Structure* with following values:
  - perFolder: Only the/all user folder trees of substituted persons are displayed without top level folder (= worklist). For each person a user folder tree is displayed.
  - perUserAndFolder: For each substituted user a tree with its worklist items (worklist and user folder) is displayed.
  - perUser: Only the worklists of substituted users are displayed without user folder items (for each person a worklist node is displayed).
- DMS: This node allows to create and adapt a DMS-folder. You can set following attributes:
  - **Columns:** Analog to node type *Worklist*
  - **Column picker:** Analog to node type *Worklist*
  - **User column filter:** Analog to node type *Worklist*
  - **Selection:** Analog to node type *Worklist*
  - **Default view:** This parameter allows you to define the default view in DMS-folders. Following entries are available:
    - ∗ Table
    - ∗ Table with small symbols
    - ∗ Table with big symbols
    - ∗ Tiles with small symbols
    - ∗ Tiles with big symbols

    More information can be found in *User manual*, section *Components of the Document Management*.
  - **Printable:** Analog to node type *Worklist*
  - **Functions:** Analog to node type *Worklist*
  - **Toolbar shape:** Analog to node type *Worklist*

  - **Forms:** In this list you can define which form types are allowed or denied for this DMS-folder. If the list is empty and the radio-button *Denied* is activated, all available form types of **@enterprise** are available for the users. Selecting a radio-button option is valid for the whole list only.

  This node can be added to navigation tree once only like node *User Folder*!

- Table: With this node, a link to a table can be created. This table can be a form-class (selectable via icon). Following attributes can be adapted:
  - **Version:** Selection between version 1 and 2. Version 2 is the table which is used in smartclient (e.g. worklist table) and offers following parameters:
    - ∗ **Class name:** A form-class must be entered or selected here. Activating the magnifier-icon opens a list of form-classes where an entry can be selected.
    - ∗ **Administration:** If set to true, table is only used in **@enterprise** administration.
    - ∗ **Columns:** Analog to node type *Worklist*
    - ∗ **Column picker:** Analog to node type *Worklist*
    - ∗ **Use column filter:** Analog to node type *Worklist*
    - ∗ **Selection:** Analog to node type *Worklist*
    - ∗ **Printable:** Analog to node type *Worklist*
    - ∗ **Functions:** Analog to node type *Worklist*
    - ∗ **Toolbar shape:** Analog to node type *Worklist*
    - ∗ **Detail window properties:** The window properties can be set here by adding several parameters separated by semicolon. The syntax is the same as using the java script method *window.open*.
    - ∗ **Sortable:** If true, the table is sortable.
    - ∗ **Default sort column:** Analog to node type *Worklist*
    - ∗ **Default group column:** Analog to node type *Worklist*
    - ∗ **Tabs:** Defines which tabs are going to be displayed in the detailed view of the selected object. The tabs are defined as a comma separated list of nodes (format: <gui_id>.<nodeid>).
    - ∗ **Table-Handler:** Enter an own implemented table handler class which extends *com.groiss.storegui.ObjectTableAdapter*.
    - ∗ **Form-Handler:** Enter an own implemented form handler which extends *com.groiss.storegui.ObjectFormAdapter*. An example can be found in Application Development Guide.
    - ∗ **Detail:** Define here, if detail view should be displayed in tabbed-view. In this case enter *com.groiss.storegui.TabbedWindow.showDialog*.
    - ∗ **Table model class:** Enter an own implemented table model class. Standard class is *com.groiss.storegui.FormTable*.
    - ∗ **Foreign keys:** Name of an attribut which is used to narrow down the table contents e.g. *userid* to show only objects which belong to a specific user.
    - ∗ **Parameter types:** In field *Condition* it is also possible to define placeholders (?) which are filled dynamically. Each question mark needs a (data)type

which can be entered as comma-separated list in this field. Following types can be entered:

- · Persistent
- · Date
- · Long
- · Double
- · Integer
- · String
- · OIDList

More information about the usage can be found in *Application Development Guide*, section *Object selection - ep/widget/ObjectSelect*.

- ∗ **Condition:** Possibility to enter a SQL condition for restricting table result, e.g. *application = (select oid from avw_application where id = 'itsm')*.
- ∗ **Attributes:** Allow to (pre-)fetch dependent objects from the database by efficient operations. The content is a comma separated list of java fields of the corresponding class. The field names must denote persistent objects! Usually oneBulkQuery per field is executed instead of a (single record) select-statement per record and field.

Version 1 is the table which was used in @**enterprise** 8.0 and previous versions and offers following parameters:

- ∗ **Class name:** Analog to version 2.
- ∗ **Columns:** Analog to version 2.
- ∗ **Column picker:** Analog to version 2.
- ∗ **Use column filter:** Analog to version 2.
- ∗ **Selection:** Analog to version 2.
- ∗ **HTML mask:** Define an HTML mask which is used as detail view of the table entry.
- ∗ **Paging:** If set to true, the paging mechanism of @**enterprise** for tables is used.
- ∗ **Items per page** Individual paging size for this table. If not set, the user parameter is used and as default the configuration parameter.
- ∗ **Functions:** Analog to version 2.
- ∗ **Toolbar shape:** Analog to version 2.
- ∗ **Toolbar target:** The toolbar ID (ID from the Frame in which toolbar is placed).
- ∗ **Toolbar alignment:** Defines if toolbar is aligned vertically (*v*) or horizontally (*h*).
- ∗ **Table target:** The table ID (ID from the Frame in which the tebale is placed).
- ∗ **Detail window properties:** Analog to version 2.
- ∗ **No search:** If set to true, whole table is displayed (e.g. if more table entries are available than allowed to display) by default and no search is possible.

- ∗ **No warnings:** If set to true, no warning is displayed, if more table entries are available than allowed to display.
- ∗ **Default sort column:** Analog to version 2.
- ∗ **Tabs:** Analog to version 2.
- ∗ **Table-Handler:** Analog to version 2.
- ∗ **Form-Handler:** Analog to version 2.
- ∗ **Detail:** Analog to version 2.
- ∗ **Table model class:** Analog to version 2.
- ∗ **Search attributes:** A comma separated list of search attributes can be entered.

- Start process: With this node you add a link to the list of all startable **@enterprise**-processes or only to a defined one. Further properties like at node *Node*. Furthermore a *Worklist Id* can be entered (e.g. standard.wl), which is the *worklistId* in XML. If such an Id is set, the worklist with the corresponding Id is shown after process start. The setting of *Worklist Id* is available for old GUI only! With attribute *Mode* the start mode can be defined:

  - ALL: A list of all startable processes are displayed (default). With attribute *Applications* you can define which processes of which applications should be offered. Please note that in smartclient the node *Start process* with this option cannot be used on any level of GUI tree - the link will be displayed, but is not executable!
  - DUEDATE: A form is displayed where a due date and an organizational unit must be defined before a process can be started. For this purpose the *Id* of the process must be defined.
  - DIRECT: Process is started immediately, whereby the *Id* of the process must be defined. Optionally an *Organizational unit* can be defined for the startable process.
  - FORM: Process form of given process (= *Id*) is displayed without starting an instance. It is possible to enter the data fist and starting the process with button *Start process*. Optionally an *Organizational unit* can be defined for the startable process, as well as the start step of the process (only steps with a defined *step-id* can be selected). These options are usable in smartclient only!

- Function list: By adding this node global functions of one or more applications can be displayed.

- Function: This node allows to add several functions (via *Id*) to the navigation tree. The added function does not know the context of the right frame, so global functions should be used (apply to no entry).

- Report: Here you can set a stored report (via *Id*), which will be executed by activating this link in navigation tree (analog to 8.4)

- Custom:

  - Class: Here you can enter a Java class, which implements the Java Interface *com.groiss.gui.NavigationTreeNode*.
  - Refresh button: Activating this checkbox results in displaying an icon at the custom node to refresh the node data.

- XML fragment: This node allows to load gui-xml fragments into the tree. The name of the XML file (without extension .xml) must be entered in the field *Fragment name*. See the Application Development Guide, paragraph “XML fragment” in section “Configuring the Worklist Client” for details.

Properties

With this function it is possible to define mask-specific properties. Following attributes are available:

- Title: A pattern for the browser window title can be defined here. If there is no defined pattern, *@@@ep: productname@@- {user}* is used. The following keywords are available:
  - *config*: Name of the GUI configuration
  - *server*: Server name
  - *user*: User name
  - *context*: Name of the displayed content
  - *count*: The number of unread entries in worklists is displayed
- Visible via roles: The select list *Visible via roles* allows to set roles. Users, who has this roles, are permitted to access this user interface. Additionally the visibility of the node can be limited to a role in a particular OU.
- Visible via rights: The select list *Visible via rights* allows to set rights. Users, who has this rights, are permitted to access this user interface. It is possible to select several roles and rights at the same time. Please note that for the user interface to be visible when both fields (*Visible via roles* and *Visible via rights*) are specified, the current user must at least be granted one of the rights **and** be assigned to one of the roles.
- Navigation type: Different types of the main navigation in @**enterprise** are supported and can be defined here. The following keywords are available:
  - *COLLAPSIBLE*: Navigation menu can be extended/collapsed by the user. When collapsed, a limited set of navigation-items is displayed.
  - *COLLAPSED*: Navigation menu is displayed as a limited set. It is not possible to expand or collapse the navigation.
  - *HIDEABLE*: Navigation menu can be extended/collapsed by the user. The menu is completely hidden when collapsed.
  - *HIDDEN*: Navigation menu is not displayed and cannot be shown.

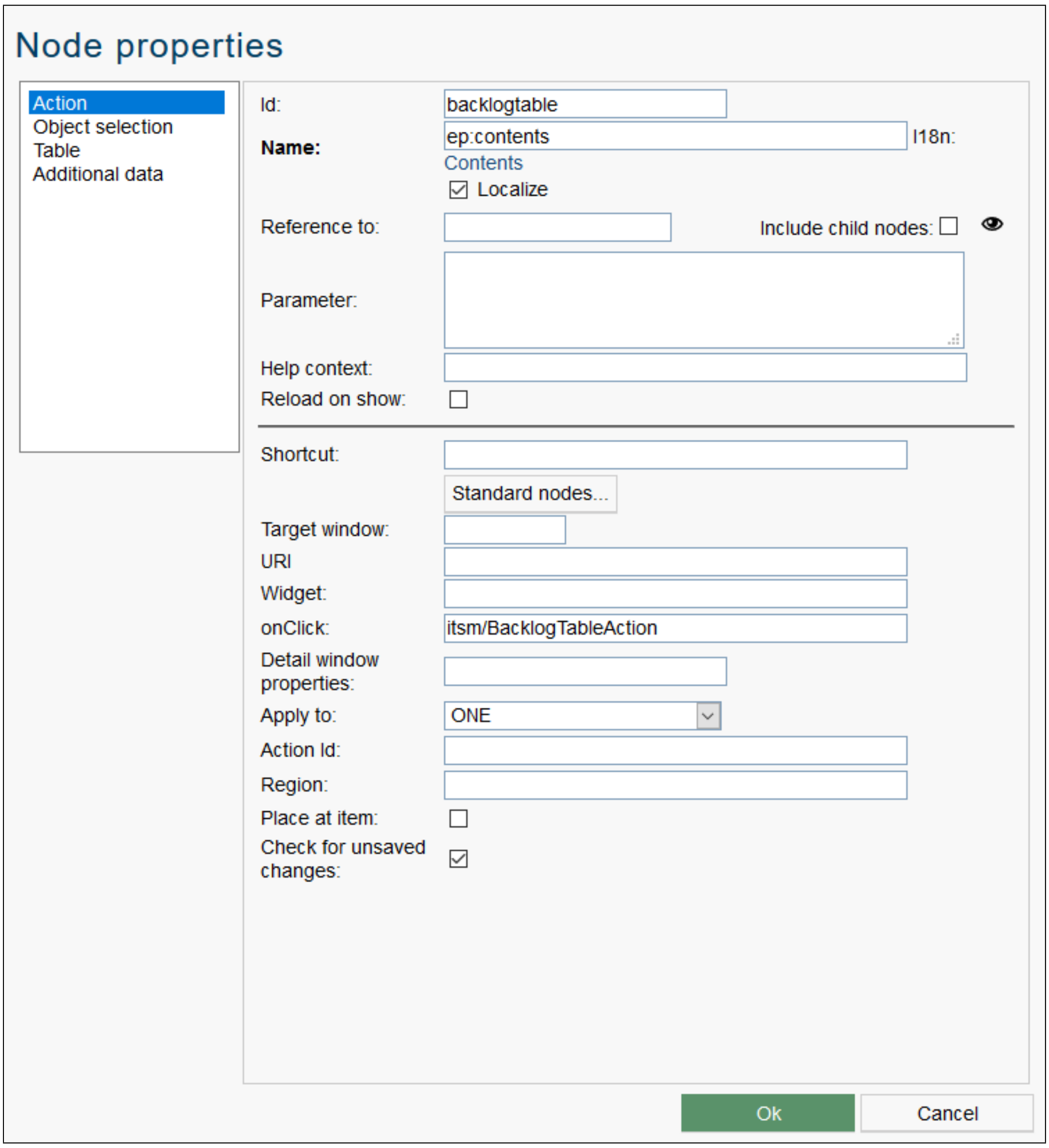
Hint: The navigation menu can be extended/collapsed by double-clicking on the splitter or by clicking on the arrow icon which is placed at the middle of the menu. The splitter can also be dragged to resize the navigation accordingly.

- HTML-Mask: Equal to attribute *framepage* in XML-file *standard.xml*.
- HTML-Mask (right-to-left): Analog to *HTML-Mask*, but for attribute *framepageRTL*.
- Standard actions: Define standard actions which are displayed always. The button *Take defaults* loads the standard actions.
- Actions in user profile: Here you can define functions for user profile. The button *Take defaults* loads the standard functions.
- Layout widget: An own widget can be defined here which is used as main page (ideally a dijit/layout/xx widget - e.g. BorderContainer).
- User profile widget: An own widget for user profile can be entered here which is used instead of standard user profile.

Functions

This function allows the definition of elements which are not visible in tree, but can be also used by tree functions. All defined functions are displayed in a table. Via toolbar functions it is possible to add, edit and delete such functions. More informations can be found in Application Development Guide in section *Non tree nodes (<nodes>)*.
There are fix elements for each node:

- Id: Unique identification of the node. If no Id is entered, @**enterprise** will assign an Id automatically.
- **Name:** Name which is displayed (in most cases must field).
- Localize: If this checkbox is activated and the entered string of the label is found in the default- or a specified resource bundle, the name will be translated (name must not contains @). By activating the I18n-link beside this field, the translations (if defined in application mask - tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- Reference to: This attribute allows the definition of a reference to another node in current or another gui configuration. For this purpose enter the ID of the gui configuration and the node-id which should be referenced in following way: <xmlid>.<nodeid> If a reference is entered, all settings of reference node will be loaded at runtime. These referenced attributes can be overwritten with the attributes defined in the current node. On the right side the view-icon is displayed which allows to open a dialog read-only with the attributes of the referenced node.
- Include child nodes: This attribute is part of a defined node-reference (see attribute above) and refers to whole subtrees and not only single (pruned) nodes.



Node properties

Id: backlogtable

Name: ep:contents I18n: Contents

☑ Localize

Reference to: Include child nodes: □

Parameter:

Help context:

Reload on show: □

Shortcut:

Target window:

URI

Widget:

onClick: itsm/BacklogTableAction

Detail window properties:

Apply to: ONE

Action Id:

Region:

Place at item: □

Check for unsaved changes: ☑

Figure 6.33: **Function node properties**

- Parameter: Analogous to the description in chapter 6.7.1. Some @enterprise actions can be adjusted with parameters. For more information please see chapter 6.7.4.
- Help context: Add a context help to a node. The context consists of the application-id and the anchor defined in help-page. For more informations please take a look *Application Development Guide*, Section *Using context sensitive help in applications*.
- Reload on show: This parameter should be used for nodes which are reloaded on each click.

You can select between following function node types:

- Action: In some cases an own function is necessary which is included via an Action-Id e.g. at a worklist node. The syntax for such an Action-Id is <xmlid>.<nodeid>. An action has following attributes:
  - **Shortcut:** An arbitrary shortcut can be defined here by entering the appropriate keys. A list of keys is listed on http://dojotoolkit.org/reference-guide/1.10/dojo/keys.html.

    Example: CTRL+SHIFT+A
    If these keys are pressed at once in appropriate context, the action will be performed. The appropriate context depends on the availability/visibility of the function, e.g. if function is a toolbar function of the worklist, the worklist must be displayed first (and maybe a worklist entry must be selected) before the shortcut can be used.
  - **Standard nodes:** Activating this button opens a list of standard nodes. If a node is selected, the settings will be taken.
  - **Target window:** The target of the link can be defined, *right* is the default. With value *ajax* a AJAX servlet method can be called which could be necessary e.g. for subform tables.
  - **URl:** Defines the link to a function. This URL is used, if no onClick action (for new smart client GUI) has been entered.
  - **Detail window properties:** The window properties can set here by adding several parameters separated by semicolon. The syntax is the same as using the java script method *window.open()*.
  - **Apply to:** Defines, if function should be applied for a table entry or could be executed without selection. Following modes are available:
    - NONE: Function can be executed without selecting a table entry
    - ONE: Function can be executed only, if one table entry is selected
    - MULTI: Function can be executed, if one ore more table entries are selected
  - **Action ID:** Here you can enter an own action ID. With this ID you can find out which action is actually the original action in case of overridden actions for “Drag and Drop”.
  - **Region:** Defines where the Action should be placed. There are three possible regions to set *top, trailing* and *center*. The header in the process detail view can be edited with the *top*. With *trailing* and *center* can be defined, if the tabs are placed on top or to the right of the process details view.
  - **Place at item:** If this checkbox is selected, the action will be displayed directly at the entry.
  - **Check for unsaved changes:** If checked, a warning message is displayed if changes are not saved before the function is executed.
- Object selection: In forms it could be helpful to store references of other **@enterprise** objects. For this purpose the object selection can be used which must be added via *searchid* to a form element. More information is available in Application Development Guide in section *Usage of customized DOJO controls*. Following attributes are available:

  - **Class name:** A class must be defined here which is used by object selection. This class could be entered manually or it is possible to selection a form class via search dialog.
  - **Default sort column:** Analog to node type *Worklist*
  - **Table model class:** Here you can define the table model (default: *com.groiss.storegui.FormTable*).
  - **Search attributes:** Define optionally search attributes which are used by the object selection. The definition is analog to *Attributes*.
  - **Parameter types:** In field *Condition* it is also possible to define placeholders (?) which are filled dynamically. Each question mark needs a (data)type which can be entered as comma-separated list in this field. Following types can be entered:
    - Persistent
    - Date
    - Long
    - Double
    - Integer
    - String
    - OIDList

    More information about the usage can be found in *Application Development Guide* - section *Usage of customized DOJO controls*.
  - **Condition:** This attributes defines the SQL WHERE-clause for the object selection. For this purpose enter the string without WHERE, e.g. formdept in (select oid from avw_dept where id = 'myoe').
  - **Attributes:** The display attributes of the form class can be defined here. For this purpose enter a comma-separated list of form field names of the appropriate class name. If no attributes are entered, the name attributes of the formtype is used.
  - **Attribute names:** A comma-separated list of attribute names as they are then transmitted by the system for each object. The names can be internationalized (e.g. @@@ key @@).
  - **Sorter:** Here you can specify a comparator <Persistent>, which will then be used for sorting.

- Table: Tables which are not accessible via tree functions should be defined here, e.g. subtables. The attributes are analog to table in section 6.7.1.
- Additional data: In **@enterprise** it is possible to attach forms to master data objects. More information is available in Application Development Guide in section *Adding tab Additional Info*.
  - **Class name:** A class must be defined here which is used as additional data object. This class could be entered manually or it is possible to selection a form class via search dialog.

- **Position:** The attribute position can be used to define the position of the Additional info tab in the tab-list (must be a positive integer).
- **Attach to:** In this field you have to enter the master data class name where additional data object should be attached to, e.g. com.groiss.org.User.
- **Form:** The form template of additional data form must be entered here. Please ensure that the file is part of the classpath and form type is XForm!
- **Editable:** This checkbox allows to define, if the additional data form is editable (save buttons are active) or just read-only.

6.7.2 Tab: GUI configuration XML

After activating this tab, the Editor for direct editing of the XML file will be opened. The changes can be stored with the appropriate Save buttons. The XML schema can be opened using the keyboard key *F6*.

6.7.3 Tab: Assignments

When using different client configurations you can now specify which user and/or role uses this configuration. The scope is either a user or a role, if more than one record matches, the one with the higher preference is chosen.

Following the description of the detail mask:

- **Agent:** The tree or URL is set for this agent. You can select between a *User* or a *Role* (with *Organizational Unit*).
- **Preference:** It is possible to assign more than one tree or URL to an agent. For this purpose you can set a preference whereas the settings with the highest preference is used at the login.

6.7.4 Customizable actions

In @**enterprise** you can customize some default actions.

Download as ZIP (download)

You can define a custom DMS function which reference from @**enterprise** default download action (*Download as ZIP*). Creating a name of the downloaded document in default action is defined as:

- a single document download: <file-name>.zip
- a single folder download: <folder-name>.zip
- multiple documents/folders download: <parent-folder-name>.zip

However, you can specify your own name pattern for the resulting zip file there.
Example:

```
<action id="myDownloadZIPFunction" ref="admin.download">
   <name>My download ZIP function</name>
   <params>namePattern={process}-{ou}</params>
   <apply>MULTI</apply>
</action>
```

Please note that the supported placeholders within the <*params*> tags are:

- name: the name of the selected object or the name of the parent folder if several objects are selected
- ou: the organizational unit to which the object or its folder belongs
- id: the id of the process instance to which the object belongs
- process: the name of the process definition of the process instance to which the object belongs
- subject: the subject of the process instance to which the object belongs

New DMS form (dmsnew)

Furthermore it is possible to add a button to the DMS toolbar, which only creates an instance of the defined form type. For this purpose create a new action in the gui configuration which references the "dmsnew" action. Then add the ID of the desired form type to the attribute *params*. Finally add the action to a DMS folder (attribute *actions*).

Example definition of such an action:

```
<nodes>
 ...
 <action id="myFormNew" ref="dmsnew">
  <name>New DMS form</name>
  <params>myformid</params>
 </action>
 ...
</nodes>
```

It is also possible to define attributes as JSON objects and to involve more attributes. Example:

```
<action id="myFormNew" ref="dmsnew">
 <name>New DMS form</name>
 <params>
  {"formtype":
 {"id":"Standarddokument","version":1,"objectId":"com.groiss.dms.FormType:250"},
  "iconClass":"scIcon scDmsForm scDmsDocument Standarddokument"}
 </params>
</action>
```

Reassign (setAgent)

If you want to customize the *setAgent* action to show only the roles:

```
<action id="setAgent_rolesOnly" ref="setAgent">
  <name>Reassign</name>
  <params>{"showUserSelect":false}</params>
  <apply>NONE</apply>
  <checkForChanges>true</checkForChanges>
</action>
```

Substitutions (substitutions)

You can define the substitutions in end-user client to include the the roles per default by defining an action with the parameter *includeRoles*, for example:

```
<action id="substitutions" ref="admin.substitutions">
   <params>{includeRoles: true}</params>
</action>
```

6.8 Resource Editor

This section describes the usage of the **@enterprise** Resource Editor. This tool allows to view the Resource Bundles of **@enterprise** and adapt the resource files (Strings) of installed applications. The resource editor is active only, if a resource has been entered in detail mask of the application (see section 6.1 - *Tab: Properties*). The application *Default* does not need these entries, because the standard **@enterprise** resources are always displayed (in readonly-mode). The standard **@enterprise** resources can be enhanced by a new language by activating the toolbar-function *New language* (see section 6.8.1)

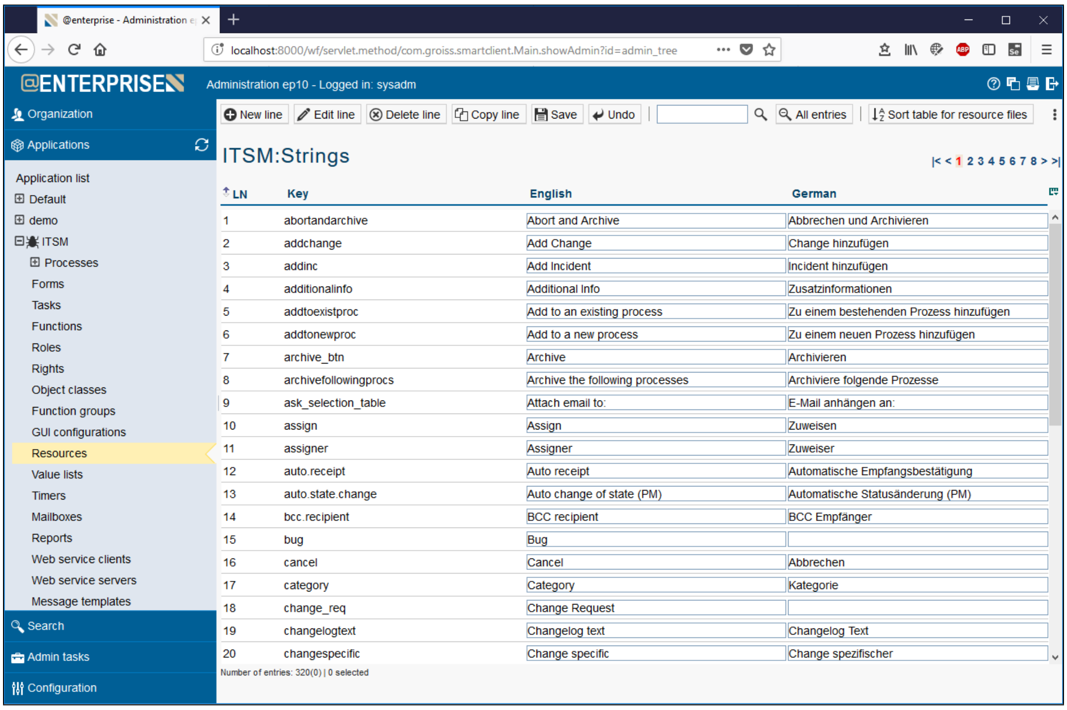
Hint: The resource editor creates/adapts a csv-file (Strings.xls) and property-files when storing the changes (depending on the entered path on detail mask of the application). Resources can be adapted only, if a csv-file and/or property-files exist on the file-system. For further information about resource files please refer to **@enterprise** *Application Development Guide*.

Activate the link *Resources* to get a spread sheet of the application resource data (Strings). If this link is activated in application *Default*, a new page will be displayed where you can select between *Strings* and *Errors* which are the standard **@enterprise** resources. The toolbar functions are explained in section 6.8.1. Following columns are available in the spread sheet (see figure 6.34):

- **LN:** Symbolizes the row number.
- **Key:** This column contains all keys of the resource file which should be translated. Existing keys cannot be changed in this view.

- **Language columns:** A set of columns is displayed whereas each column represents a language. Select the appropriate cell to edit the value. The fist language column is the default language (= *Strings.properties*).

The behaviour of the table (sorting, column picker, etc.) is equal to the standard **@enterprise** behaviour described in section 2.1.



ITSM:Strings

LN	Key	English	German
1	abortandarchive	Abort and Archive	Abbrechen und Archivieren
2	addchange	Add Change	Change hinzufügen
3	addinc	Add Incident	Incident hinzufügen
4	additionalinfo	Additional Info	Zusatzinformationen
5	addtoexistproc	Add to an existing process	Zu einem bestehenden Prozess hinzufügen
6	addtonewproc	Add to a new process	Zu einem neuen Prozess hinzufügen
7	archive_btn	Archive	Archivieren
8	archivefollowingprocs	Archive the following processes	Archiviere folgende Prozesse
9	ask_selection_table	Attach email to:	E-Mail anhängen an:
10	assign	Assign	Zuweisen
11	assigner	Assigner	Zuweiser
12	auto.receipt	Auto receipt	Automatische Empfangsbestätigung
13	auto.state.change	Auto change of state (PM)	Automatische Statusänderung (PM)
14	bcc.recipient	BCC recipient	BCC Empfänger
15	bug	Bug	
16	cancel	Cancel	Abbrechen
17	category	Category	Kategorie
18	change_req	Change Request	
19	changelogtext	Changelog text	Changelog Text
20	changespecific	Change specific	Change spezifischer

Number of entries: 320(0) | 0 selected

Figure 6.34: **Resource Editor spreadsheet**

6.8.1 Toolbar functions

This section describes the several functions for adapting the resource file. If the resource could not be adapted (e.g. if resource is within a jar-file), most of this functions are not allowed to execute. The toolbar contains following functions:

⊕

- **New line:** This function adds a new row to the spread sheet. If no row is activated, the first available empty row on last page will be activated or, if no empty row is available, a new page with an empty row will be created. If a row is selected and this function is activated, the new row will be inserted at a position depending on the sorted column.

✎

- **Edit line:** Select a row and activate this function to get an overview of the selected key and its translations in a popup-window. This overview allows to adapt the translation strings and to step to the next or previous row. Activating the button *Apply* leads in refreshing the spread sheet (= changes are stored temporarily). The changes will be persistent when the toolbar-function *Save* will be activated (= changes are stored in resource files).

- **Delete line:** Activating this function leads in removing the selected row from table.
- **Copy line:** The selected row is copied when this function is activated. The copied row is inserted at a position depending on the sorted column.
- **Save:** If this function is activated, all changes of the current spread sheet are saved to the appropriate csv- and property-files. The csv- and property-files are stored in the same directory which has been defined on application mask (see section 6.1). If the files are read from a jar-file and this function is activated, only new columns (= new languages) will be stored in the classes-directory of the appropriate application.

  Hint: The created csv-file is encoded in *UTF-16LE* after activating this function.
- **Discard changes:** If this function is activated, all not saved changes are discarded (removed from session).
- **Shortsearch:** Enter a string into the textfield and activate this function to get a restricted result. This search works analog to the standard short search of **@enterprise**.
- **All entries:** Activate this function to display all entries of the table (spread sheet).
- **Sort table for resource files:** If the temporary sorting order of the spread sheet should be used for the csv- and property-files, this function should be activated. The changes are persistent only when activating the function *Save* in toolbar.
- **New language:** A popup-window will be opened where a new column can be added by selecting a value of the dropdown-list and activate the button *Create*. The default languages are displayed, if no further languages has been configured in **@enterprise***Configuration* → *Localization* → *List of Locales* . This function can be executed always even though existing resources are read from a JAR-file.

6.8.2 Converting csv-files

If csv-files are used, they must be encoded with character set UTF-16LE. Following function is available to convert from Cp1252 to UTF-16LE:

```
http://'host':'port'/'context-root'/servlet.method/
  com.groiss.reseditor.HtmlMethods.convertXLS?resource=<reurl>
```

The parameter *resource* must be the URL to the appropriate csv-file, e.g. for application *myappl* Strings:

```
http://'host':'port'/'context-root'/servlet.method/
  com.groiss.reseditor.HtmlMethods.convertXLS?
  resource=com/dec/myappl/resource/Strings.xls
```

6.9 Value lists

Value lists allows to combine diverse attributes with their values for a specific application. Value lists are used for example in form select lists and can be defined with the form-editor (value column in schema tab) by entering the Id. The value table of a value list object consists of following elements:

- Label: An arbitrary text (which can start with @@@ signs for internationalization) that should be displayed (e.g. in select list on form, display attribute in a report, etc.).
- Value: The value which should be stored in the database.
- Position: This column allows the definition of an order of the list entries. If no position is defined (= position value 0), the values are listed in alphabetical order according to the translated label text.

The button *Upload File* allows to import values from a CSV file. Existing value list entries are either replaced (= option *Replace*) or the list is enriched by the entries of the CSV file (= option *Merge*), whereby the content of value is taken for the check. The format of the CSV file is following: The first row must contain the fix string value;label;position, with the beginning of second row the value list data must be defined.

Example:

```
value;label;position
1;Option 1;1
2;Option 2;2
3;Option 3;3
```

The imported values are not stored immediately in the database, you have to activate any save button first!

6.10 Web Services

This chapter describes the creation of web service server/client objects which can be used for one of the web server nodes in process editor (see section 7.2.19. The requirement for creating server/client objects are existing WSDL-files in the classpath of @**enterprise**.

Please notice that WSDL files must correspond to the WS-I Basci Profile 1.1 (http://www.ws-i.org/profiles/basicprofile-1.1.html).

If you want to offer web service which are not corresponding to the WS-I Basic Profil (e.g. RPC web services, ...), these services can be added/activated via the function *Admin tasks* → *Communication* → *Web services* → *Local services* (see chapter 9.6.8). This kind of web services cannot be used (automatically) in processes.

Webservice Server/Client objects can be defined in every application.

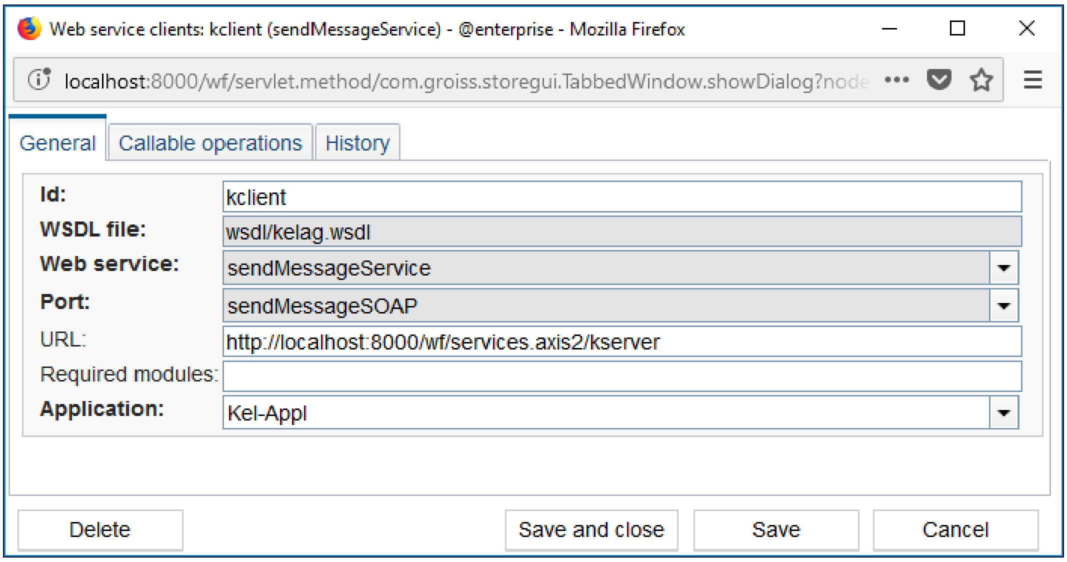
6.10.1 Webservice clients

With client objects it is possible to define which web service with its parameters (IN-/OUT-parameter) is called. OUT-parameter are submitted to web service and IN-parameter are received from web service. Client objects are applicable for submitting data to an other server for processing.

The object-details contain following tabs:

- General
- Callable operations
- History

Tab: General


Web service clients: kclient (sendMessageService) - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.showDialog?node
General
Callable operations
History
Delete
Save and close
Save
Cancel

Id: kclient
WSDL file: wsdl/kelag.wsdl
Web service: sendMessageService
Port: sendMessageSOAP
URL: http://localhost:8000/wf/services.axis2/kserver
Required modules:
Application: Kel-Appl

Figure 6.35: **Tab: General**

You can edit the following attributes (required fields are bold):

- **Id:** A free assignable ID of the web service client object. The ID must be unique per application.
- **WSDL file:** The path to a WSDL file in **@enterprise** classpath.
- **Webservice:** A selection of web services is offered depending on the definition in WSDL-file. Selection is available only, if a correct path to a WSDL file has been entered.
- **Port:** Depending on the select *Webservice* a appropriate port can be selected which was defined in the WSDL file.

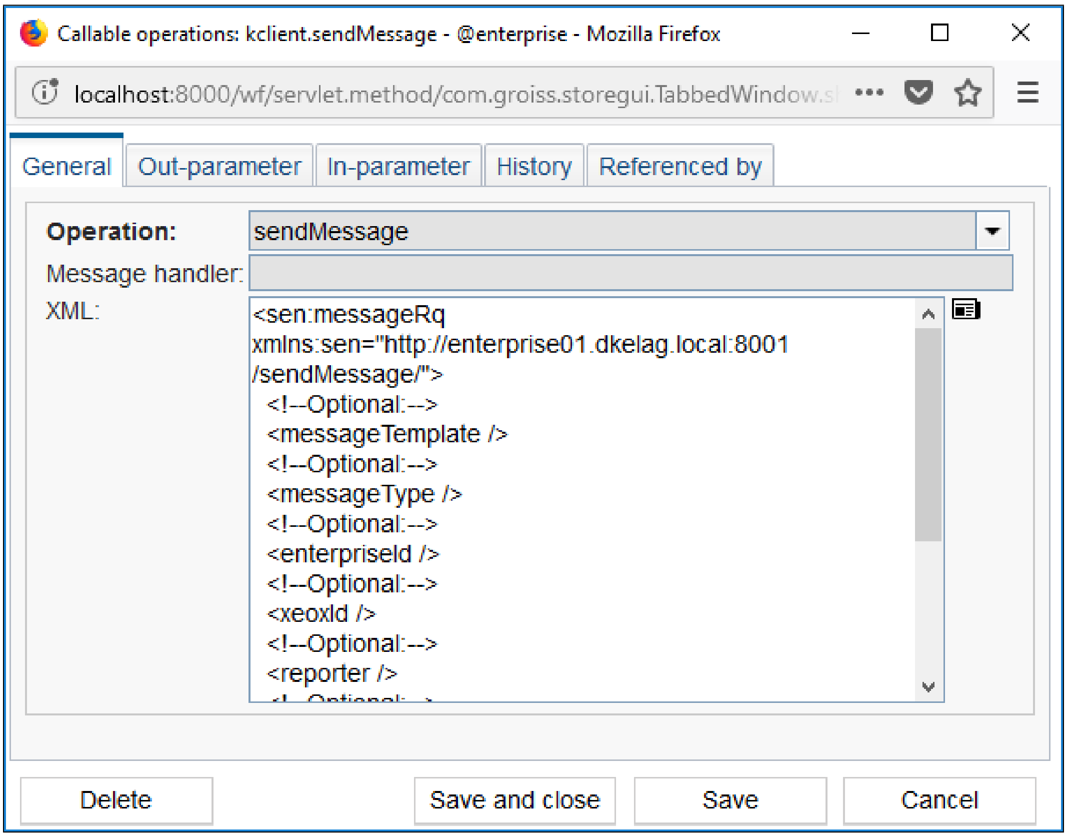
- URL: The URL of the web service which should be called. If nothing is entered, the URL defined in the WSDL file is used.
- Required modules: If needed, a comma separated list of AXIS2 modules can be entered, e.g. rahas,rampart,scripting
- **Application:** The application where the client object should be stored.

After storing the information on tab *General* an *Operations* object should be created in tab *Callable Operations*. This object allows to define IN-/OUT-parameter.

Tab: Callable operations

In this tab a table of all operations of the current client object is displayed. This table contains the default toolbar functions and the function *Execute webservice operation* which allows to test the selected operation object with its OUT-parameter.

Activate the toolbar function *New* to create a new operation object. A new dialog will be opened where you can select an *Operation* which has been defined in WSDL file (see figure 6.36). Afterwards a XML should be created by using the function *Generate XML* which is stored in field *XML*.


Callable operations: kclient.sendMessage - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.s
General
Out-parameter
In-parameter
History
Referenced by
Delete
Save and close
Save
Cancel

Operation: sendMessage

Message handler:

XML:

```
<sen:messageRq
xmlns:sen="http://enterprise01.dkelag.local:8001
/sendMessage/">
  <!--Optional:-->
  <messageTemplate />
  <!--Optional:-->
  <messageType />
  <!--Optional:-->
  <enterpriseId />
  <!--Optional:-->
  <xeoxId />
  <!--Optional:-->
  <reporter />
```

Figure 6.36: **The *Operation*-Object**

After successful creation of an *Operation* object, IN- and OUT-parameter can be defined. For web service client objects OUT-parameter are parameter which should be submitted for processing. IN-parameter are parameter which are received form web service (e.g. status notification about processing). A parameter is defined by an *Id*, a *Name* and a *Path (XPath)* which are required fields. Prefixes, which are defined in root-element of the WSDL file, can used as namespace-prefix in XPath expression . Parameter can be created manually by activating the toolbar function *New* or automatically by activating the toolbar function *Generate parameters*. It is not possible to create duplicates (identified by ID)!

6.10.2 Webservice server

With server objects it is possible to provide web services at the server. Other systems are able to call these services.

The *Webservice server* dialog is analog to object *Webservice clients*:

- General: Contains the same attributes as *Webservice clients*, but no URL can be entered.
- Callable operations: Analog to *Webservice clients*, but the toolbar function *Execute webservice operation* is not available. IN-parameter are parameter which are received for processing and OUT-parameter are parameter which should be submitted (e.g. status notification about processing). Optionally a *Message handler* can be entered which has to implement the interface *com.groiss.ws.server.MessageHandler*. If a handler is entered, this operation cannot be used in a process definition.
- History: Analog to *Webservice clients*.

6.11 Message templates

This section describes the definition of message templates which are used in several places in @**enterprise**. Following events use message templates:

- Process cycle (system step, pre-processing, postcondition, etc.)
- Escalation
- Notification about new processes in worklist(s)
- Notification of processes I follow (function *Follow the process*)
- Timer PasswordExpiration
- ReportTimer
- Changes of a DMS document (function *Follow document changes*)
- API program

@enterprise offers standard templates for most of these events which are stored in application *default*. In addition to these templates own message templates per application can be defined. Following standard templates are available:

- **Default template (documentTracker):** This template can be used in DMS function *Follow document changes*. More information concerning this function is available in **@enterprise** user manual.
- **Escalation (escalation):** Escalation emails use this template by default. More information can be found in section 6.5.9.
- **Notification (notification):** By default the notification mechanism for new worklist entries uses this template. For details please take a look into **@enterprise** user manual (keyword *Email notification*).
- **Process tracker template (processTracker):** This template is used by worklist function *Follow the process*. More information concerning this function is available in **@enterprise** user manual.
- **Password expiration warning template (pwdExpiration):** The timer PasswordExpiration uses this template to send a warning email to the users. More information can be found in section 9.1.8.
- **Report timer template (reportTimer):** This template is used as default template by ReportTimer for sending emails. More information can be found in section 9.1.8.

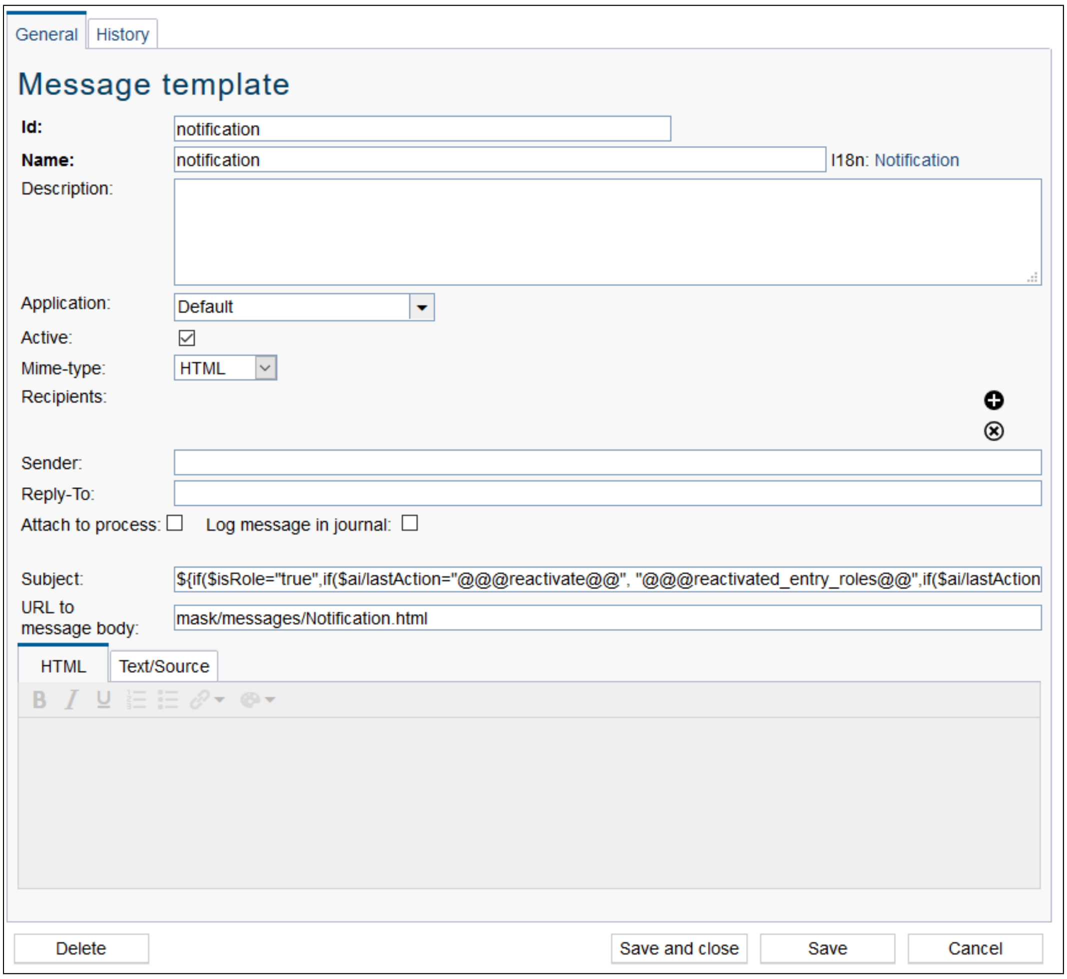
The API description is available in **@enterprise** application development guide - section *E-Mails*.

Hint: An overview of templates and the modes of sending is illustrated in section 6.11.2!

6.11.1 Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Each message template defined in **@enterprise** administration must contain an id.
- **Name:** The name of the message template. By activating the I18n-link beside this field, the translations (if defined in tab *Properties*) of this key are displayed and can be edited directly by changing the values and activating the button *Save*. The changes are stored in the resource file of this application (see section 6.8).
- Description: Free text which describes the template.
- Application: The application which this template belongs to.
- Active: This checkbox indicates, if template is active or inactive. Active templates are selectable/usable for email notification. Inactive templates are not selectable in selection list and are ignored by notification mechanism.



Message template

Id: notification

Name: notification I18n: Notification

Description:

Application: Default

Active: ☑

Mime-type: HTML

Recipients:

Sender:

Reply-To:

Attach to process: □ Log message in journal: □

Subject: ${if($isRole="true",if($ai/lastAction="@@@reactivate@@", "@@@reactivated_entry_roles@@",if($ai/lastAction

URL to message body: mask/messages/Notification.html

Figure 6.37: **Message template**

- Mime-type: This selection defines the format of the message. If the value *HTML* is selected, the tab *HTML* is active and allows to enter a HTML-formatted text. If the value *Text* is selected, tab *Text/Source* is active only where a plain text can be entered. When email will be sent, in case of *HTML* a HTML bodypart (text/html) and in case of *Text* a PLAIN bodypart (text/plain) will be created.

- Recipients: The recipient list can contain plenty of To-, CC- and BCC-recipients. Following recipient types can be defined:

  - User: **@enterprise** user can be selected here. If user has an email-address entered, a message will be sent otherwise this recipient will be ignored.
  - Role: **@enterprise** role and/or organizational unit can be selected here. All users of this role (in this organizational unit) will receive an email (if email-address has been entered for this user).
  - Email: A valid email-address can be specified here.

  - Agent of a process step: Enter a label of a process step which is the id of a step within the process definition. Depending on the agent (user or role) an email will be sent.
  - Form field: Here a form field of a process form can be entered in WDL-syntax. The syntax is <formid>.<fieldid> whereby <formid> is the id of the process form in process definition. More information about WDL-syntax can be found in section 7.
  - Current process agents: All current agents and their substitutes (user or role) of the active process will receive an email, if this recipient type has been added to the template.
  - Document owner: The owner (= creator) of the document will receive a message. For example userA creates a document and userB changes the document, then userA will receive an email that document has been changed.

- Sender: This field allows to specify an alternative sender. If field remains empty, the default settings of the configuration will be taken (see @**enterprise** Configuration/Communication/Mail sender).

- Reply-To: One or more by comma separated email-addresses could be entered here as alternative reply address, if needed.

- Attach to process: If this checkbox is active and the template is used in context of a process, an appropriate email object will be created in process-folder *Emails*. More information can be found in @**enterprise** user manual - section *Emails*. If the template is not used in context of a process, this checkbox will be ignored.

- Log message in journal: This checkbox indicates, if outgoing messages should be stored in *Mail journal*. Such an entry will be created when message could be sent. More information concerning the *Mail journal* is available in section 9.6.3.

- Subject: Here you can define a subject for the message. The subject can

  - be a simple text,
  - contain place holders (starts with @@@) which are replaced by entries of a resource bundle (see section 6.8 for more details) or
  - be a XPATH expression (e.g. to read values from form fields). More information about XPATH expressions are available in application development guide, e.g. in chapter *Office templates*. Alternatively take a look into our standard templates.

- URL to message body: An alternative to a message text a path to a HTML mask can be defined here. The URL must be relative to classes-directory (of @**enterprise** or the application). This possibility allows you to define more complex masks which are added as HTML bodypart (text/html). It is also possible to define place holders as mentioned at subject field. If an URL has been entered, no message text in *HTML* or *Text/Source* could be created and also the value of *Mime-type* will be ignored.

- Message text (HTML or Text/Source): Analog to *Subject* a message text can be defined here (= bodypart). If the *Mime-type* value is set to *Text*, the tab *HTML* is not active. If an *URL to message body* is entered, both message text tabs are inactive.

6.11.2 Overview about events and modes of sending

The following table shows an overview about the events and which templates are used:

Definition of template	**Default template (Id)**	**Agents**	**Sending mode**	**Language**
Notification about new process in worklist:				
Select template per process definition	notification	Are set at run-time in Java code	Depending on configuration parameter *Default action for sending mails*	Depending on user locale
Escalation:				
Select template per escalation object	escalation	Are set at run-time in Java code	Depending on configuration parameter *Default action for sending mails*	Default locale of @**enterprise**
Notification of processes which are followed:				
fix	processTracker	User who created a tracker object with function *Follow the process*	Depending on configuration parameter *Default action for sending mails*	Depending on user locale
ReportTimer:				
In timer field *Parameter*	reportTimer	According to definition in template or defined recipient in timer field *Parameter*	Depending on configuration parameter *Default action for sending mails*	Default locale of @**enterprise**
System step:				
In method call	none	According to definition in template or defined in JAVA-code	Mail queue entry is created; handled by MailQueueTimer	Default locale of @**enterprise**
Changes of a DMS-document:				
Selection of template or ad-hoc template	documentTracker	According to definition in template or recipient list of DMS function *Follow document changes*	Mail queue entry is created; handled by MailQueueTimer	Default locale of @**enterprise**

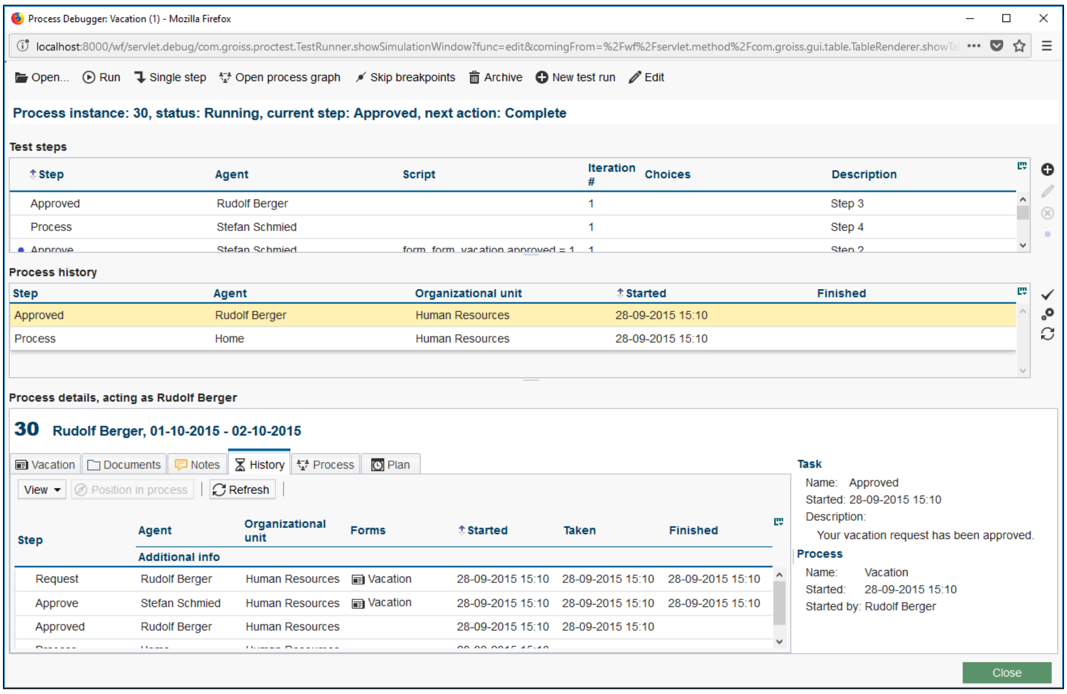
Table 6.2: Overview about events and modes of sending

6.12 *Test cases*

This section describes the definition of test cases which allows to test the operational capability of a process definition. By activating the toolbar function *New* a new test case with test steps can be created for a particular process definition. But before test steps can be created the test case needs some information:

- **Name:** Free text.
- **Process:** Process definition which should be tested. The list is restricted to process definitions of current application where test case object is created.
- Description: Free text (optionally) to describe the test case.
- Start agent: A user can be selected which is always the start agent of the process. If no user is selected, the start agent is taken from the process definition.

By activating the Button *Ok* the main window (Process Debugger) will be displayed which is divided into several areas (see figure 6.38) which are described in following sections. By activating the button *Close* the main window will be closed.


Process Debugger: Vacation (1) - Mozilla Firefox
localhost:8000/wf/servlet.debug/com.groiss.proctest.TestRunner.showSimulationWindow?func=edit&comingFrom=%2Fwf%2Fservlet.method%2Fcom.groiss.gui.table.TableRenderer.showTa
Open...
Run
Single step
Open process graph
Skip breakpoints
Archive
New test run
Edit
Vacation
Documents
Notes
History
Process
Plan
View
Position in process
Refresh
Close

Process instance: 30, status: Running, current step: Approved, next action: Complete

Test steps

Step	Agent	Script	Iteration #	Choices	Description
Approved	Rudolf Berger		1		Step 3
Process	Stefan Schmied		1		Step 4
● Approve	Stefan Schmied	form_form_vacation_approved = 1	1		Step 2

Process history

Step	Agent	Organizational unit	Started	Finished
Approved	Rudolf Berger	Human Resources	28-09-2015 15:10	
Process	Home	Human Resources	28-09-2015 15:10	

Process details, acting as Rudolf Berger

30 Rudolf Berger, 01-10-2015 - 02-10-2015

Step	Agent Additional info	Organizational unit	Forms	Started	Taken	Finished
Request	Rudolf Berger	Human Resources	Vacation	28-09-2015 15:10	28-09-2015 15:10	28-09-2015 15:10
Approve	Stefan Schmied	Human Resources	Vacation	28-09-2015 15:10	28-09-2015 15:10	28-09-2015 15:10
Approved	Rudolf Berger	Human Resources		28-09-2015 15:10	28-09-2015 15:10	
Process	Home	Human Resources		28-09-2015 15:10		

Task
Name: Approved
Started: 28-09-2015 15:10
Description:
Your vacation request has been approved.

Process
Name: Vacation
Started: 28-09-2015 15:10
Started by: Rudolf Berger

Figure 6.38: **Process Debugger (Test case)**

Hint: Test cases use GROOVY scripts! For this purpose the execution of GROOVY scripts must be activated in configuration file *avw.conf* by setting parameter *ep.scripts.enable=true*.

6.12.1 Toolbar

The toolbar contains several functions for executing and adapting a test case:

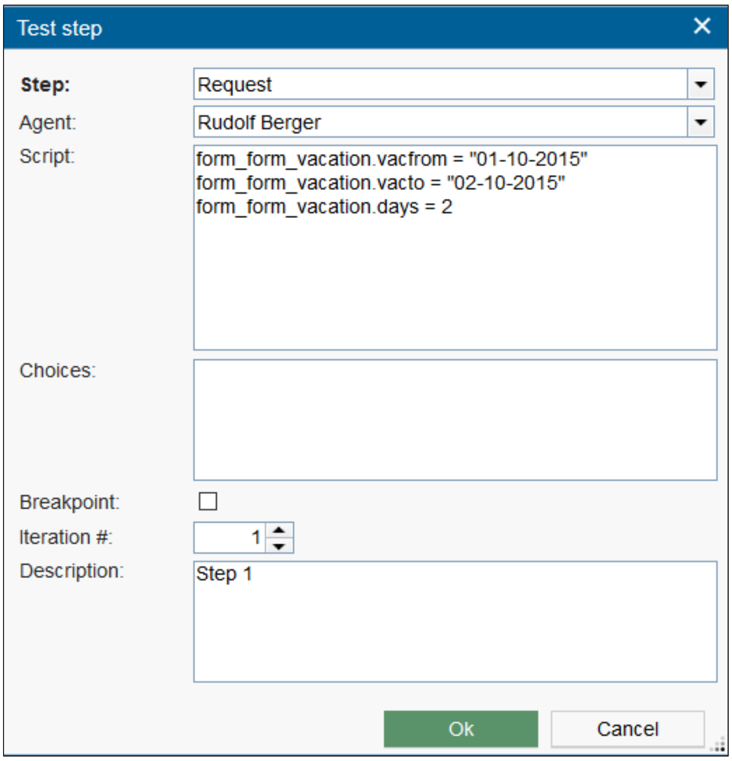
- **Open:** By activating the function a new dialog will be opened where an existing process instance can be loaded into process debugger for further treatment.
- **Run:** This function allows to start a new process instance (or continue one) and the defined test steps are processed automatically. If a breakpoint has been defined for a test step , the execution stops at this step. By hitting the toolbar function *Run* again the subsequent steps are processed until the end/next breakpoint.
- **Single step:** Alternatively to function *Run* you can process each test step separately from beginning or from a particular breakpoint.
- **Open process graph:** By activating this function a new window with the process graph(s) is opened. Beside the main process also all subprocesses are displayed in an own tab. If the function *Single step* is executed and the process graph window is opened, the current processed step is highlighted.
- **Skip breakpoints:** If this function is activated, all defined breakpoints will be skipped when toolbar function *Run* is executed.
- **Archive:** Because each test run creates a process instance in database this function allows to delete it to avoid unnecessary garbage.
- **New test run:** This function allows to start a new test run independent of the test run status (still running or finished). After activating this function a confirm dialog will be displayed which offers the possibility to archive the process instance created by this test run.
- **Edit:** This function opens the detail dialog of a test case where *Name*, *Process*, *Description* and *Start agent* can be defined. The fields of this dialog are described in section 6.12.

Beneath the toolbar an information area is displayed with following elements:

- Process instance: The id of the process instance used by this test run is displayed here.
- Status: The state of the process instance.
- current step: The process step which is performed at the moment.
- next action: The next action which will be performed.

6.12.2 Test steps

Test steps can be created/adapted with the appropriate toolbar functions. The toolbar function *Toggle breakpoint* allow to define/remove breakpoints for/from the selected test step. A breakpoint is displayed as ball. If a breakpoint is defined, the execution stops at this step



Test step

Step: Request

Agent: Rudolf Berger

Script:

```
form_form_vacation.vacfrom = "01-10-2015"
form_form_vacation.vacto = "02-10-2015"
form_form_vacation.days = 2
```

Choices:

Breakpoint: □

Iteration #: 1

Description: Step 1

Figure 6.39: **Test step**

(see also toolbar function *Run*).

A test step consists of following elements (see figure 6.39):

- **Step:** Select a process step which is processed by the test step. Only process steps of the defined process definition and the appropriate steps of subprocesses are listed.
- Agent: A user can be selected here which is always the step agent. If no user is selected, the step agent is taken from the process definition.
- Script: This field can contain a GROOVY script to set form field values. The values are updated automatically during the test run, i.e. it is not necessary to take care of the database handling! Form field values are set with following syntax:

  ```
  form_<formid1_in_procdef>.<field1>=<value1>
  form_<formid1_in_procdef>.<field2>=<value2>
  form_<formid2_in_procdef>.<field3>=<value3>
  ...
  ```

  The form-id is the id of the process form defined in process definition. The value is either a string (must be quoted) or a number. If the value of date field should be set, use the given date format of @**enterprise** configuration, e.g. form_f.datefield="2015-05-05". For persistent fields (e.g. object select fields) the id of the persistent can be used (e.g. user id) or <classname>:<oid> (both values must be quoted). If the persistent is a **@enterprise** form, either store.get() must be used to get the persistent (and assigned as value) or <classname>:<oid> can be used.

For manipulating subforms following possibilities are available:

- Add subform: Use the method *addSubform()* for this purpose. The parameter <*subformid*> is the numeric subform-id which has been defined in form template (XTHML, XForm) of main form.
  Syntax:

  form_<formid_in_procdef>.addSubform(<subformid>)

- Set field values of subform: Use following syntax to set field values whereby <*subformid*> is the numeric id of the subform defined in form template and <*subformpos*> is the position of the subform entry in subform table, beginning with 0.
  Syntax:

  form_<formid_in_procdef>.subforms[<subformid>][<subformpos>].<field>=<value>

- Remove subform: Use the method *deleteSubform()* for this purpose. The parameter <*subformid*> is the numeric subform-id which has been defined in form template (XTHML, XForm) of main form. The parameter <*subformpos*> is the position of the subform entry in subform table, beginning with 0.
  Syntax:

  form_<formid_in_procdef>.deleteSubform(<subformid>,<subformpos>)

- Choices: If choices are used in process definition, this field allows the definition of the choice-path which should be processed. The choice-node (<*choice_node_label*>) and each choice-path (<*choice_branch_label*>) must contain a label which can be defined in process editor. The definition of the choice-path which should be processed must be done in the previous test step with following syntax:

  <choice_node_id>=<choice_branch_id>

- Breakpoint: If this checkobx is activated, a breakpoint will be defined for this test step. If a breakpoint is defined, the execution stops at this step (see also toolbar function *Run*).

- Iteration #: If a test case contains several test steps with the same process step, the appropriate iteration number must be defined here, beginning with 1. This could be possible, if a loop is used in process definition and the process step should be processed several times or parfor steps are processed.

- Description: Free text to describe test step.

By activating the button *Ok* a test step will be added to table *Test steps*. The button *Cancel* discards the changes and closes the dialog *Test step*.

6.12.3 Process history and Process details

The process history provides the detail view of one process instance. It shows all process steps a process has passed through. Process history entries are created by executing the test steps (by toolbar functions *Run* or *Single step*). The areas *Process history* and *Process details* correlate with each other, i.e. by selecting a process history entry the appropriate process details are displayed. In addition there a some display options which can be activated in the appropriate toolbar:

- ✓ **Show finished steps:** By activating this function the finished steps are displayed. By default the process history displays active steps only.

- ⚙ **Show system steps:** By activating this function *System steps* (steps that were automatically handled by the WFMS) are displayed as well.

- 🔄 **Refresh:** This function allows to refresh the process history table manually.

7 Process Definition

In this chapter we describe the definition of processes. **@enterprise** provides two ways for defining processes.

1. graphical definition using the process editor,
2. definition of the process as a script in the Workflow Definition Language (WDL).

Both options have the same expressiveness - you can define a process with the process editor, save it as a WDL-script, edit the script, load it again, and make additional changes in the process editor[1].
In the next section we describe the script language WDL, afterwards the handling of the process editor is shown.

7.1 WDL

In the following we describe the syntax and semantics of the language elements of WDL. The language has resemblance to a structured programming language and allows the definition of workflow processes. Each WDL script consists of a process header, a declaration section, and a statement section. Example:

```
process jobproc()
name "jobproc";
description "simple process";
version 1;
subject f.subj;
forms f Jobform;
begin
  <label_order> all order(f);
  loop
    f.recipient a_task(f);
    exit when xpath:"$form_f/finished = 'true'";
  end;
  label_order:user inform(f);
end;
```

[1] Graphical layout and annotations are not preserved across notations.

The process definition starts with the keyword process, followed by the process id and a list of arguments. The declaration section contains a set of keyword-value pairs, for example version 1;.

The statement section begins with the keyword begin and ends with end. In between the structure of the workflow, containing task calls, subprocesses, system steps and control structures is described.

Hint: Defined process escalations are not available in WDL!

7.1.1 Lexical Conventions

In WDL the following lexical rules apply:

- Ids

  Ids are identifiers for tasks, roles, users, and similar entities. The following conventions apply:

  Ids start with a letter or $ or / or \. After the first character more of these characters plus digits can follow. The length of an id must not exceed 80 characters.

- Strings

  Strings are character sequences enclosed in double quotes. A double quote within a string is denoted as two consecutive double quotes.

  Example: "This is a string." "This is a string with two ""double quotes""."

- Comments

  All characters between "/*" and "*/" are ignored. Comments can span lines. [2]

- Case-Sensitivity

  WDL is case-sensitive, this means "If" is not equal to "if". All keywords use lower case characters.

- Keywords

  The WDL keywords are listed in table 7.1. A keyword enclosed in single quotes is no longer interpreted as a keyword, but as an id.

7.1.2 Process header

Syntax:

```
processdef =
  "process" id "(" [formdecl{ "," formdecl}] ")"
  { pdeclaration ";" }
  "begin" [nodename]
    statseq
  "end" [nodename] .
```

[2] Comments are ignored when loading the WDL script, therefore they are not visible in the system.

abort	adhocTasks	and	andpar	application
autofinish	baseform	batch	begin	branch
call	choice	corr	correlation	current_tx
days	description	do	else	elsif
end	exception	exit	for	forms
gobackonerror	goto	hours	if	in
instanceid	invoke	loop	maxtime	minutes
name	new_tx	newthread	none	not
null	or	orpar	out	owner
parallel	priority	process	raiseEvent	receive
registerForEvent	repeat	reply	skipable	start
startfunction	startnow	subject	success	sync
system	then	unregister	until	version
wait	when	while		

Table 7.1: Keywords in WDL

Description:

- Id: id (internal name) of the process.
- Parameter list: Forms which are parameters of the process. These are used when the described process is called as subprocess from another process. The forms are passed by reference, this means the form data are not copied.
- pdeclaration: declarations, see below.
- statseq: sequence of statements.

7.1.3 Declaration part

In the declaration part some general information about the process is specified.
Syntax:

```
pdeclaration =
   "name" string
 | "description" string
 | "version" number
 | "subject" ( formfield | expressionstring )
 | "maxtime" number ("days" | "hours" | "minutes" )
 | "forms" formdecl { "," formdecl}
 | "application" application
 | "instanceid" string
 | "priority" number
 | "adhocTasks"  adhoctask { "," adhoctask }
.
```

Description of the declarations:

- name: Name of the process, is displayed in the end user interface.
- description: free text
- version: Integer, declares the version of the process
- subject: specifies the content of the subject column in the worklist. Can be a single formfield designation (formid.fieldid), or an expression referencing several formfields. More information can be found in section 6.5.
- maxtime: intended maximum running time of the process, specified in days, hours, or minutes.
- forms: declaration of forms as process local data containers. The definition of a local form is:

  formid formtype ["baseform" baseformid] ["formname"]

  - formid: is the id of the local form in this process
  - formtype: is the id of a formtype defined in the system
  - formname: is the local display name of a form in this process (optional)
  - baseform: if the declared form is a view-form, the base form must be specified here

  Example: forms rg bill, ls item_list, rgsum shortbill baseform rg;
- application: id of the application the process belongs to.
- instanceid: Id which identifies the started process instance uniquely. It is also possible to enter a pattern which allows to specify a numbering scheme. More information can be found in section 6.5.
- priority: The priority of the process.
- adhocTasks: Can be used to declare additional tasks which may be instantiated programmatically during the execution of the process. They provide a means to define form and field visibilities. Syntactically, they are task statements (see below) without a declared agent list, since the agents will be specified at run time. Each adhoctask is defined as:

  ["<" labelid ">"] taskid "(" [formlist] ")" [nodename]

All declarations, except the name, version and application are optional.

7.1.4 Basic Statements

The statement section is the central part of the process specification, it is enclosed between the keywords begin and end. It contains at least one statement. Statements are terminated with a semicolon.
Syntax:

```
statseq = { [ "<" labelid ">" ] statement [ nodename ] ";" }.


 statement =
  (
     batchstmt
    | branchstmt
    | choice
    | exitstmt
    | gotostmt
    | ifstmt
    | invokestmt
    | loopstmt
    | par
    | parforstmt
    | raiseEvent
    | receivestmt
    | registerForEvent
    | repeatstmt
    | replystmt
    | subproccall
    | sync
    | systemstmt
    | taskstmt
    | unregister
    | whilestmt
    | waitstmt )
.
```

labelid: An id of this step within the process definition. Must be unique and can be used as exact reference to this step.
nodename: A string used as the display name for the statement (and the corresponding node in the process editor). Does not need to be unique.
e.g. <ordertask> all order(form) "place the order";
In the following we describe the different statements:

Manual Tasks Specifications

Manual tasks are denoted as:
Syntax:

```
taskstmt =
   ( "none" | agentlist ) taskid "(" [ formlist ] ")" [ "skipable" ].

agentlist =  agent { , agent }.
```

Description:
agentlist: There are several possibilities to define the agents of a task:

- The agent can be a **user**, specified as the id of an **user**. Should be used only in special cases, because the process definition should usually stay independent of specific users.
- The agent can be a **role**, the id of the role is specified. Each user who has the role is a potential agent of the task. The task will appear in the role-worklist of these users.
- Additional to the role an **organizational unit** can be specified. The notation is: org_unitid "!" roleid. Example: marketing!sek.

  The organizational unit of the current task is changed to the given OU. The organizational unit of the overall process does not change.
- **Agent of a previous step**: The agent of this task is the last agent of another task. The other task is referenced via its labelid according to the syntax labelid ":user". In this case the organizational unit of the previous step is taken!

  Example:

  ordertask:user sek task1();
- **Agent from a form field**: The agent is taken at run-time from the content of a field in a process form. The content is either a role id, a user id or a role id together with an organizational unit id.
- **Empty agent**, Syntax: none.

  At run-time the agent must be set either programmatically or manually by the agent of the previous step.
- **Java-Method:** a Java Method (e.g. com.acme.Action.setAgent() which returns either one of
  - a role id
  - a user id
  - a combination of id of organizational unit and id of role in the form of org_unitid "!" roleid
  - a user object
  - a role object
  - an object of type com.groiss.ds.Pair, where Pair.first will be used to set the agent of the stepinstance, and Pair.second will be used to set the "step agent" of the stepinstance. When using this kind of agent specification,

- ∗ Pair.first should designate a user (com.groiss.org.User) and
- ∗ Pair.second should designate a role (com.groiss.org.Role) or a combination of orgunit (com.groiss.org.OrgUnit) and role.

When using this form the task will appear in the worklist of the designated user, and if this user "gives back" the task, it will appear in the role worklist of the designated role.

- **Sequence of agents**: Can be formed by a comma separated list of agent definitions in the variants stated above. The task is routed to the agents of the list in a sequential manner[3].

Note that the agent of the process definition can also be overwritten at run-time by a preprocessing method of the task.
taskid: The id of a task defined in the application. If you specify an id which is not the id of an already defined task, you can use the option "Generate Tasks" when loading the process. The task is then generated with the id from the process definition (and the same name, all other fields empty).
formlist: Comma separated list of formids. Forms, which have been defined either in the argument list of the process or were declared as local forms.[4]
skipable: If a taskstmt has the empty agent ("none") and is marked as skipable and no agent is set at runtime, the corresponding task is simply omitted. The task would be instantiated only if an agent has been set via a preprocesing method.

Subprocess Call:

A process can be called as part of the execution of another process. This allows to design processes in a reusable and modular manner or to build layers of abstraction to provide a proper level of detail.
Syntax:

```
subproccall =
  "call" subprocid "(" [formlist] ")".
```

The call statement instantiates one process of the definition denoted by subprocid as part of the current process execution. Execution is synchronous, the called process will get control and when it ends, the control recommences in the calling process after the call statement.
Forms can be passed along the call. The formlist is a comma separated list of form ids. The forms are passed *by reference*, no data is copied. The formids of the call refer to form variables in the calling process (actual parameters) and must match the forms declared in the parameter list of the called process.

[3] Preprocessing is executed once before the first agent, postconditions are executed once after the last agent

[4] At run-time, the icons for those forms will appear in the worklist for instances of this task. The form content is visible and editable in this task. See section 6.2 for a description how to restrict the rights to view and edit forms in a task.

System Step

A system step is used to execute a Java method without any manual intervention. The name of the method is specified after the keyword system and followed by a comma separated list of string literals which is enclosed in parentheses. Since such methods are executed synchronous, they should be rather short in terms of execution time.
A system step can also accept a list of Java methods. Such methods are to be enclosed between begin and end, ant to be separated with ; . The methods are executes sequentially.
Syntax:

```
systemstmt =
  "system" methodname "(" [ string { "," string } ] ")"
  |
  "system" "begin"
     methodname "(" [ string { "," string } ] ")"
     { ";" methodname "(" [ string { "," string }] ")"}
  "end"
  .
```

Note, that you must specify the full-qualified method names including the package names.
Example: system com.groiss.demo.Step.exec("p1","p2");

Hint: Useful standard methods can be found in class com.groiss.wf.SystemAction!

Batch Steps

Like system steps, batch steps are also executed automatically by the engine. The main difference is that batch steps are called asynchronously and can have an arbitrary long execution time. A handler class must be specified to be able to react to events during this asynchronous execution. Detailed information concerning batch jobs can be found in the Application Programming Guide and in the API-documentation.
Syntax:

```
batchstmt =
 "batch" batchAdapterClassName "(" [ paramstring ] ")
   { "startnow" | "newthread" | "retrystart" |
     "autofinish" | "pollfinish" | "gobackonerror" }.
```

Note, that you must specify the full-qualified class name, including the package name.
Example: batch com.groiss.demo.DemoBatchAdapter("param").

Wait Step

A wait step can be used to halt the process execution for a time duration or until a certain point in time. The wait step is finished automatically by timer *Suspension*, i.e. the wait step is finished at the earliest when the time period is exceeded depending on the next execution time of timer *Suspension*. Another possibility is to finish the step manually via process history. The duration or point in time is specified after the keyword wait. It can be given in the form of a method, as a form field or as a number combined with a time unit:

Syntax:

```
 waitstmt =
    "wait"
     (   methodname "(" [ string { "," string } ] ")"
       | formfield
  | number ("workdays" | "days" | "hours" | "minutes" )
 )

      .
```

The methods and formfields can return either java.util.Date objects which are interpreted as absolute point in time, or integers which are minutes to wait. No real waiting occurs, when the specified dates are in the past or the specified integers are not positive.
Additionally, Groovy and XPath-expressions can be used to specify the waiting period or time point. For more information about Groovy and XPath take a look into *Application Development Guide*.
Note, that you must specify the full-qualified method name including the package name. Example: wait com.groiss.demo.Step.calcDate("p1","p2");

7.1.5 Control Structures

The flow of control in a process is defined using the control structures of WDL. All the usual control structures like sequence, alternative execution and repeated execution are provided along with the crucial ability to specify parallel execution.

Sequence

Sequential execution of statements is specified by simply listing the statements one after another.

Example:
Execute first the task insert_order() from role sec. After this activity is finished, the activity survey should be performed by a member of the role clerk. After this, in the organizational unit production the task manufacture should be performed by users in the role worker.

```
...
sec insert_order(order);
clerk survey(order);
production!worker manufacture(order);
...
```

Conditions

Conditions are used in WDL in the following control structures:

- Alternatives: if, choice

- Loops: while, repeat, loops - exit when
- Postconditions in tasks

Comparisons of form values and literals and boolean Java methods can be combined in the usual manner via logical operators to form complex conditions. Additionally, WDL-conditions can be defined in Groovy and via XPath-Conditions. For more information about Groovy and XPath-Conditions take a look into *Application Development Guide*.
Syntax:

```
cond = expr1 { "or" expr1 } .

expr1 = expr2 { "and" expr2 }.

expr2 = [ "not" ] expr3.

expr3 =
     "(" cond ")"
   | methodcall
   | booleanformfield
   | formfield relop (number | string | formfield | "null").

relop = ( "=" | "<>" | "<=" | ">=" | "<" | ">" ).

formfield = formid "." fieldid.
```

Examples:

- f.recipient = null
- f.ordervalue > 100000
- com.groiss.Check.isAvailable("f.amount") and f.class > 3
- (f.recipient <> null or f.value > 10000) and f.class = 4
- groovy: form_f.subject == "Book"
- xpath:$form_f/subform[@id='1']/form/status = 'ok'

Java methods should have 0 to n literal string parameters and a return value of type boolean. See the **@enterprise** Programming Guide for details on writing such Java methods.

If: system evaluated alternatives

if and elsif constructs allow the conditional execution of process parts. Syntax:

```
ifstmt =
   "if" cond
   "then" [nodename] statseq
```

```
    { "elsif" cond "then" [nodename] statseq }
    ["else" statseq ]
   "end".
```

Description:

- cond: A condition as defined above.
- statseq: a statement or a sequence of statements.

Example:

```
if order.amount <= 2000 then "small orders"
   clerk write_confirmation()
elsif order.amount <= 5000 and order.class = 4 then "medium orders"
   manager approve()
elsif ...
   ...
else
   ...
end
```

Choice: mixed automatic and manually evaluated alternatives

Choice statements allow the user to choose the process path from a predetermined but run time dependent set of available paths.
Syntax:

```
choice =
   "choice" [ nodename ]
    { branchname [ "," cond ] ":" statseq }
   "end".
```

Description:
Each path has a name (denoted with branchname), where an arbitrary string can be given, and an optional condition. The engine first checks the conditions of all potential branches, only the branches where no condition is specified or the condition evaluates to true are presented to the user for the final selection. When no conditions are given, the selection is done purely manual.

Example:

```
choice "manual selection"
   "order now", f.sum < 5000:
      sec order(f);
   "check again":
      clerk check(f);
   "archive":
      system Archive.insert();
end;
```

While: repeated execution

Syntax:

```
whilestmt =
   "while" cond "do" [ nodename ]
     statseq
   "end"
.
```

Description:
The statements in the loop body (between "do" and "end") are executed over and over again, as long as the condition evaluates to true. Since the condition is evaluated before the body of the loop, the body may never be executed zero or more times.
Example:

```
while f.proved = 0 do
   sec correct(f);
end;
```

Repeat: accepting repeated execution

Syntax:

```
repeatstmt =
   "repeat" [ nodename ]
      statseq
   "until" cond.
```

Description:
The statement sequence in the body is executed repeatedly until the condition evaluates to true. Since the condition is at the end of the statement block the statements are executed at least once.
Example:

```
repeat
   clerk insert_data(order);
   call check_data(order);
until order.data_ok = 1;
```

Loop - exit when : generalized repeated execution

Syntax:

```
loopstmt =
   "loop" [ nodename ]
      [ statseq1 ]
      "exit" "when" cond;
      [ statseq2 ]
   "end".
```

Description:
The statements in statseq1 are executed. The condition of the "exit when" is evaluated. If this result of the evaluation is false, the statements of statseq2 are executed and the loop is executed again. If the evaluation result is true, the loop terminates without further execution of statseq2.

Andpar and Orpar: parallel execution

Parallel execution of process paths can significantly reduce the overall processing time. The two control structures andpar and orpar allow the definition of a predetermined number of parallel execution paths.
Syntax:

```
  par =
    ( "andpar" | "orpar" ) [ nodename ]
          statseq
      { "|" statseq }
    "end" [ "do" parmethod ].
```

Description: The parallel branches are separated by the bar "|". When the par is reached, all parallel branches are instantiated simultaneously. Continuation depends on the kind of parallelism:

- andpar: Process is continued, when all parallel branches are finished.
- orpar: Process is continued, when one parallel branch is finished.

The parmethod is described down below.
Example for andpar:
For the handling of a complicated business case the consultation of three assessors is necessary. After they make their assessment, a final judgment can be performed.

```
  ...
  andpar
     assessor1 make_assessment(s_form1);
   | assessor2 make_assessment(s_form2);
   | assessor3 make_assessment(s_form3);
  end
  s_ou!manager judge(s_form1, s_form2, s_form3)
...
```

Example for orpar:
When calculating the route for a business trip two route planners are consulted. However, the result of one of them is sufficient for going on in the process:

```
...
clerk insert_tripdates(flyform);
orpar
   clerk check_routeplanner1(flyform);
```

```
 | clerk check_routeplanner2(driveform);
end
...
```

The (*paramethod*) can be specified at the end of an andpar and is used to implement generalized forms of parallelism.
When a fixed number of branches (n of m) have to be finished, the method

com.groiss.wf.SystemAction.join(n,action)

can be used. Both parameters are strings:

- n: the number branches that must be finished, in order for the whole par construct to be finished
- action: contains the value *none* or *cancel*. Active branches will be aborted by setting the value *cancel*.

Example for an andpar with n of m finished branches:
For the handling of a simpler business case, the consultation of two assessments out of three are necessary:

```
  ...
  andpar
     assessor1 make_assessment(s_form1);
   | assessor2 make_assessment(s_form2);
   | assessor3 make_assessment(s_form3);
  end do com.groiss.wf.SystemAction.join("2","cancel");
  ...
```

If overall completion of parallelism can not be defined by completion of a fixed number of branches, but is rather computed at run time, an arbitrary Java method can be called. More about that can be found in the *Application Development Guide*.

Parallel For: runtime determined number of parallel branches

The parallel for statement can be used to split the process execution into a number of identical parallel paths where the number is determined at runtime.
Syntax:

```
  parforstmt =
     "parallel" "for" (localformid "in" formid"."subformtableid ["when" cond]
                  | iteratorclass)
     "do" [ nodename ]
        statseq
     "end" [ "do" parmethod ].
```

With the help of this control sequence it is possible to either generate a parallel branch for each row of one of the subform tables of a main table or to generate parallel branches according to an iterator.
Description:

- localformid: new local variable referring to the corresponding sub form within the parallel branch.
- formid: id of the mainform.
- subformtableid: id of the sub form table as defined in the tablefield for the formtype of the mainform.
- cond: Optional condition, if parfor branch should be started or not (true/false return value).
- iteratorclass: name of a class which implements the interface com.groiss.wf.ParForIterator

The end node of a parallel for can take an optional parmethod in order to implement specific end conditions: When a fixed number of branches (n of m) have to be finished, the method

com.groiss.wf.SystemAction.parforJoin(n,action)

can be used. Both parameters are strings:

- n: the number branches that must be finished, in order for the whole par construct to be finished
- action: contains the value *none* or *cancel*. Active branches will be aborted by setting the value *cancel*.

If overall completion of parallelism can not be defined by completion of a fixed number of branches, an arbitrary Java method can be called. More about that along with examples of parfor constructs with subforms and with iterators can be found in the *Application Development Guide*.

Branch Statement:

The branch statement allows one to split the process execution into a main path and into an ancillary flow (the branch).
Syntax:

```
branchstmt =
  "branch" [nodename]
    statseq
  "end".
```

Statements in the branch execute in parallel to the statements in the main flow. Termination of either one does not terminate the other one, so branches may outlive the main execution path of the process.
Example:

```
begin
  ..
  clerk enter(f);
  supervisor check(f);
  branch "hold in evidence"
    recordkeeper inform(f);
    ...
  end;
  worker build(f);
  ...
end
```

Goto Statement:

Gotos allow to deviate from the structured flow of control and to jump to other parts of the process specification.
Syntax:

```
gotostmt =
    "goto" labelid.
```

The flow of control resumes at the statement denoted by the labelid.
Example:

```
  <entry> clerk enter(f);
  supervisor check(f);
  if (f.quality <> "OK") then /* denotes exceptional case */
    goto entry;
  end;
  worker build(f);
```

In this script the goto statement causes that the tasks enter and check to be repeated when the quality is not acceptable. Note that a repeat until would usually be a better formulation of the flow, but the designer might have chosen the goto explicitly to distinguish the exceptional flow from the usual execution sequence.
When used excessively or with poor judgment, gotos can severely harm the readability of a process description and make it almost unmaintainable. If at all, use them with care and only in well founded cases.

7.1.6 Event Mechanism

The event mechanism allows to signal process progress to (other) process instances which expressed interest in such an event. On arrival of such an event a handler can be called or the execution of a stalled process can be continued. Detailed information about events can be found in the *Application Development Guide*.
Syntax:

An event can be raised with:

```
raiseEvent =
  "raiseEvent" "(" eventname "," "current_tx" ["," form] ")".
```

Events can be waited for with:

```
sync =
  "sync" "(" eventname [ "," eventhandler ["," form] ] ")".
```

Registration of a handler for an event is done via::

```
registerForEvent =
  "registerForEvent" "(" eventname [ "," eventhandler ["," form] ] ")".
```

Handlers can be unregistered with:

```
unregister =
  "unregister" "(" eventname ")".
```

Description:

- eventname: the name of the event.
- current_tx: the event handler should be carried out in the same transaction (no other value possible).
- form: either a form or a form field which serves as the context object; alternatively the keyword *process* can be used which designates the parent node of the current activity instance as the context objext.
- eventhandler: a Java class implementing the interface com.groiss.event.IEventHandler. If none is given, com.groiss.event.EventHandler is used.

7.1.7 Web services

The WDL provides elements to incorporate Web Services into process descriptions in a straightforward manner. Web services can be called via invoke, process execution can be stalled with receive until a web service is called by an external entity, or a reply can be send as an answer to a webservice invocation issued earlier.

Web services nodes must reference the service operation to be used and provide a mapping between the message elements and the process data containers (the forms). Web services and operations are defined via the admin interface in @**enterprise** manually or on the basis of a WSDL file.

Details can be found in the *Application Development Guide*.

Syntax:

Incoming Message (RECEIVE):

```
receivestmt =
  "receive" [ "start" "process" ] operationspec "(" [incorrparams] ")" ["end"].
```

Reply Message (REPLY):

```
replystmt =
  "reply" operationspec "(" [outparams] ")".
```

Outgoing Message (INVOKE):

```
invokestmt =
  "invoke" [address "."] operationspec  "(" [inoutparams] ")"
     ["success" statseq ]
     ["exception" statseq]
  ["end"].
```

Common statement-parts, which are used by the webservice-nodes are:

```
operationspec =
  serviceid "." operationid.


incorrparams =
  incorrparam {"," incorrparam}.

incorrparam =
  inparam | corrparam.

corrparam =
  ("corr" | "correlation") xpath "=" messagecomp.

inoutparams =
  inoutparam {"," inoutparam}.

inoutparam =
  inparam | outparam.

inparam =
  ["in"] xpath "=" messagecomp.

outparams =
  {"," outparam}.

outparam =
  ["out"] messagecomp "=" xpath.
```

Short description of the syntactical elements:

- serviceid: The ID of the web service.
- operationid: The operation-ID of the web service.
- address: The URL of the web service.
- messagecomp: The ID of the (IN/OUT)-parameter of the message.
- xpath XPath expression denoting the form element to map.
- statseq: Sequence of statements.

Example for webservice nodes:

```
...
 invoke mywebservice.SendMessage(
     MessageTemplate="form_ticket/messageTemplate",
     MessageType="$form_ticket/messageType", enterpriseid="$pi/id",
     xeoxid="$form_ticket/xeoxId", reporter="$form_ticket/reporter",
     'subject'="$form_ticket/subject", """0"""=SendMessageResult)
   exception
     administrator inform(ticket);
 end;
...
 receive kserver.sendMessage(
   corr "$pi/id"=enterpriseId,
   "$form_ticket/messageTemplate"=messageTemplate,
   "$form_ticket/messageType"=messageType,
   "$form_ticket/enterpriseId"=enterpriseId,
   "$form_ticket/xeoxId"=xeoxId,
   "$form_ticket/reporter"=reporter,
   "$form_ticket/subject"='subject',
   "$form_ticket/text"=text,
   "$form_ticket/analyst"=analyst
 ) waitforincomingmessage;
...
 reply kserver.sendMessage('out'="""0""");
...
```

7.2 The process editor

The **@enterprise** process editor provides you an easy way to define workflows. The process editor supports the notations *BPMN* (Business Process Modeling Notation - see figure 7.1).

To start the process editor, go to the system administration, select the application where you want to define the process and click on the link "Processes":

- Click on the toolbar icon "New process (Editor)" to create a new process with the editor. The editor is opened in BPM-Notation.
- If you want to edit a process, select it in the list and click "Edit in editor". The process editor will start and show the selected process definition.

7.2.1 The process editor window

The main window of the process editor has the following sections:

- **Title bar:** In the title bar you see the name of the process you edit.
- **Menu bar**: The menu bar contains the following menus:
  - Process
  - Edit
  - View
  - Help
  - Symbol bar
- **Drawing area**: In this area you see the graphical workflow definition.
- **Function list**: The function list shows the function buttons for editing the process definition.

Hint: To avoid problems with popup-blocker, we recommend to turn it off!

7.2.2 Using the process editor

Before describing the various elements and functions of the editor in detail we provide an overview on how editing of a process is done using this editor.

Adding elements

All elements you can add to your process are listed in the function list to the left of the drawing area. To provide a better overview those elements are grouped in categories, e.g. category *control structures* for modeling conditional branches or loops.

To add an element perform the following steps:

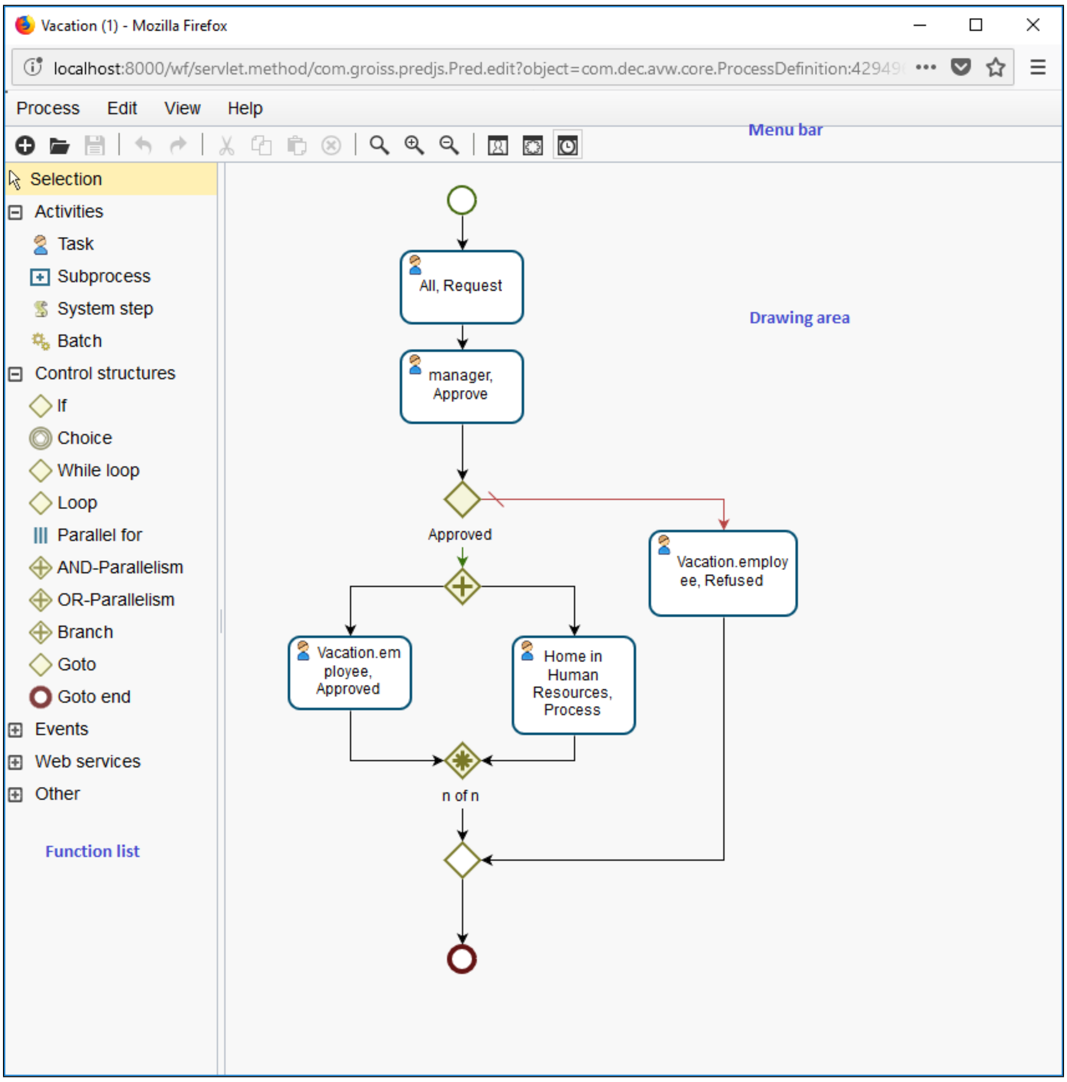


Figure 7.1: **Process Editor**

- Click on the required element in the function list to switch to insert mode.
- Move the mouse into the drawing area. This will change the mouse cursor to indicate that the editor is now in insert mode (see Fig. 7.2).
- A new element can only be added on a line connecting two existing elements. Therefore move the mouse over the desired line (the line will then be highlighted and the mouse cursors will change again) and click on the position at which you want to insert the selected element(see Fig. 7.3).

Hint: Annotations are the only elements that are not added on lines but by clicking on any empty space in the drawing area. You can also attach annotations to elements

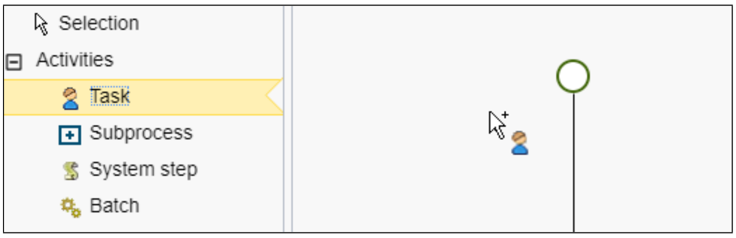


Figure 7.2: **Insert mode for *Task***

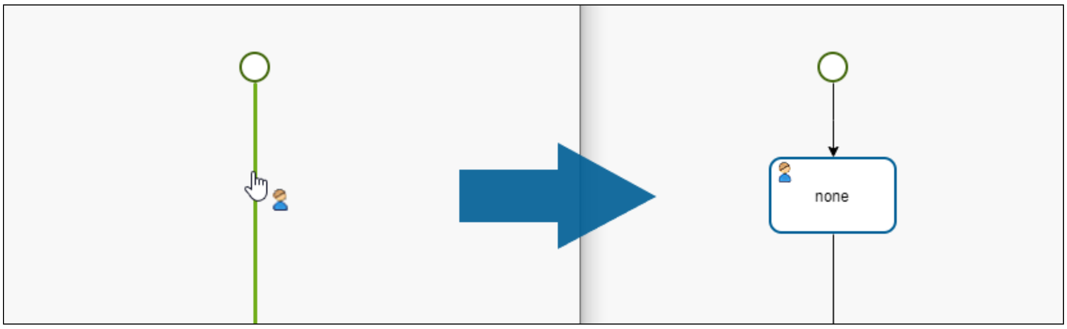


Figure 7.3: **Adding a *Task***

by selecting that element and activating menu item *Annotate*. This will add an annotation connected to that element by a dashed line.

- If adding is prohibited, which is only the case for a few specific lines, this will also be displayed by the mouse cursor – and the line will not be highlighted is such a case (see Fig. 7.4).

Hint: you can cancel the insert mode by pressing the *ESC* key on your keyboard or by selecting option *Selection* in the function list.

The process editor ensures that each insert action will lead to a valid process model. So when adding an *If* construct for example not only one element will be added but all elements needed for this construct, i.e. the start and end elements and 2 connecting lines, one for the true and one for the false path of that condition (see Fig. 7.5).

This is a major distinctive feature to many other process modeling tools which do not support such a structured approach. A full list and description of all available elements in the function list can be found in chapter 7.2.8.

Hint: constructs like *Parallelism* and *Choice* may have many paths but only two paths will be added initially. If you want to add more paths select the start node of that construct and activate menu item *Add edge*.

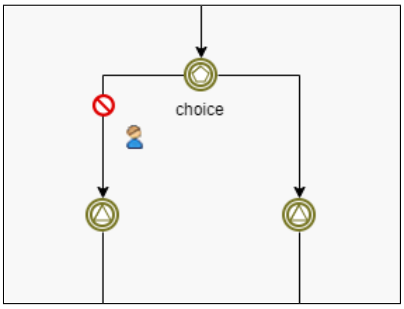


Figure 7.4: **Insert not allowed**

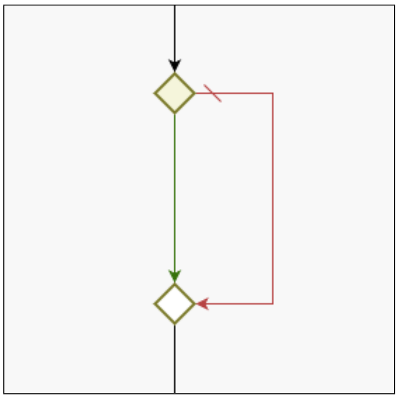


Figure 7.5: **Inserted *If* construct**

Edit elements

Elements have properties like e.g. a name. You can edit those properties in different ways:

- Double-click the element
- Select the element, open its context menu by clicking the right mouse button and activate menu item *Activity properties*
- Select the element, open menu *Edit* in the menu bar and activate menu item *Activity properties*

Each of these actions opens a details window in which you can edit the properties available for the current element. More details on that can be found in chapter 7.2.9 and following.

For elements like e.g. *Task* you may also change the size of that element. To do so select the element. Small squares will now be displayed at the borders of the element. Those can be used to change the width (squares at the vertical borders), the height (squares at the horizontal borders) or both at once (squares at the corners). Move the mouse over such a square and a changed mouse cursor will indicate that you can adjust that border by moving the mouse with the left mouse button pressed (see Fig. 7.6).

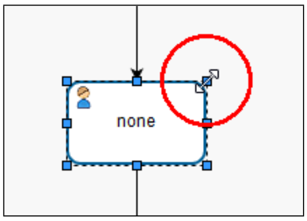


Figure 7.6: **Selection frame with resizing squares**

Hint: if no such squares are visible the size of the selected element cannot be changed. This is the case for all elements represented by a circle or diamond.

Move elements

You can change the position of existing elements via Drag & Drop. Therefore select the element and move the mouse with left mouse button pressed. When you let loose the mouse button the element will be placed at the current mouse position(see Fig. 7.7).

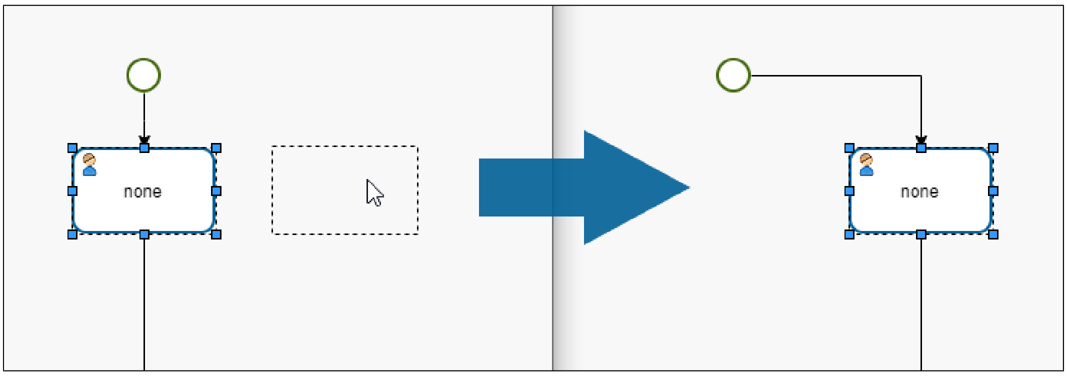


Figure 7.7: **Moving element**

You can move multiple elements at once by extending the selection. To do so click on additional elements with *CTRL* key pressed. Alternatively you can click on an empty space in the drawing area and move the mouse with left mouse button pressed to mark the selection area.

Connecting lines can also be moved, e.g. to avoid lines crossing other lines or elements. Just select a line by clicking on it and you will see small squares. All squares except the two at the start and the end of the line can be used to move the line. Therefore move the mouse over such a square and as soon as the mouse cursor changes you can adjust the line by moving the mouse with left mouse button pressed. Vertical lines may be moved in horizontal direction and horizontal lines in vertical direction (see Figures 7.8 and 7.9).

Hint: You can undo your manual line modifications at any time by activating menu item *Route automatically* which is also available in the context menu of a line.

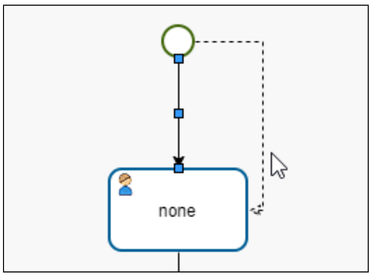


Figure 7.8: **Moving vertical line**

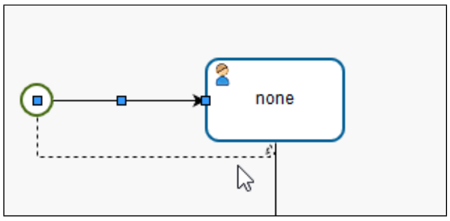


Figure 7.9: **Moving horizontal line**

Delete elements

To delete elements just select them and either press the *DEL* key on your keyboard or activate menu item *Delete*.

Enlarge drawing area

You can enlarge the drawing area if more space is needed. To do so just move an arbitrary element via Drag & Drop to that border of the area which shall be extended.

Hint: this operation may be a bit stubborn sometimes. In this case please move the mouse cursor inside the border with small movements from top to bottom or left to right – that should trigger the extension in the desired direction.

Data modeling

Every process gathers and computes data, if it is data used by the users or data to control the process flow. In @**enterprise** such data are modelled in a structured way using forms – see chapter 6.4. You can attach those form to your processes as follows:

- Activate menu item *Properties* in menu *Process*
- In the displayed property window select tab *Forms*
- Click on button *New* (plus icon) and fill in the fields as described in chapter 7.2.4 section *Forms*, then click OK
- Now click on *Save and close* in the property window

Hint: *Save and Close* will only apply the changes into the editor but the process itself will not be saved already – this will only be done via function *Save* in the editors menu.

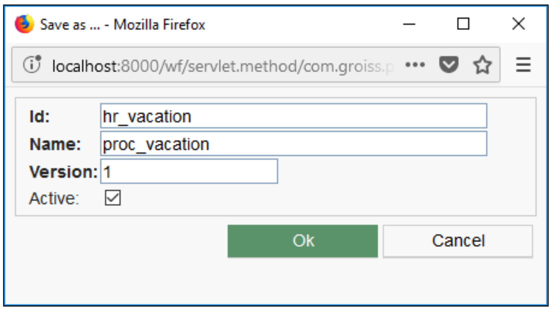
To enable the user to see and edit those forms you need to assign them to the interactive steps – the Tasks. Therefore select the required task in your process model and activate menu item *Activity properties*. In the displayed property window you can assign all the forms attached to the current process to that task. Additionally you can specify the visibility modes (invisible/read-only/read–write) for each field in those forms in the context of this task. More details about the property window and its fields and functions can be found in chapter 7.2.10.

7.2.3 The Functions of the menu bar

The *Process* menu

- **New:** With this function you discard the current contents of the process editor and start editing a new process.
- **Open:** With this function you can open existing processes for modification.
- **Save:** You save the changes. This means the process is stored in the server's database. The system informs you, whether the operation was successful. If steps are not specified sufficiently (e.g. no task is assigned to an activity), the process will be saved and set on inactive. Then the process has to be enabled manually, if you want to use it (see chapter 6.5).

  Note: Saving a process is possible when at least the name and the id has been set (see function *Properties*).
- **Save as ...:** Save the current process under a new name. A dialog window for specifying name and id will appear (Fig. 7.10).



Save as ... - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.p

Id: hr_vacation
Name: proc_vacation
Version: 1
Active: ☑

Figure 7.10: **Function "Save as"**

- **Properties:** This function opens the process-properties (see section 7.2.4).
- **Tasks:** With the help of the task mask you are able to specify those task which can be assigned to a recipient of a task while you are changing the agent of a task.

- **Escalations:** The reaction to process timeouts is defined here (see section 7.2.6).
- **Process Plans:** Managing of process plans for this process (see section 7.2.7).
- **Print ...:** Print the process with the format properties defined in the "Settings" dialog.
- **Download graphic:** This function allows to download a picture of the process.
- **Exit:** With this function you leave the process editor. If you have unsaved changes, a dialog appears which allows discarding the changes or saving them.

The *Edit* menu

- **Undo:** With this function the last n steps can be undone in the drawing area.
- **Redo:** This function is analog to *Undo*.
- **Cut:** With this function it is possible to cut elements from a place in the process and paste it to an other place in the process. Click on the elements first and then select this function. If you cut elements, you can paste it one time only. All settings will be kept for the cut elements.
- **Copy:** With this function it is possible to copy elements from a place in the process and paste it to an other place in the process. Click on the elements first and then select this function. If you copy elements, you can paste it more than one time, but not all settings will be kept (e.g. visibility of forms).
- **Paste:** This function pastes previous cut or copied elements at the selected place. Select this function first and then click on the desired place to insert the element. The element in the clipboard is displayed beside the mouse cursor until you have pasted the element, selected another function or you have pressed the key *Escape*.
- **Delete:** This functions allows to delete individual elements. If a node (e.g. Loop) contains further elements, a popup windows appears and asks you, if you really want to delete. Click on the element first and then select this function.
- **Activity properties:** This function opens the detail-view of this task, where you can add actors and forms.
- **Eskalationen:** This function allows to define escalations for Task-, Synchronize- or Batch-steps which should be fired. More information is available in sections 6.5.9 and 7.2.6.
- **Task properties:** This function opens the task-properties for this activity (see chapter 6.2) or in case of subprocess a new process editor window with the selected process.
- **Plan entry:** If at least one process plan has been defined, this function opens the dialog *Plan entry* for this process step (see section 7.2.7). More details concerning process plans are available in section 7.2.7.
- **Annotate:** This function allows to annotate each node in process editor (node must be selected first). The annotation will be linked with the selected node. Perform a double-click on the textfield to add a text and then confirm with *Return*.

- **Add/Remove exception handling:** This function is available for node *Outgoing Message* (INVOKE) only. It allows to add (and remove) an exception flow to this node which will be executed, if the invoke-function fails (e.g. server does not reply).
- **Additional edge:** With this function additional edges can be added to *Choice*, *AND-Parallelism* and *OR-Parallelism*. Select one of this object first and the choose this menu point.
- **Select all:** All elements in the drawing area are selected by this function.
- **Invert selections** This function selects all elements in the drawing area, which are not selected before.

The *View* menu

- **Zoom:** This function contains following 3 subfunctions:
  1. *Normal viewing*: The drawing area is shown in the size, which is given at the start of the process-editor.
  2. *Zoom in*: The shown area will be enlarged.
  3. *Zoom out*: The shown area will be reduced.
- **Align:** With this function the elements of the drawing area can be aligned.
- **Show end node:** This function marks the end-node of the selected element.
- **Route automatically:** You have the possibility to remove edges: Select the edge and move it in the desired direction. For automatically routing of the edge, select the edge and then this function.
- **Settings:** With this function you can set following properties:
  - Snap to grid: The elements and edges will be aligned by the grid.
  - Show grid: Activating this checkbox results in displaying a grid in drawing area.
  - Show page borders: This function shows margins in the drawing area.
  - Page format: Here a format can be selected which is relevant for printing function.
  - Printer zoom: You can define the print-zoom of the process here.
  - Hide control edges: This function allows to hide light grey dotted edges in process editor, e.g. the control edge of a GOTO node.
  - Hide goto-help: If this function is activated, the help-window will not appear when you insert a goto.
  - Hide welcome message: If this function is activated, the welcome message will not appear when editor is started.

The *Help* menu

- **Help:** The help–page of the process editor is shown (see section 2).

The symbol bar

You can reach the most used functions in a faster way than using the previous described menus:

- **New:** see section 7.2.3
- **Open:** see section 7.2.3
- **Save:** see section 7.2.3
- **Undo:** see section 7.2.3
- **Redo:** see section 7.2.3
- **Cut:** see section 7.2.3
- **Copy:** see section 7.2.3
- **Paste:** see section 7.2.3
- **Delete:** see section 7.2.3
- **Normal viewing:** see section 7.2.3
- **Zoom in:** see section 7.2.3
- **Zoom out:** see section 7.2.3
- **Show activity properties on node double-click:** If this function is activated and you make a double-click on a node, the *Activity properties* will be displayed.
- **Show task properties on node double-click:** If this function is activated and you make a double-click on a node, the *Task properties* will be displayed or in case of subprocess a new process editor window with the selected process.
- **Show plan entry on node double-click:** If at least one process plan has been defined, this function is activated and a double-click on a node will be performed, the dialog *Plan entry* for this process step will be opened (see section 7.2.7). More details concerning process plans are available in section 7.2.7.

The context menu

The context menu is a fast and comfortable form of handling in the drawing area. By clicking the right mouse button on an element in the drawing area the menu will be opened. The context menu includes some components of the menu bar:

- **Cut:** see section 7.2.3
- **Copy:** see section 7.2.3
- **Delete:** see section 7.2.3
- **Activity properties:** see section 7.2.3

- **Escalations:** see section 7.2.3
- **Task properties:** see section 7.2.3
- **Plan entry:** see section 7.2.3
- **Annotate:** see section 7.2.3
- **Add/Remove exception handling:** see section 7.2.3
- **Additional edge:** see section 7.2.3

Hint: If you want to work faster with the process editor, you can use *Shortcuts*. The particular shortcut of a function is displayed beside the function.

7.2.4 Process properties

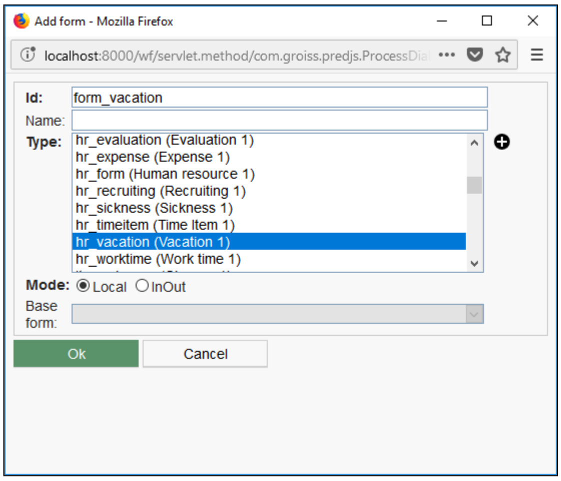
On the process–properties mask you have the possibility to set properties relating to the process. The tabs are described here:

- **Common:** Analog to 6.5, but the field *Apply changes at* is not available.
- **Forms:** Here you can set the forms for the process. With a click on the button *Add* a new window appears (see figure 7.11), where you can select a form type and define some information about the usage of the form in the process. The window *Add Form* contains following information:
  - Id: You have to give the form a local id in the process.
  - Name: Here you can enter a name for the form (optional).
  - Type: Select one of the listed types for the process form. You can add additional forms by clicking on the button *New* beside the list (see section 6.4).
  - Mode: Here you can specify the purpose of the adding form.
    Local: An instance of the form is created when the process is started (a process instance is created). This is the default.
    InOut: The form is handed over from another process. This means that the currently edited process is used as subprocess.
  - Baseform for view: Select here the baseform for the view. The type of the form currently defined and the base form must be compatible, i.e. the form must be a view to the baseform.

  The buttons *Ok* and *Cancel* work in the usual manner.
  Use the button *Remove* to remove a form from the process. Use the button *Edit* to change the *Mode* or *Id* of the process form. If you change an existing form id, the id's will be replaced automatically in objects like *activity*. In structures like *If* where a condition field exists, the id must be changed manually, otherwise you will be informed when saving the process. If you use the button *Remove* or *Edit*, a form must be selected first.

Hint: If view forms are used as process forms, assign these forms to tasks only (setting form visibilities). For all other cases (e.g. process control via form fields) the appropriate base form should be used!

- **Source:** Analog to 6.5.
- **Components:** Analog to 6.5.
- **Visibility of forms:** Analog to 6.5.
- **Escalation:** Analog to 6.5.
- **History:** Analog to 6.5.
- **Access:** Analog to 6.5.
- **Referenced by:** Analog to 6.5.



Add form - Mozilla Firefox

localhost:8000/wf/servlet.method/com.groiss.predjs.ProcessDia

Id: form_vacation

Name:

Type:
hr_evaluation (Evaluation 1)
hr_expense (Expense 1)
hr_form (Human resource 1)
hr_recruiting (Recruiting 1)
hr_sickness (Sickness 1)
hr_timeitem (Time Item 1)
hr_vacation (Vacation 1)
hr_worktime (Work time 1)

Mode: ● Local ○ InOut

Base form:

Figure 7.11: **Add form to process**

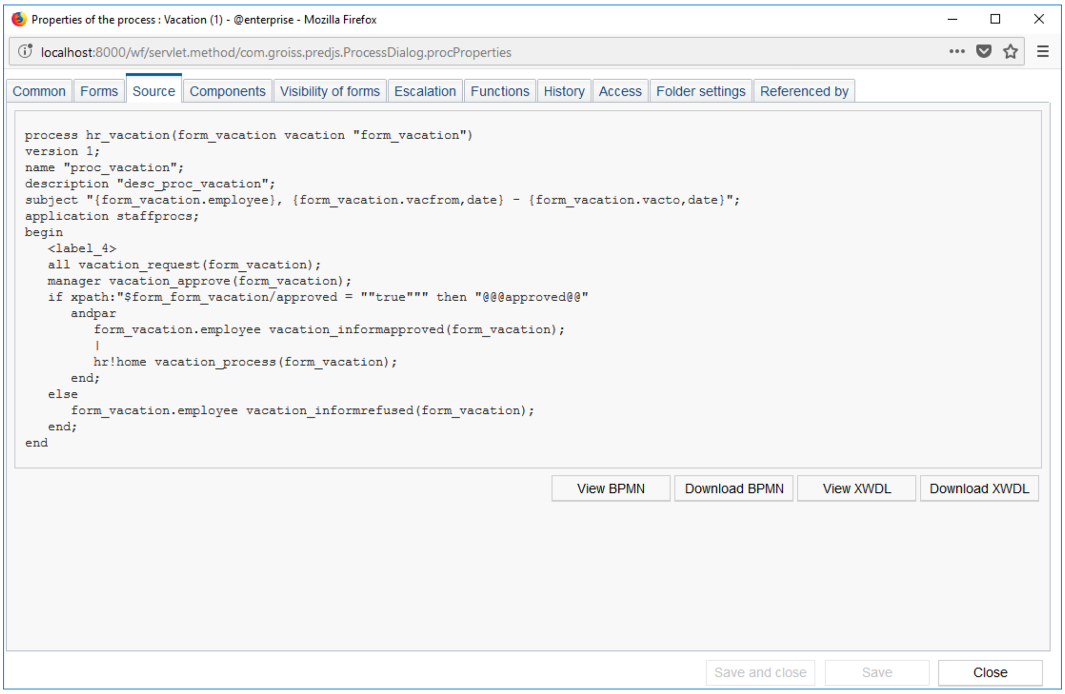
7.2.5 Tasks

With the help of the task mask (see figure 7.13) you specify those task which can be assigned to a recipient of a task while you are changing the agent of a task. This function is not activated for the worklist by default. For this purpose add the *action key* adHoc in the GUI configuration at the node type *Worklist* -> *Functions*. More details can be found in section 6.7.1.

Add Task

The following steps are necessary:

1. Select the menu item "Process -> Tasks". A table appears where the toolbar function *New* must be activated. The dialog of figure 7.13 is shown.



```
process hr_vacation(form_vacation vacation "form_vacation")
version 1;
name "proc_vacation";
description "desc_proc_vacation";
subject "{form_vacation.employee}, {form_vacation.vacfrom,date} - {form_vacation.vacto,date}";
application staffprocs;
begin
   <label_4>
   all vacation_request(form_vacation);
   manager vacation_approve(form_vacation);
   if xpath:"$form_form_vacation/approved = ""true""" then "@@@approved@@"
      andpar
         form_vacation.employee vacation_informapproved(form_vacation);
         |
         hr!home vacation_process(form_vacation);
      end;
   else
      form_vacation.employee vacation_informrefused(form_vacation);
   end;
end
```

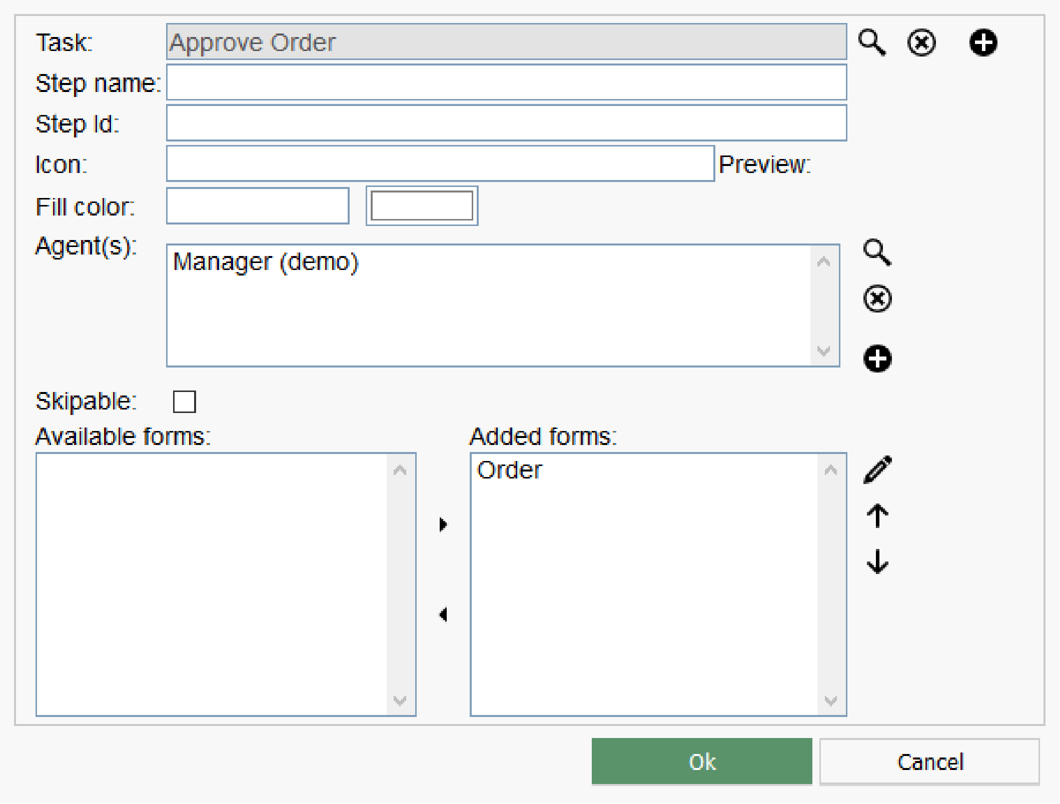
Figure 7.12: **WDL source**

2. **Task:** Select a task or create a new one which is added to the selection.
3. Step name (optional): Specify the name of the node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.
4. Step Id (optional): Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
5. If you want to assign a form to a task then do the following:
   (a) Select a form of the list "Available forms".
   (b) Click the "Add form"–button. Now the added form appears in the list "Added Forms".
6. Click the button "OK". Now your entries are stored in the database and the dialog is closed.

Delete Task

The following steps are necessary:

1. Select one or more tasks of the tasks table.
2. Click the toolbar function *Delete*.



Task: Approve Order

Step name:

Step Id:

Icon: Preview:

Fill color:

Agent(s): Manager (demo)

Skipable: □

Available forms:

Added forms: Order

Figure 7.13: **Tasks**

Delete an assigned Form from a Task

The following steps are necessary:

1. Select the menu item "Process -> Tasks". A table appears where an entry must be selected and the toolbar function *Edit* must be activated. The dialog of figure 7.13 is shown.

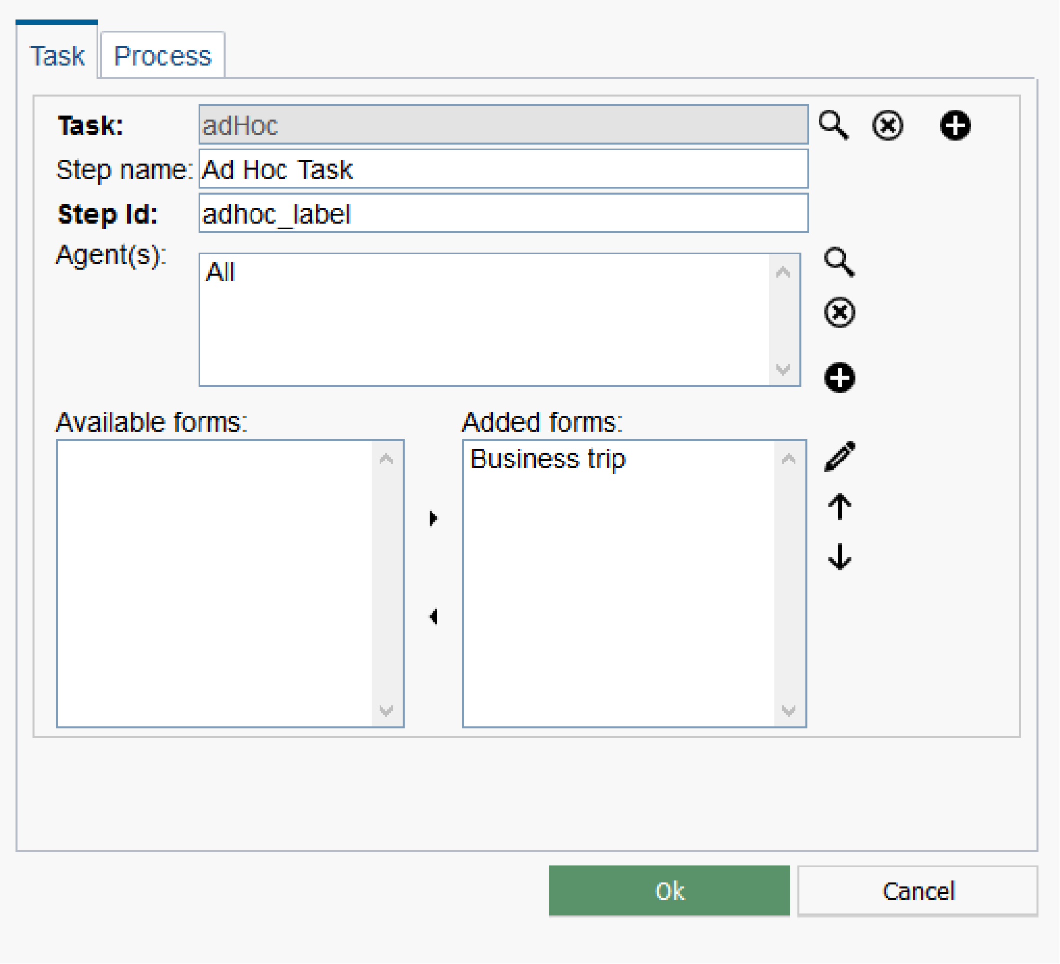
2. Select the form you want to delete of the list "Added forms".

3. Click the button *Remove* beside the list "Added forms". If you want to delete more than one form repeat the steps 2 to 3 as often as required.

4. Click the button "OK".

7.2.6 Escalations

This function allows the definition of escalation steps which are executed when escalation is fired. An escalation step can be a task which should be executed or a process which should be started. In both cases an escalation step object must be created which can be selected in select list *Start step* at definition of an escalation (see section 6.5.9).



Task: adHoc

Step name: Ad Hoc Task

Step Id: adhoc_label

Agent(s): All

Added forms: Business trip

Figure 7.14: **Escalation**

Add escalation

The following steps are necessary:

1. Select the menu item "Process -> Escalations". A table appears where the toolbar function *New* must be activated. The dialog of figure 7.14 is shown.
2. **Task:** Select a task or create a new one which is added to the selection.
3. Step name (optional): Specify the name of the node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.
4. **Step Id:** Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
5. Agent(s): Define a list of agents of role, users, tasks, form fields or methods (see section 7.2.10 for more details).
6. If you want to assign a form to a task then do the following:

   (a) Select a form of the list "Available forms".
   (b) Click the "Add form"–button. Now the added form appears in the list "Added Forms".

7. Click the button "OK". Now your entries are stored in the database and the dialog is closed.

If you want to add more escalations of type *Task*, repeat steps 2-6 before executing step 7.

Alternatively a process can be defined as escalation step. For this purpose execute step 1, change to tab *Process* and select in step 2 a process instead of a task. The remaining steps (excepting agent selection) are the same as on tab *Task*.

Delete escalation

The following steps are necessary:

1. Select one or more tasks of the escalations table.
2. Click the toolbar function *Delete*.

7.2.7 Process plans

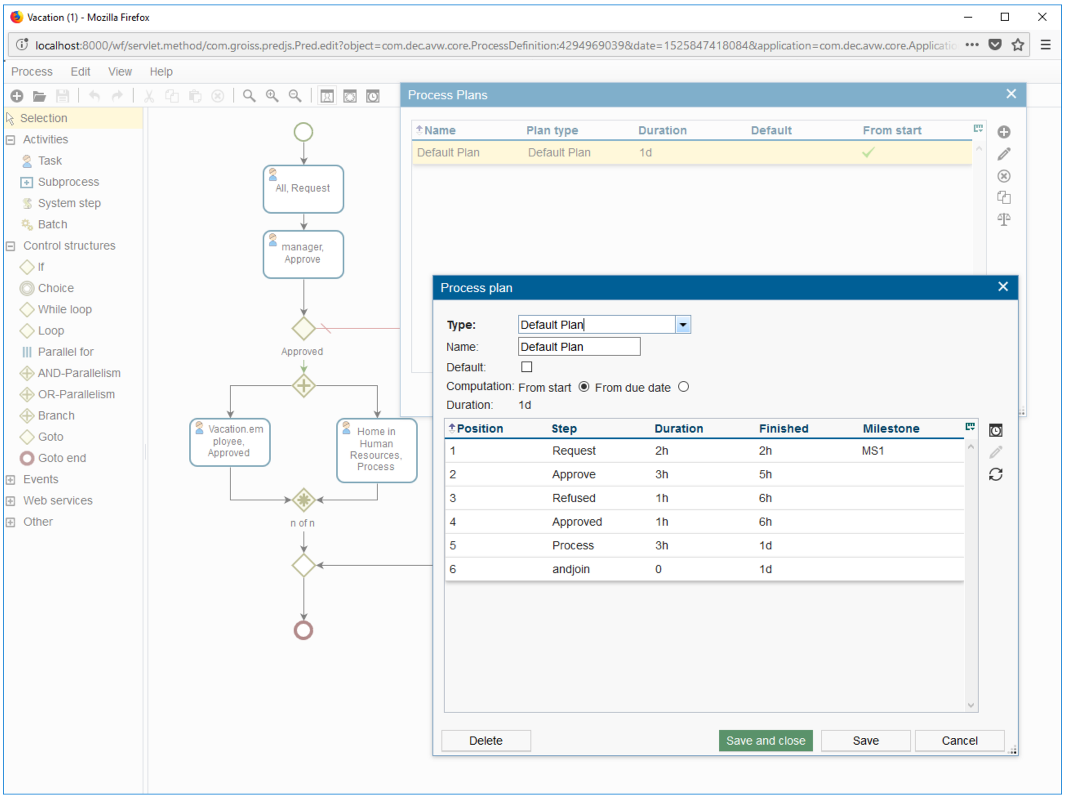
This function offers the possibility to generate process plans to have realistic deadlines for the process and process steps. For a process definition several process plans can be defined with the attribute *Plan type* (is only assignable one time per process definition). Plan types are managed per application in submenu of *Processes* and must be defined before a process plan can be created (see section 6.5.16).

After selecting the menu item *Process plans* a dialog appears where the process plans of this process can be managed (see figure 7.15). The toolbar of this dialog contains functions to create and adapt process plans (New, Edit, Delete) and also a *Copy* function to create similar process plans. After activating this function a dialog appears where a plan type must be defined. Select a plan type which is not used by any other process plan in this process definition! By activating the button *Ok* a copy of the selected process plan will be created. The plan type of the copy will be changed to the selected one.
Another toolbar function is *Compare plans* which allows to compare several process plans in detail. For this purpose select several process plans and activate this toolbar function.

Definition of process plans

After activating toolbar function *New* or *Edit* the dialog *Process Plans* is displayed (see figure 7.15):

- **Type:** The plan type is a compulsive attribute and can be used only one time per process definition for a process plan. Plan types are defined in the administration of **@enterprise** in submenu of *Processes* (see section 6.5.16).
- Name: Optionally a name for the process plan can be defined which could be used as short description.



Name	Plan type	Duration	Default	From start
Default Plan	Default Plan	1d		✓

Type: Default Plan

Name: Default Plan

Default: □

Computation: From start ● From due date ○

Duration: 1d

Position	Step	Duration	Finished	Milestone
1	Request	2h	2h	MS1
2	Approve	3h	5h	
3	Refused	1h	6h	
4	Approved	1h	6h	
5	Process	3h	1d	
6	andjoin	0	1d	

Figure 7.15: **Process plans**

- Default: This option defines, if a process plan should be used by default at process start, i.e. when process is started the default process plan is used to calculate a plan (displayed in tab *Plan*). Please note that only one default process plan per process definition can be defined!

- Computation: Define the kind of computation for the process plan which is either *From start*, which means the time of process start, or *From due date* which means the calculated due date of a process.

- Duration: This attribute shows the calculated duration of the plan entries.

- Plan entries: This table contains all plan entries due to available process steps. The table contains following information:
  - Position: The position of the process steps due to y-axis in process graph.
  - Step: The name of the process step.
  - Duration: The duration of the process step. If the task attribute *Max. duration* is already defined, this value will be taken for attribute *Duration* when generating plan entries. The duration is calculated due to worktime settings under *Configuration/Calendar*!
  - Finished: Interval of process step's end time at the beginning of a process. This value can be set with function *Compute plan* or manually.

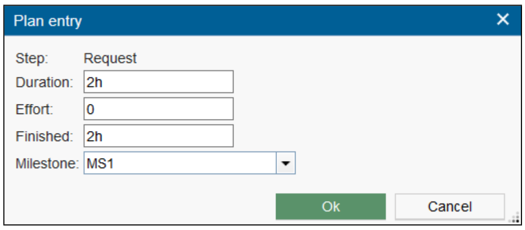
  - Milestone: The name of the milestone which is used for this plan entry. The definition of milestone is done in **@enterprise** administration in submenu of *Processes* (see section 6.5.15).

  When creating a new process plan the plan entry table is empty initially. By activating the button *Save* plan entries will be generated, but no plan will be computed. You can modify the attributes of a plan entry manually or set automatically by using toolbar function *Compute plan*. Please note that for automatic computation each plan entry needs a duration! Plan entries can be adapted by double-clicking on a plan entry or selecting one first and activating the toolbar function *Edit* (see section 7.2.7).

- Delete: By activating this button the process plan (incl. plan entries) will be deleted and the dialog will be closed. The table *Process Plans* will be refreshed afterwards.
- Save and close: Activating this button saves the changes of the process plan and closes the dialog. The table *Process Plans* will be refreshed afterwards.
- Save: Activating this button saves the changes of the process plan, but the dialog is kept open.
- Cancel: By activating this button the changes of the process plan are discarded and the dialog is closed.

Plan entry

The dialog *Plan entry* consists of following attributes (see figure 7.16):



Step: Request
Duration: 2h
Effort: 0
Finished: 2h
Milestone: MS1

Figure 7.16: **Plan entry**

- Step or Plan: If the plan entry dialog has been opened in context of a process plan (see section 7.2.7), the name of the process step is displayed here (read-only). If this dialog has been opened via function *Plan entry* in process graph (e.g. via context menu of a process step), the selection list *Plan* is displayed. After selecting a plan the appropriate information for the plan entry is displayed.
- Duration: The duration of the process step. If the task attribute *Max. duration* is already defined, this value will be taken for attribute *Duration* when generating plan entries. If the value is an integer, the unit s for seconds will be added. It is also possible to define the unit(s) directly like in following example: 3d 4h 30m (= 3 days, 4 hours and 30 minutes). The duration is calculated due to worktime settings under *Configuration/Calendar*!

- Effort: The effective effort for execution is defined here which is not used for the calculation of the process plan. If the task attribute *Effort* is already defined, this value will be taken for plan entry's attribute *Effort* when generating plan entries. If the value is an integer, the unit s for seconds will be added. It is also possible to define the unit(s) directly like in following example: 3d 4h 30m (= 3 days, 4 hours and 30 minutes). The effort is calculated due to worktime settings under *Configuration/Calendar*!

- Finished: Interval of process step's end time at the beginning of a process. This value can be set with function *Compute plan* or manually. If the value is an integer, the unit s for seconds will be added. It is also possible to define the unit(s) directly like in following example: 3d 4h 30m (= 3 days, 4 hours and 30 minutes).

- Milestone: Optional selection of a milestone which should used for this plan entry. The definition of milestone is done in **@enterprise** administration in submenu of *Processes* (see section 6.5.15).

- OK: Activating this button saves the changes of the plan entry and closes the dialog. The table *Plan entries* will be refreshed afterwards, if this dialog has been opened in context of process plan dialog.

- Cancel: By activating this button the changes of the plan entry will be discarded and the dialog will be closed.

7.2.8 The function list

The function list contains the functions for the graphical modeling of processes.
After selection of a function you can perform the action in the drawing area of the process editor window. The nodes can be moved only vertically or horizontally by pressing the *Shift-Key* and moving the mouse.

- **Selection:** In this mode you can move and edit the objects in the drawing area.

- **Task:** This function allows the insertion of new activities. After selection of this function you can drop an activity on en edge in the process graph by simply clicking on this edge. A new activity will appear. On a double–click on the activity a property window for setting the activity properties appears.

- **Subprocess:** Subprocesses can be inserted in the same way as above.

- **System step:** System steps can be created and the method to be called can be specified. Enter the fully qualified name of a Java method which should be executed in the step.

- **Batch step:** Batch steps can be inserted, the name of a Java class (the batch adapter) can be specified. The class provides a callback interface for events during the life cycle of a batch step. For details, please consult the Application Programming Guide and the API documentation.

- **If:** The if control structure consists of two nodes, an if node and a corresponding end node. These two nodes are connected with two edges, a green and a red one. The green edge is the path followed when the condition of the "if"-node evaluates to true, the red edge is the path followed when the condition evaluates to false.

  A double–click on the "if"-node opens a window where you can edit the condition.

  If you click in the if-mode on the red edge you add an additional if-node without a corresponding end node. This control structure corresponds to the if-elsif control structure:

  ```
  if condition 1 then
    action 1
  elsif condition 2 then
    action 2
  elsif condition 3 then
    action 3
  else
    action 4
  end
  ```

  Note: Use the WDL-Script window to see how the graphical definition corresponds to the WDL script.

- **Choice:** Every choice branch has a name and an optional condition. At run-time the engine first checks the conditions of all branches, only the branches where no condition is specified or the condition evaluates to true are shown for selection.

  Insert the choice in the usual way. You see a black arrow, whereas the black arrow is a possible choice branch, where you can add activities. If you want to add alternatives, select the choice and activate *Additional path* in the menu *Edit* or click with the right mouse button on the choice and select in the context menu *Additional path*.

- **While loop:** With this control structure you create a condition node, where the green edge goes in a loop back to this node, the red edge goes to the original following node. Activities dropped onto the green edge are the loop body. Process execution goes through the body until the condition of the while node becomes false.

- **Loop:** The loop control structure consists of two nodes, the loop node, and the exit node. The exit node is a conditional node, so two edges leave this node: The red one goes back to the loop node, the green one goes to the original follower.

- **Parallel for:** The parallel for control structure consists of two nodes in WD-notation, the parfor node and the end node. In BMP-notation this control structure is represented as BMPN-subprocess. If you click within the *Parallel for* border, but not on an element, the whole frame will be selected. In this case e.g. you can move the whole *Parallel for*-structure or delete it. A double–click opens the same dialog as double–clicking on *Parallel for* start-node.

- **AND-parallelism:** With this control structure you can create parallel process execution paths. Between the nodes "par" and "andjoin" several paths can be created. To add alternatives, select "par" and activate *Additional path* in the menu *Edit* or click with the right mouse button on "par" and select in the context menu *Additional path*. See the section about parallelism in the WDL chapter of this book for an example of an andpar.
- **OR-parallelism:** Works like the AND-Parallelism above, the only difference is at run-time: The process execution continues after one parallel path has been finished.
- **Branch:** The branch allows to add an additional path which is processed independently by the main process flow. For example the main process flow is finished, but the branch can be processed furthermore.
- **Goto:** Use the goto function to jump to an arbitrary node in the process structure. For inserting a goto do the following: Activate the goto function by clicking it in the function list. Click on the edge where the goto should start. Then take the arrowhead of the drawn through line and put it by pressed left mouse button to the destination node and leave the left mouse button. The dashed line from the goto shows the original way of the process. If the drawn through line shows on an activity, the label of this activity is shown in the detail view of the goto. In the detail view of a goto you can set the *Target Label*. If the drawn through line shows on an element in the process editor and you change the label in the goto, the changes will be accepted in the target node.

  A special kind is *Goto end* to jump to the end of the process automatically. Inside a parfor this element is not allowed!

  Hint: In BPM-Notation the drawn through line cannot cross the borders of a *Parallel for*.

  Be careful when using gotos! Jumping out of and-parallelism can cause strange effects.
- **Events:** This event control structures consists of a single node which stands for a special action in the context of events. The event control structures are *Raise-Event*, *Sync-Event*, *Register-Event*, *Unregister-Event* and *Wait* which is a special case of event. See the section about "Events" in the WDL chapter of this book for an example of an event.
- **Web services:** In this area following nodes can be selected:
  - Outgoing message (INVOKE): If this node is selected, the defined web service is called during run-time and the appropriate data will be submitted. If this action fails and an *Exception Handling* has been defined, the exception flow will be performed (see definition of exception handling in section 7.2.3).
  - Incoming message (RECEIVE): If this node is selected, it will be waited for data of the (previous called) web service. If data are received, they will be processed according to the definition.

  - Reply message (REPLY): If this node is selected, a reply message will be send when node *Incoming Message* has been processed successfully.

  The properties of each node are described in section 7.2.19.

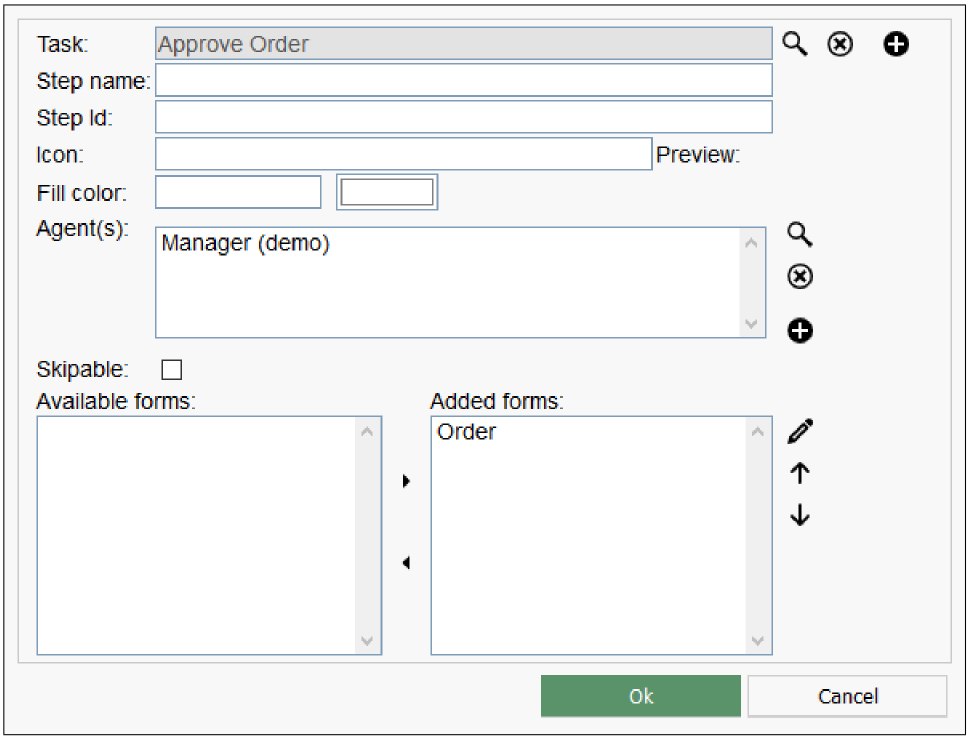
- **Annotation:** If you have selected this function, you can add a textfield at any place in the drawing area. Perform a double-click on the textfield to add a text and then confirm with *Return*.

7.2.9 The common attributes of a node

For each node a *Step name* and a *Step Id* can be defined. The step name for a node can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used. The step id must be unique within the process and has the same syntactical conditions as a **@enterprise**-id.

7.2.10 Properties of an activity

You can edit the properties of an activity, when you perform a double–click on the node (if function *Show activity properties on node double-click* is activated only) or click with the right mouse–button on the node an select in the context menu *Activity properties* - the property window will appear (see Fig. 7.17).



Task: Approve Order

Agent(s): Manager (demo)

Skipable: □

Added forms: Order

Figure 7.17: **Properties of an activity**

- **Task:** Specify the activity by inserting a task id or using the task selection window.

- Step name: Specify the name of the node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- Icon: The icon which will represent the activity in the drawing area of the process editor. If no icon is specified here the default icon of @**enterprise** is used. An icon is handled like a resource in @**enterprise**, i.e. the icon is part of the classpath. Example: Path *lang/default/images/pred/nodes/event_register.png* shows the icon for node *Register-Event*.
- Fill color: Here you can define a color for the graphical representation of the step. The color can either be selected using *Color picker* or entered as a hexadecimal code.
- **Agent(s):** Add an agent by clicking the "+" button besides the agent list. The agent selection window appears. You have several possibilities to define an agent, the tabs on the window let you choose between them:

  - *User:* Select a user in the list and click apply. The user id appears in the agent line on the bottom of the window.
  - *Role:* Select a role and click apply.
  - *Task:* Select a task in the list. The agent will be set at run-time to the last agent of the selected task. Note, that you can only select a task which is performed *before* the current task.
  - *Form field:* Select a form and then a field in the form. The agent is taken at run-time from the content from a field in a process form. The content must be either a role id, an user id, a role id together with an organizational unit id, or an agent of a previous step. See the WDL description for the syntax of the agents.
  - *Organizational unit:* Org. units can be combined with role and user. At run-time, the organizational unit of the current task will be set to the given OU. The organizational unit of the overall process will not change.
  - *Method:* Define a JAVA method (no Groovy script). Return value must be an *Agent* or a *String* in WDL syntax. See page 147 for details.

  To remove an agent, select it in the list and click the "x"-button right or the list.
- **Skipable:** When the checkbox is activated,the task is skipable, this means when no agent is set at build-time and run-time, the task is skipped.
- **Available forms:** Add and remove process forms to/from the activity. To add a process form, select the form in the list an click on the arrow button. To remove it, select it in the "Added form" list and click the "x"-button. You can set the visibilities of a form by selecting an entry in the list of *Added forms* and click on the Edit icon beside this list (analog to *process*). The order of process forms can be changed by using the buttons beside the list, i.e. the form at the top of this list is displayed as leftmost tab in worklist.

7.2.11 Conditions for Ifs, Choice, Loops

Perform a double–click on the node, the property window will open where a condition can be defined. For this purpose the condition editor is available which is described in section 7.2.20.

Furthermore for each node a *Step name* and a *Step Id* can be defined. The step name for a node can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used. The step id must be unique within the process and has the same syntactical conditions as a **@enterprise**-id.

7.2.12 Properties for system steps

Perform a double–click on the node, the property window will open. There are two possible ways to define the methods, that should be executed in this system step, which are mentioned in the following sections.

Furthermore for this node a path to an *Icon* (which is a resource in **@enterprise** classpath), a *Fill color*, a *Step name* and a *Step id* can be defined. The step name for a node can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used. The step id must be unique within the process and has the same syntactical conditions as a **@enterprise**-id.

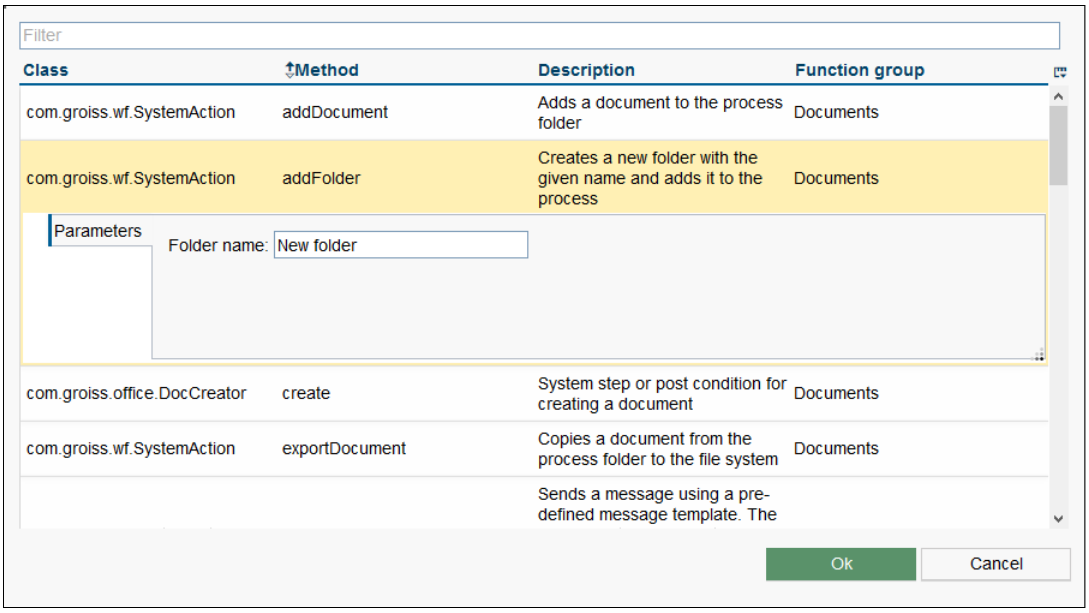
See section 7.1.4 for the syntax of system steps.

Editor

The editor tab allows to add, edit and remove Java methods of the system step by selecting them from a list. Furthermore the order of the method sequence can be changed with appropriate functions. When adding or editing a method, the editor window opens (see Fig. 7.18) where useful methods of **@enterprise** are shown by default. If own methods should be available in this list, they must be annotated with @*CallableMethod* (more details about this topic can be found in the Applications Development Guide, section *Adding methods to the system step editor*).
By selecting an entry an area with parameters is shown (if available for this method) which are provided by this method. By activating the button *Ok*, the window closes and the method is added to the sequence or an already available entry is updated.

Input

This tab offers the possibility to insert and edit methods by hand. To add a method, insert the full qualified method name, including the optional parameters in the text area of this tab. If a sequence of methods is to be executed, the methods must be separated by ; . The methods can be checked for correct syntax with the check icon beside the input field. If the icon changes to a red exclamation mark, the syntax of the method is wrong. A green check mark indicates that the syntax of the method is correct. The availability in class path is checked too.



Class	Method	Description	Function group
com.groiss.wf.SystemAction	addDocument	Adds a document to the process folder	Documents
com.groiss.wf.SystemAction	addFolder	Creates a new folder with the given name and adds it to the process	Documents
com.groiss.office.DocCreator	create	System step or post condition for creating a document	Documents
com.groiss.wf.SystemAction	exportDocument	Copies a document from the process folder to the file system	Documents
		Sends a message using a pre-defined message template. The	

Parameters

Folder name: New folder

Figure 7.18: **The system step editor**

7.2.13 Properties for Batch steps

Perform a double–click on the node, the property window will open. Insert the full-qualified class name of the BatchAdapter without parenthesis (round brackets). The field *Parameter* allows to enter the parameter for the BatchAdapter class (in WDL theses parameter are within the parenthesis). The execution of the batch steps can be modified using the checkboxes. Details can be found in the Applications Programming Guide and in the API documentation.

Furthermore for this node a path to an *Icon* (which is a resource in **@enterprise** classpath), a *Fill color*, a *Step name* and a *step id* can be defined. The step name for a node can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used. The step id must be unique within the process and has the same syntactical conditions as a **@enterprise**-id.
See section 7.1.4 for the syntax of batch steps.

7.2.14 Properties of a subprocess

Perform a double–click on a subprocess and a property window opens, where you can select the process and the forms handed over to the subprocess.

- **Process:** Specify the process by inserting a process id or using the process selection window.
- Step name: Self defined name for this node which replaces the default name. Can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.

- Step id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- Icon: Path for displaying an alternative icon which is a resource in @**enterprise** classpath.
- Fill color: Here you can define a color for the graphical representation of the step. The color can either be selected using *Color picker* or entered as a hexadecimal code.
- **Available forms:** Add and remove process forms to/from the subprocess. To add a process form, select the form in the list an click on the arrow button. To remove it, select it in the "Added form" list and click the "x"-button.

7.2.15 Properties of a parallel for

Perform a double–click on the "parfor"–node and a property window opens, where you can edit the following properties of the parfor statement:

- for each Subform in: If this radio button is checked the parallel for statement is executed for the sub form entries of a form, like it is described in the WDL sub section (see case one of Parallel For under 7.1). Select the appropriate subform (Mainform.Subform-Id) from the dropdown-list.
  - Form Id within the loop: The id of the selected subform within the parallel for construct.
  - Form Name within the loop: The name of the subform within the parallel for construct.
  - Condition: A method (with boolean return value) or a simple expression can be defined, if a parfor-branch should be executed or not, e.g. localform.isopen = 0 (*localform* is the id and *isopen* is a field in subform). By activating the wrench-icon the condition editor is opened which allows to define a more complex condition (see section 7.2.20 for details).
- Iterator: If this radio button is checked the parallel for statement is executed for the specified class, like it is described in the WDL sub section (see section 7.1.5).
- Step name: The name for this node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.

Furthermore it is possible to define a method in end-node of parfor (see section 7.1.5).

7.2.16 Properties of AND-/OR-parallelism and end node of Parallel for

Perform a double–click on the "andpar"–, "orpar"–node or end node of PARFOR construct and a property window opens, where you can edit the following properties:

- Method call: If overall completion of parallelism can not be defined by completion of a fixed number of branches, but is rather computed at run time, an arbitrary Java method can be called. More about that can be found in the *Application Development Guide*.
- Step name: The name for this node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.

For more details concerning the syntax see sections 7.1.5 for AND-/OR-parallelism and 7.1.5 for end node of Parallel for.

7.2.17 Properties of an event

There are following events:

- Raise: raise an event.
- Synchronize (Sync): stop process execution and wait for an event.
- Register: register for a certain event.
- Unregister: unregister for a certain event.
- Wait: is a special case of event and is described in section 7.2.17.

Perform a double–click on an event and a property window opens. where you can edit the following properties of the event:

- **Event name:** the event name.
- **Event handler:** a Java–class implementing the interface "com.groiss.event.EventHandler".
- Context: the context object: either a form or a form field which serves as the context object; alternatively the keyword *process* can be entered and so the current process instance (oid) is the context object.
- Step name: The name for this node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id. The step id is relevant for process escalations of type *Sync unfinished* (see section 6.5.9).
- Icon: Path for displaying an alternative icon which is a resource in @**enterprise** classpath.

By clicking the button "Ok" your entries are stored and the current dialog will be closed.
By clicking the button "Cancel" your entries are discarded and the current dialog will be closed.

See section 7.1.6 for the syntax of events.

Event *Wait*

A wait step can be used to halt the process execution for a time duration or until a certain point in time. The wait step is finished automatically by timer *Suspension*, i.e. the wait step is finished at the earliest when the time period is exceeded depending on the next execution time of timer *Suspension*. Another possibility is to finish the step manually via process history. Perform a double–click on the wait step and a property window opens. where you can edit the following properties of the event:

- **Duration:** In this area you can enter either a time interval or an expression:
  - Time interval: Enter a positive integer value for duration to wait. The time units minutes, hours, days and working days are available.
  - Expression: Enter an expression which returns a point of time (= date) or a time interval as integer in minutes. Possible expressions are methods, form fields, xpath- and groovy-expressions (see section 7.1 for more details).
- Step name: The name for this node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.

By clicking the button "Ok" your entries are stored and the current dialog will be closed. By clicking the button "Cancel" your entries are discarded and the current dialog will be closed.

More information about wait steps is available in section 7.1.4.

7.2.18 Properties of a GOTO

Perform a double–click on the "GOTO" construct and a property window opens, where you can edit the following properties:

- Step name: The name for this node which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used.
- Step Id: Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- Target label: The label of the target node can be changed here. This field is filled automatically, if the drawn through line has been set on a node in the process editor. Changing the label here also changes the label on target node.

See section 7.1.5 for the syntax.

7.2.19 Properties of Web service nodes

Select a web service-node and perform a double–click on the node to open the appropriate property window. For each node you can define a *Step Name* which can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@. If nothing is entered, the default step name is used. Furthermore a *Step Id* can be defined which must be unique within the process and has the same syntactical conditions as a @**enterprise**-id. The step id in node *Incoming Message* is relevant for process escalations of type *Receive unfinished* (see section 6.5.9).
Following properties can be defined for node *Outgoing Message*:

- **Webservice operation:** Select an existing web service client operation which was created previously (for this application). See section 6.10.1 for more details.
- **Step name:** Self defined name for this node which replaces the default name. Can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.
- **Step Id:** Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- **Icon:** Path for displaying an alternative icon which is a resource in @**enterprise** classpath.
- **Address:** Select an address to call the web service. You can choose between reading the address from WSDL-file, enter a XPath-expression or enter an URL.

  Example for XPath-expression: Read from configuration parameter of application *myappl*:

  ```
  string($configuration_myappl/property[@name='webservice.address'])
  ```

- **Out-parameter:** Here you can enter a list of parameter as XPath-expression which should be submitted. The parameters are defined in WSDL-file and has been defined during the creation of the web service client.
- **In-parameter:** Analog to Out-parameter, but for data which should be read from web service.

Following properties can be defined for node *Incoming Message*:

- **Webservice operation:** Select an existing web service server operation which was created previously (for this application). See section 6.10.2 for more details.
- **Start process:** If this checkbox is activated and this node is the first step in the process flow, a new process instance will be started. If this checkbox is no activated in this case, no instance can be created. If this node is not the first step in process, this checkbox must not be enabled!
- **Step name:** Self defined name for this node which replaces the default name. Can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.

- **Step Id:** Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- **Icon:** Path for displaying an alternative icon which is a resource in @**enterprise** classpath.
- **In-parameter:** Here you can enter a list of parameter as XPath-expression which should be read. The parameters are defined in WSDL-file and has been defined during the creation of the web service server.
- **Correlation parameter:** Here you can enter a list of parameter as XPath-expression which has been defined during creation of the web service server. A mapping can be defined to assign automatically an *Incoming Message* to a process instance.

Following properties can be defined for node *Reply Message*:

- **Webservice operation:** Select an existing web service server operation which was created previously (for this application). See section 6.10.2 for more details.
- **Step name:** Self defined name for this node which replaces the default name. Can be localized, if the value starts with @@@ and ends with @@, e.g. @@@myname@@.
- **Step Id:** Must be unique within the process and has the same syntactical conditions as a @**enterprise**-id.
- **Icon:** Path for displaying an alternative icon which is a resource in @**enterprise** classpath.
- **Out-parameter:** Here you can enter a list of parameter as XPath-expression which should be submitted. The parameters are defined in WSDL-file and has been defined during the creation of the web service server.

By clicking the button "Ok" your entries are stored and the current dialog will be closed. By clicking the button "Cancel" your entries are discarded and the current dialog will be closed.

For more information about the wdl-syntax please take a look in section 7.1.7.

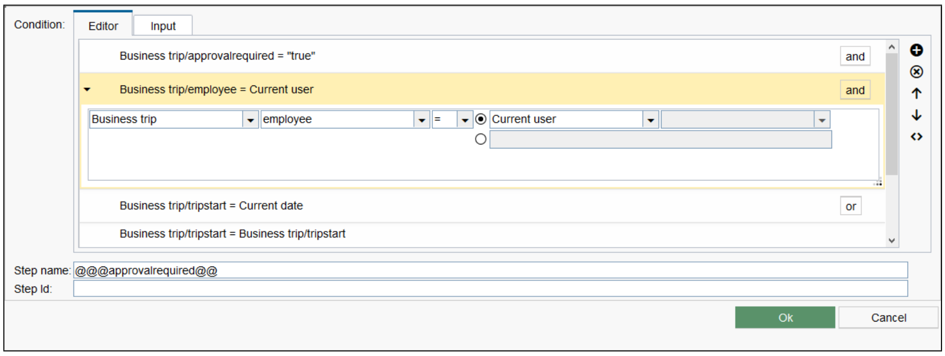
7.2.20 Condition editor

The condition editor allows to define complex conditions in 2 different ways:

Tab *Editor*

This tab allows to define conditions in XPath syntax graphically. For this purpose the toolbar offers functions to add, remove and move condition rows. Setting parentheses allow to manipulate the kind of evaluation by selecting the appropriate rows and activate the toolbar function *Set Parentheses*. New added condition rows are linked with logical AND by default, but the operator can be change to logical OR by clicking on the operator button, i.e. klick on AND changes to OR and inverse.

A condition row consists of following components:



Condition:

Business trip/approvalrequired = "true"

Business trip/employee = Current user

Business trip | employee | = | ● Current user

Business trip/tripstart = Current date

Business trip/tripstart = Business trip/tripstart

Step name: @@@approvalrequired@@

Step Id:

Figure 7.19: **Graphical condition editor**

- Expression 1: The first dropdown list offers following selection:
  - Current user: During evaluation of the condition the current user (thread user) is taken for comparison.
  - Current process: During evaluation of the condition the current process instance is taken for comparison. In second dropdown list a process attribute must be selected for comparison.
  - Current date: During evaluation of the condition the current date is taken for comparison.
  - Forms: All added process forms are selectable (see definition in section 7.2.4). The second dropdown list offers all form fields of the selected form are listed and one form field must be selected for comparison.
  - Configurations: If configurations of applications are available, this one are listed here (see definition in section 6.1.2). In second dropdown list a configuration parameter must be selected for comparison.
- Operator: A dropdown list offers different operators to allow comparison of expression 1 and 2.
- Expression 2: Either the definition of an expression analog to expression 1 can be done here or a direct comparison with a value. Depending on expression 1 either the value is free text or a dropdown list is offered where a value can be chosen (e.g. if expression 1 is a form field of type radio button, the dropdown list in expression 2 offers all options of this radio button). Please note that in some cases the free text value must be wrapped within double quotes (e.g. if a string attribute is selected in expression 1).

⚠ If a condition has not been defined correctly or it is faulty, a warn-icon is displayed at the beginning of the row. The conditions are stored in XPath syntax. If the whole expression is wrong or not in XPath syntax, an error message is displayed in this tab.

The button *Ok* saves the conditions or applies them to the referenced field in XPath syntax. The button *Cancel* discards all changes which are not saved before.

Tab *Input*

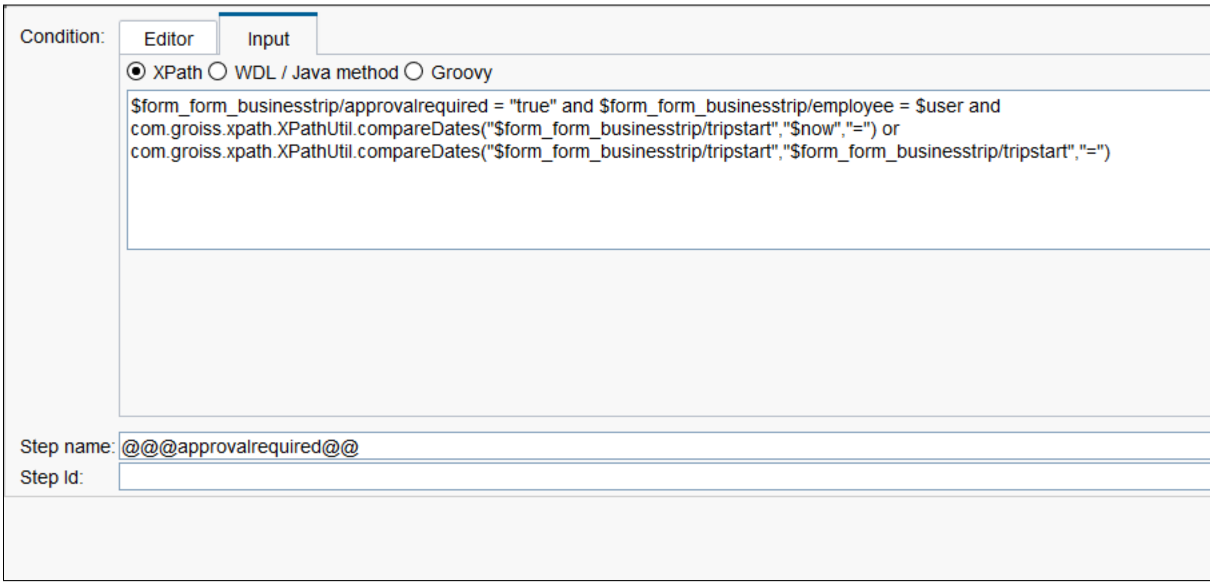
This tab offers the possibility to define conditions in 3 different ways:

- XPath: The XML Path Langauge (XPath) is developed by the W3-consortium for addressing parts of an XML-document (considered as tree). The tab *Editor* generates XPath syntax which is displayed here, but it is also possible to define own XPath conditions (if evaluable these conditions are displayed in tab *Editor*). For more information take a look into *Application Development Guide*.
- WDL / Java method: The Workflow Definition Language has resemblance to a structured programming language and allows the definition of conditions (see section 7.1). Alternatively a Java method can be entered which returns a boolean value.
- Groovy: GROOVY is an object oriented programming language for the Java platform. For more information take a look into *Application Development Guide*.

✓

Each condition can be checked for correct syntax with the check-icon beside the input field. If the icon changes to a red exclamation mark, the syntax of the condition is wrong. A green check mark indicates that the syntax of the condition is correct. In case of Java method the availability in class path is checked too.

The button *Ok* saves the entered condition or applies it to the referenced field. The button *Cancel* discards all changes which are not saved before.



● XPath ○ WDL / Java method ○ Groovy

```
$form_form_businesstrip/approvalrequired = "true" and $form_form_businesstrip/employee = $user and
com.groiss.xpath.XPathUtil.compareDates("$form_form_businesstrip/tripstart","$now","=") or
com.groiss.xpath.XPathUtil.compareDates("$form_form_businesstrip/tripstart","$form_form_businesstrip/tripstart","=")
```

Step name: @@@approvalrequired@@

Step Id:

Figure 7.20: **Textual condition editor**

8 The Search of **@enterprise**

8.1 Process search

The process search allows you to find process instances you have been involved in as a user. A detailed information about this functionality is described in *User manual*.

8.2 Document search

This function can be activated by clicking on the link *Document search* in the navigation area. A detailed information about this functionality is described in *User manual*.

8.3 Report designer

This function offers extended functionality for finding process instances and is available only, if right *Statistic* is assigned. A detailed information about this functionality is described in *Reporting* manual.

8.4 Reports

In this table all stored reports can be adapted or executed. A detailed information about this functionality is described in *Reporting* manual.

9 Administration tasks

9.1 Server

9.1.1 Server Monitor

@enterprise uses the tool *Java Melody* which measures and calculates statistics on real operation of an application depending on the usage of the application by users. It is possible to display this information in the Browser or export it to a PDF.
The Server Monitor offers following information (see figure 9.1):

- Common statistics
- Statistics for HTTP requests
- Statistics for SQL statements
- Statistics for HTTP system errors
- Statistics for system error logs
- Current requests
- System information
- Threads

By default *Java Melody* is used, but can be deactivated in section *Tuning* of **@enterprise** configuration or the *web.xml* deployment descriptor of **@enterprise** must be changed. For this purpose remove following block from *web.xml*:

```
<filter>
  <filter-name>monitoring</filter-name>
  <filter-class>net.bull.javamelody.MonitoringFilter</filter-class>
  <async-supported>true</async-supported>
</filter>
<filter-mapping>
  <filter-name>monitoring</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>
```

It is also possible to define additional parameters within the filter tags in following way:

```
<filter>
 ...
 <init-param>
  <param-name>log</param-name>
  <param-value>true</param-value>
 </init-param>
</filter>
```

Some parameters are worthy of mention:

- storage-directory: Storage directory (path must be absolute) of Java Melody, default is <ep-tmp-director>/javamelody. The default Java Melody directory location is usually specified by the system property 'java.io.tmpdir'. This value can be found e.g. via the corresponding link in the Server-Control of the @ep administration.
- warning-threshold-millis und severe-threshold-millis: Thresholds in in ms. These threshold parameters can serve as a basis for a SLA (service level) of an application.
- system-actions-enabled: This parameter (true by default) enables or disables the system actions garbage collector, http sessions, heap dump, memory histogram, process list, jndi tree, opened jdbc connections, database (near the bottom of reports). These actions do require confirmations when necessary.

In addition to these parameters the @**enterprise** configuration parameter *ep.melody.initparams* in section *Other parameters* allows to define initialization parameters of the Java Melody filter. These parameters can be used to reduce the memory footprint / general overhead of Java Melody. Issues with monitoring in a production environment could include:

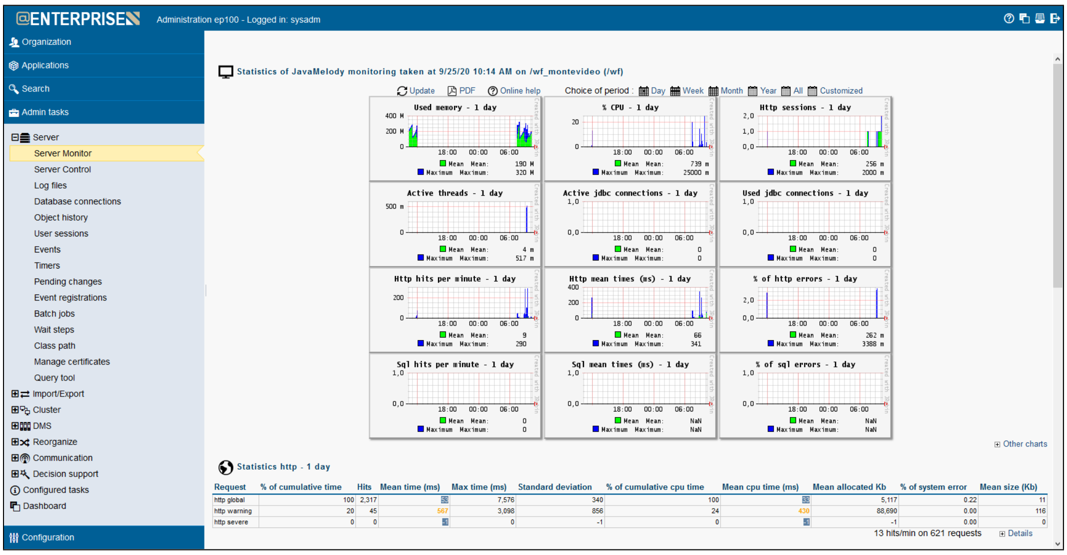
- Excessive use of file descriptor
- Memory hogging during startup
- Some delay during startup

Sensible initial values for those parameters even in production environment might e.g. be:

```
displayed-counters=http,log,error,sql
http-transform-pattern=(?<=/webdav/).*|\\d{10,}
sql-transform-pattern=(?<=[iI][nN] ?)\\([\\d, ]*\\)|\\d{10,}
```

All these infos are accessible via JMX calls, if the parameter *ep.melody.initparams* is set to value *jmx-expose-enabled=true*. More information of an @**enterprise** server via JMX can be determined via interface com.groiss.server.ServerInfoMXBean (see APIDoc for more details). If @**enterprise** is running with Java 1.8 or higher, the server must be started with following parameters:

```
-Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.authenticate=false
-Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.port=<jmx_port> //needed in Tomcat
```



Statistics of JavaMelody monitoring taken at 9/25/20 10:14 AM on /wf_montevideo (/wf)

Statistics http - 1 day

Request	% of cumulative time	Hits	Mean time (ms)	Max time (ms)	Standard deviation	% of cumulative cpu time	Mean cpu time (ms)	Mean allocated Kb	% of system error	Mean size (Kb)
http global	100	2,317	53	7,576	340	100	33	5,117	0.22	11
http warning	20	45	567	3,098	856	24	430	88,690	0.00	116
http severe	0	0	-1	0	-1	0	-1	-1	0.00	0

13 hits/min on 621 requests

Figure 9.1: **Server Monitor**

Hint: More information of Java Melody can be found in the *Online help* which is accessible via a link in Server Monitor or on https://github.com/javamelody/javamelody/wiki.

9.1.2 Server Control

Here you can control the server with the following functions:

- **Started:** The date when server was started.
- **Shutdown:** Shut down the **@enterprise**Server.
- **Restart:** Restarts the **@enterprise**Server.
- **Disable/Enable login...:** This function disables/enables the login to the server, only the users, which have the right *Configuration*, may login in this mode. Other users receive the message you provide in the message area.
  There are following information available:
  - Logins enabled: If this radio–button is activated, there are no restrictions at the login.
  - Logins disabled: If this radio–button is activated, only system administrators can login after server restart. At server restart upgrade(s) of application(s) will be performed (if defined). For further information about upgrading applications, please take a look in the API of **@enterprise** (*ApplicationAdapter.getVersion()* and *ApplicationAdapter.upgrade()*).
  - Message: If the login is disabled, you can enter a message here, which will be shown, when a user logs into the system.

- **Reload database connections:** All database connections (of the current node) will be marked as "old". Before assigning a connection to a transaction the "age" will be checked first, then old connections will be closed and new ones opened.
- **All passwords have to be changed on next login**
- **Scan for new JAR-libraries:** This function searches for new jar files and add them to the @**enterprise** classpath.
- **Health Check:** This function checks the system status. Following checks are performed:
  - General: Checks, if the times of @**enterprise** server, database server and client are synchronized and check which password for sysadm is used.
  - Shadow classes: Checks, if @**enterprise** resources are shadowed.
  - Directories and files in configuration: Here the configuration parameter *Directory of form classes*, *Directory of temporary files*, *KeyStore file*, *httpd.jetty.webxml.location*, *avw.java.compiler* and *httpd.jetty.favicon.path* are checked, if the paths/files are available on file system.
  - Methods and classes in configuration: Here all possible methods and classes of @**enterprise** configuration are checked. Examples: *JDBC Drive Class*, *Authorization Class*, *Settings Class*, *Notification Provider Class*, *Archiving Class*, *Error-Formatter Class*, *DMS Archiving Class*, *Holiday Class*, etc.
  - Directories and files in applications: This area checks, if template files of formtypes are available on file system. Furthermore available gui configuration objects are checked, if the appropriate xml files are available on file system.
  - Methods and classes in applications: This area checks all entered methods/classes of application objects. Examples: Process DMS table handler, form event handler, methods entered in tasks, methods defined in escalations, methods of functions, time methods and java-methods of mailboxes.
  - System tables: Checks whether all system tables exist.
  - Form tables: This area checks all form tables of all applications and lists findings where the column size of database is different to form field size. With button *Fixing field sizes* it is possible to adapt automatically the column size of all varchar columns according to form field definition. This is done only for columns with different sizes and where the column size of the database is smaller than the form field size of the form.
  - Role assignments: This area lists all faulty role assignments, e.g. if a local role without org-unit is assigned to a user.
- **Check foreign keys:** This function checks, if the foreign keys in the database are created correctly. In addition this function tries to create missing foreign keys (shown next to labels "created" and "failed").
- **Check supporting indexes for foreign keys:** This function checks, if the supporting indexes for the foreign keys are created. SQL statements for the creation of missing indexes will be generated, but the indexes themselves are not auto generated to avoid performance impacts. Please use with care.

- **Threads:** This function allows to create multiple thread dumps by clicking multiple times on the link.
- **Server info:** This function offers information about the **@enterprise** server like used license, used database, used JDK, etc.
- **Client info:** This function offers information about client specific things like used cookies, session variables, etc.
- **Send a message to all logged-in users:** This function allows to send a message to all logged-in users. The message is displayed as own dialog in smartclient after activating button *Send*.
- **Reload configurations:** This function allows to search for changes in configuration files of **@enterprise** (e.g. *avw.conf*) and the *appl.prop* of each application (but not in configuration parameter definition *properties.xml*) which has not been changed via GUI and load the changed values into the memory of **@enterprise** (Configuration object). After loading the method *reconfigure()* is called for each service (and each application where application class implements the interface *com.groiss.component.Service*). More information can be found in the *Application Development Guide* - chapter *The configuration file*. Underneath a table of applications is displayed with following columns:
  - Id: The id of the application. By activating the link a new window will be opened where all parameters of the configuration files of this application are shown. If the parameter *ep.configuation.store.in.database* under *Configuration/Other parameters* is activated, in addition to the parameters of the configuration files the parameters stored in the database are displayed - this part is marked with the text *Configuration content from DB follows*. More information about the parameter *ep.configuation.store.in.database* is located in the Installation Guide of **@enterprise**.
  - Loaded at: The time stamp when configuration has been loaded into memory of **@enterprise**.
  - Up to date: This column contains the status of the configuration.
    - is current: The current configuration in the memory of **@enterprise** is consistent with the configuration of the files and database.
    - is not current: The current configuration in the memory of **@enterprise** is different from the configuration given in files and database, i.e. the values of the files/database are newer than the values in the memory of the **@enterprise** server. In this case activate function *Reload configurations* to get a consistent state of **@enterprise** memory and files/database, i.e. the parameter values of files/database are read and updated in the memory of **@enterprise**.
    - unknown: No configuration is available for this application which can be read and updated.
  - Files/Change time: The paths to the configuration files and the time stamp when the files have been changed are displayed in these 2 columns. If the column *Change time* contains the value N/A, the configuration file is not available.

  - Database/Change time: These columns are displayed only, if the parameter *ep.configuation.store.in.database* under *Configuration/Other parameters* is activated. In the column *Database* the ID is displayed which is used for this configuration to identify it in the database. The column *Change time* shows the time stamp when the configuration has been changed in the database. If the column *Change time* contains the value N/A, the configuration is not available in the database.

- **Java System Properties:** This function opens a window with a list of all set java system properties.

- **Environment Variables:** This function opens a window with a list of all environment variables.

- **Current state:** An overview of reports that are currently being executed or are waiting to be executed.

- **Show Reporting schema:** Displays the reporting schema (XML file) in a separate window.

- **Reparse Reporting schema:** Reloads the reporting schema.

- **Show cache statistic:** Displays statistics about the permission cache for debugging purposes.

- **Show cache info:** Displays internal information about the permission cache for debugging purposes.

Worklist Cache

The engine constructs the worklists via heavily cross-linked in-memory structures. Database operations are hardly ever invoked.
The state of the worklist cache can be configured via the server configuration in section *Tuning*.

Refresh Cache: A refresh of cache structures is needed in the following cases: new applications, new departments, changes in the department-tree, new roles.
For this purpose following functions are available which can be executed manually:

- *Refresh cached org. structures:* With the help of this function you can refresh the organizational structures of the cache.

- *Refresh activity instances:* This function refreshes the Workitems. This would be also accomplished by switching the worklist cache off and then on again.

- *Repair WLCache:* If there have been inconsistencies in the worklist cache of one Node N due to "stop the world" garbage collection pauses, they can be repaired with this function. By entering a time interval (e.g. start and end of the GC-Phase of the inconsistent node) and by selecting another node M, node N gets information from node M which step instances changes during the interval. Nod N uses this information to update its internal state to the current data base state of those step instances.

For each function the timstamp of last execution is displayed within the brackets.

When a user logs in, his current roles and substitutions are accounted for. So changes in the assigned roles of the user (or the users he substitutes) are reflected after the login.
Changes in the substitutions are accounted for immediately after the changes (without the need for the substitute to log in again). This is the case for manual changes of substitutions as well as for changes made by the CurrentSubstitutesTask because the period of substitution starts or ends. Please note that the CurrentSubstitutesTask must be set to active in the Timer administration.
During a refresh of the cache structures, some of the structures are instantiated twice (the old and the new version). So additional memory usage during cache refresh and after it should be expected until garbage collection kicks in.
Two methods are available to refresh cache structures:

- com.dec.avw.wlcache.WLCache.getInstance().refresh() This takes into account all organizational changes. Corresponds to the link "Refresh" in Administrative Tasks / Cache Administration. Use e.g. after importing a batch of users programatically.

- com.dec.avw.wlcache.WLCache.getInstance().refreshUser(User u) This function considers changed roles and changed substitutions for one user. It does not take into account new applications, departments, depttrees, roles, . . .

Check and refresh cache for user: With the help of this function *Show* you can check the cache consistency for a selected user. The system compares the contents of the users personal worklist, role worklist, suspension list, role suspension list and pending items list according to the worklist–cache to the contents of the corresponding lists according to the database state.

If no discrepancies could be detected, the lists will show an icon in the form of a green tick. In case of discrepancies, the affected lists are marked with a red cross and the offending items are displayed. The administrator can then fix such discrepancies by clicking the provided Update-links in popup window or using the function *Refresh org. structures for user* which refreshes the whole cache for the current user. The changes are reflected immediately, that is the worklist cache is updated with the latest state of the step instance in the database. Display refresh must be triggered explicitly by the administrator.

9.1.3 Log files

Depending on the defined log level all accesses are logged (see *Installation- and Configuration guide* for more details).

Following tasks can be done on this mask:

- **Table handling:** The current log(s) are displayed in bold letters and each row can be sorted.

- **View log file:** After selecting a table entry this function opens the log file in view mode. Double clicking on a table entry executes the same function.
- **Length of tail** and **View tail of log file:** Depending on the value in the input field the last n rows of the selected log file are displayed when function *View tail of log file* is activated. The default value of the input field is defined in section *Logging* of @**enterprise** configuration.
- **Download:** This function allows to download the selected log file as ZIP- or text file.
- **Initialize log file:** When activating this function the current log file will be closed and a new log file will be created. Use this function if you want to record some events in a log file.

9.1.4 Database connections

This table shows the current open database connections used by executed statements. If a statement in column *Statement* is displayed in italic letters, the statement is already finished, but the connection is open (i.e. no commit has been done).
If Oracle is used as database, database connections can be labeled with the ThreadUser and the busyObject in column *In use*, e.g. *sysadm*Thread[JHttp-23,5,main]*. The label is set when a connection is attached to a thread and is reset when the transaction ends. The label is available in the client_identifier field of view v$session. Set the parameter *DB connection reservation warning interval (secs)* in *Configuration/Database* to a positive value to activate labeling.
The toolbar offers following functions:

- **Refresh:** This function reloads the table.
- **Cancel statement:** Executing this function could be necessary, if a statement is already running und must be aborted.
- **Release transaction:** This function allows to release transactions. The function will roll back the user-transaction corresponding to the selected db connection. Every db connection of the user-transaction will be roll backed, closed, given back to the pool and set to dubious state. Furthermore the afterCompletion() methods of SessionSynchronization beans will be called.
- **Histogram:** This function shows the db connections in a histogram. You can define *Unit* and *Columns*.
- **Statement statistics:** If parameter *Statement statistics* is activated under *Configuration/Tuning*, all database statements of the system will be displayed.

9.1.5 Object history

View the history of the objects in the database. You can see who has changed which objects and view older versions of objects. After activating the button *Start search* a result table with all changes is displayed depending on the search criteria. The button *Reset* deletes the values entered as search criteria. By performing a double-click on an entry in result table the details of the change are displayed.

9.1.6 User sessions

With the help of the administration function *User sessions* it is possible to get information about the logged in users and when they were logged in.

When a user is logged in, the number of the logged in users will be checked with the license (Concurrent-User). If the login is possible, an user session will be generated. This user session is as long as valid, until the user activates the *Logout* button. If no logout happens, the user-session is valid for 24 hours and will be finished automatically. Only user sessions which are inactive less than 2 hours, will be checked with the license.

You can display the user sessions as user list or in form of a histogram. Further you can set the time horizon for better display. After activating the button *Start search* a result table with all user sessions is displayed depending on the search criteria. The button *Reset* deletes the values entered as search criteria. By performing a double-click on an entry in result table or with the help of the function *Details* the details of the user session are displayed. The information will be shown in a new window in which you can get detailed information about the activity (including HTTP–sessions). If a thread is currently running (an action is performed by the user), it will also be displayed. The function *Refresh* updates the data for the existing session. The detailed overview of the HTTP–session is displayed in a new window with help of the function *HttpSession*.

User list: For displaying the user list, you have to take further restrictions.

- **Logged in users:** All user sessions which are active.
- **All users:** All user sessions, also inactive sessions.
- **User:** All user sessions of the selected user.

With option **Last access (minutes)** you can define (depending on selected *User list* option) which users should be displayed where last access was done x minutes before.
You will find following information in the result table:

- **User:** Contains the first and last name of the user.
- **Client IP:** The IP-address of the user.
- **Login:** The initialization-date of the user session (login date of the user).
- **Last access:** The date, when the user was active in the system.
- **Date of logout:** You can see the date of logout. Activating the toolbar function *Logout* kills the selected sessions and the users will be logged out (even clusterwide).
- **Node Id:** Contains the cluster node id.
- **Trace Level:** The *trace level* is displayed here. The trace level for a session or more sessions can be defined or changed with the toolbar function *Set trace level*.

Histogram:

- **Hour:** The time interval starts with 0 minutes.
- **Day:** The time interval starts at 12pm.
- **Week:** The week starts with the start-day of the time horizon at 12pm.

9.1.7 Events

In the section *Events* you can search for all recorded system events of **@enterprise**:

- **From** and **To:** Here you can set time restrictions
- **Type:** The event type *startup* or *shutdown* can be selected
- **Start search:** This function searches all recored system events, depending on the search-options. If no option was set, all recorded events will be displayed in a table.
- **Reset:** With this function you can delete the values entered as search criteria.
- **Delete all:** With this function you can delete all recorded events which are displayed in the table.

9.1.8 Timers

The timer triggers time-controlled events. It is used for some system tasks but also open for application timers. If you click the "Timer"-Link you see the list of timers already defined. You can add entries or change the properties of existing entries in the usual manner. Furthermore the following toolbar functions are available:

- **Execute:** allows you to execute the selected timer.
- **Timer manager infos:** displays internal state information of the timer manager.

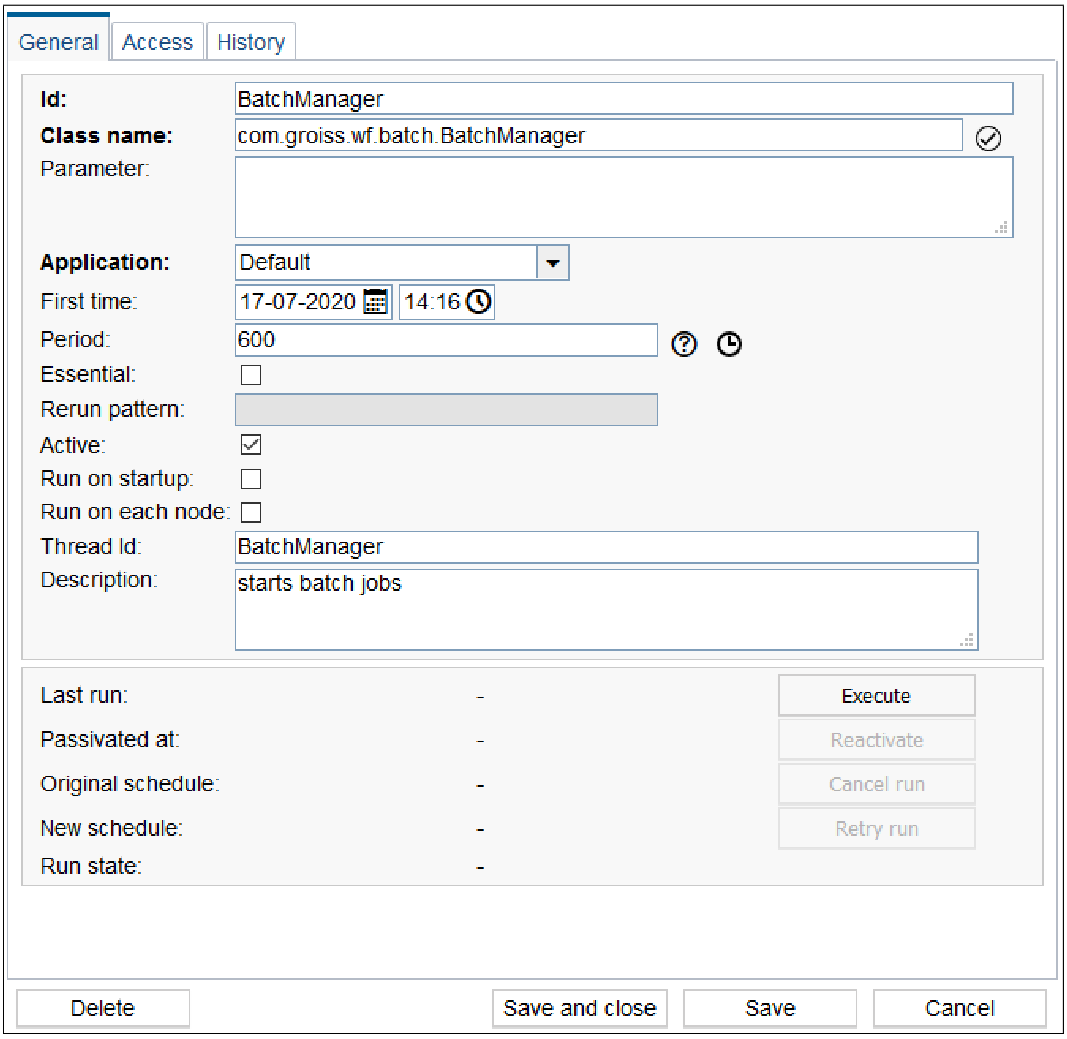
The object-details of timer contain the following tabs:

- General
- Access
- History

Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Short name of the entry.
- **Class name:** Name of the class which contains the timer action. The class should implement the interface com.groiss.timer.TimerTask
- **Parameter:** A String parameter for the "run" function.



Id: BatchManager

Class name: com.groiss.wf.batch.BatchManager

Parameter:

Application: Default

First time: 17-07-2020 14:16

Period: 600

Essential: ☐

Rerun pattern:

Active: ☑

Run on startup: ☐

Run on each node: ☐

Thread Id: BatchManager

Description: starts batch jobs

Last run: -

Passivated at: -

Original schedule: -

New schedule: -

Run state: -

Figure 9.2: **Tab: General (Timer)**

- **Application:** An application which the timer belongs to. The timer is listed in the timer-table of the appropriate application.
- **First time:** The time of the first run.
- **Period:** Interval in seconds or in form of cron-pattern (see section 9.1.8).
- **Essential:** Activate this checkbox to mark the timer as essential one. Essential timers provide a means to automatically reschedule erroneous or missing timer runs. A timer watcher component in the system records the planned execution dates of essential timers. Periodically, those schedules are checked for late or unfinished ones. When such a situation is encountered (e.g. error in timer, database connection lost, etc.), a mail is being send to the administrator and a retry run is scheduled. After a successful timer run, the original schedule pattern (= field *Period*) is used to determine the next planned schedule. The schedule of the retry run can be a delay in seconds or a cron-

pattern (= field *Rerun Pattern*). Check for late runs or missing runs are made every 60 seconds, but this period can be set via the *ep.timerentry.essential.check.seconds* configuration parameter located in the *Other parameters* section.
Please take notice of following hints when using an essential timer:

1. It is recommended to issue essential timers in their own thread, i.e. enter a *Thread Id*!
2. It is not recommended to activate checkbox *Run on startup*!
3. In an **@enterprise** clustered installation activate checkbox *Run on each node*!

Example:
Consider a long running summation activity to be carried out at the beginning of each quarter. The corresopnding timer pattern would e.g. be "0 3 1 1,4,7,10 *", that is on 3:00 a.m. on the first on January, April, July and October. If this timer is a nonessential one, then outages (e.g. system is down, network or database issues) at this points in time would result in an erroneous or unscheduled timer run. The "missing" run would need to be initiated manually at some convenient later point in time after the issues were dealt with. To continue the example, when a rerun pattern of "*/5 3-5 * * *" is specified, missed runs would be re-scheduled every five minutes between 3 a.m. and 5 a.m. on each day. This could be a meaningful pattern, if the timer is rather long running and puts some load on the system. To be completed before prime time, a start later than 5 a.m. would not be viable.

- **Rerun Pattern:** Interval in seconds or in form of cron-pattern for essential timer.
- **Active:** Only when checked, the timer task is performed.
- **Run on startup:** When checked, this timer task is started on startup.
- **Run on each node:** The timer is running locally on every node of the cluster.
- **Thread Id:** If you specify a non-empty string, the string is used as thread identifier. All timers with this string as thread id are executed in the same thread. Default is, that all timers are executed in one thread.
- **Description:** Free text.
- **Last run:** Shows, when the timer had its last run (start- and end-time) and the duration (in seconds).
- **Passivated at:** Time, when the timer was set temporarily inactive because of an exception (only for timers which are not marked as *Essential*).
- **Original schedule:** Time of the next original planned schedule (field *Period*) of an essential timer.
- **New schedule:** Time of the next planned schedule of an essential timer. In case of an error the next schedule is determined depending on the value of field *Rerun Pattern*.

- **Run state:** The state of an essential timer. Normally the state is *Scheduled* which means that the timer is waiting until the next run (= value of *New schedule*). If a timer is already executed, but not finished, the state is *Started*. Another state is *Failed* which indicates an erroneous timer-run.

Activating the button **Execute**, executes the actual timer immediately.

Activating the button **Reactivate**, releases the timer of the passive status.

The buttons **Cancel run** and **Retry run** are relevant for essential timers only. If the button **Cancel run** is activated, the plan for the next run (= *New schedule*) will be canceled and a new plan according to the setting in field *Period* will be calculated.
If the button **Retry run** is activated, a new plan (= *New schedule*) will be calculated which is 1 minute in future.

❓ By clicking on this symbol a popup-window will be opened, where you can enter the period in seconds or in form of cron pattern (see section 9.1.8).

🕒 If you click on this symbol, a popup-window will be opened, where the next ten invocations are shown.

Cron-Pattern

The cron-pattern comes from the UNIX-world and is used for tasks, which should be executed automatically in recurring intervals.
@enterprise uses this pattern to start timers as desired. **@enterprise** adheres to the V7-standard of cron.

A row consists of five defined columns. These columns contain the time data (minutes, hours, days, months, weekdays), whereas the columns are separated by spaces. The entries for the time data are shown in the following:

Minutes	0-59 and * for all minutes
Hours	0-23 and * for all hours
Days	1-31 and * for every day
Months	1-12 and * for every month
Weekdays	0-7 and * for every weekday (0 and 7 for sunday)

Furthermore cron offers following advanced functions:

- A comma , allows more time data
- A hyphen - specifies a period
- A slash / divides into a time range

Examples:

- Every day at 9h and 15h the timer will be executed: 0 9,15 * * *
- On the 15th of every month at 09:50h the timer will be executed: 50 9 15 * *
- The timer will be executed every Saturday at 00:00h: 0 0 * * 6
- The timer will be executed every 30 minutes: */30 * * * *
- Every day from 8h to 20h the timer will be executed every 20 min: */20 8-20 * * *

For further information about cron, please take a look at *http://en.wikipedia.org*

Overview about Standard-Timers

Standard-timers are:

- **BatchManager:** Starts and finishes batch jobs. Only needed, when batch job steps are used in process definitions.
- **BuildTimer:** Builds the active classifier assignments of all active processes. This timer is only needed for classifier assignments which are build dynamically instead of using a manually defined decision tree. The following optional parameters may be defined:
  - processes: the (comma-separated) ids of the processes to respect
  - assignments: the (comma-separated) names of the classifier assignments to be built
  - mailTo: an email address to which an email containing the evaluation results of the built classifier assignments will be sent
  - accuracyThreshold: a threshold for the accuracy of the built classifier assignment. Only evaluation results of classifier assignments which accuracies are below that threshold (or which could not be build due to an error) will be contained in the email mentioned above. Supported are values between 0 and 100 which may also contain decimal places.

  Example configuration:

  ```
  processes=incident
  assignments=category
  mailTo=heisenberg@frequentis.com
  accuracyThreshold=87.5
  ```

- **CalendarReminder:** Checks, if there are any calendar entries which specified reminder time is reached and sends mail notifications for those entries. Keep it switched on, if the DMS is used.
- **CheckForUpdatesTimer:** This timer checks for updates periodically in application repositories. If updates are available, an email with affected applications is sent to administrator.

- **CleanUpDMS:** Deletes empty directories in the checkout area and also deletes ACLs, which where DMS-object specific, but are now unreachable. Keep it switched on, if the DMS is used.
- **ClusterCheck:** Checks whether other nodes are running and reassigns cluster timer. This timer is only needed, when using the **@enterprise** cluster. Default value for tolerance time is 60 seconds, but can be changed by entering an integer value in field *Parameter*. For more information about **@enterprise** cluster and related times see the *Installation Guide*.
- **CurrentSubstitutes:** Checks, if some substitution specifications have to be enabled or disabled due to the time periods specified at those substitution. Needed when user or role substitutions are used.
- **DeferredUpdate:** On each run this timer takes a look, if there are any deferred updates of master data for which the time to execute has been reached. And if so, those updates will be performed by this timer. Keep it switched on.
- **DeleteUserSessions:** This timer deletes user sessions which are expired. With the field *Parameter* the duration (in days) can be defined, how long a user session should be active.
- **Escalations:** This timer checks on each run, if there are any escalations to fire. For detailed information see section 6.5.9. Needed when any escalations are used in the process definitions.
- **EvaluationTimer:** Performs an evaluation of the active classifier assignments of all active processes. The following optional parameters may be defined:
  - processes: the (comma-separated) ids of the processes to respect
  - assignments: the (comma-separated) names of the classifier assignments to be evaluated
  - mailTo: an email address to which an email containing the evaluation results of the classifier assignments will be sent
  - accuracyThreshold: a threshold for the accuracy of the evaluated classifier assignment. Only evaluation results of classifier assignments which accuracies are below that threshold (or which could not be evaluated due to an error) will be contained in the email mentioned above. Supported are values between 0 and 100 which may also contain decimal places.

  Example configuration:

  ```
  processes=incident
  assignments=category
  mailTo=heisenberg@frequentis.com
  accuracyThreshold=87.5
  ```
- **HeartBeat:** Informs the cluster that this node is alive. This timer is only needed when using the **@enterprise** cluster. In field *Parameter* you can set a tolerance time

(integer value) for heartbeats. It is recommended to set the value to two times of the maximum heartbeat timer interval of all nodes. Default value is 30 seconds. For more information about **@enterprise** cluster and related times see the *Installation Guide*.

- **IndexRefresh:** Refresh the full-text search index in ORACLE. This timer is only needed, if you use full-text search under ORACLE. The timer may be configured with the following parameters:
  - index: The full text index names (comma-separated) to refresh.
    Default: avw_ctxdoccont,avw_ctxfieldvals
  - memory: The memory used for refresh. Default: 32M
  - threads: Number of threads refreshing the index. Default: 1
  - maxtime: Maximum duration of refresh in minutes, the index refresh is stopped if this time is exceeded. The refresh will be continued at the next run of index refresh. Default: CTX_DDL.MAXTIME_UNLIMITED
  - lockwait: Oracle provides several strategies how to handle a database lock during the index refresh. Default: LOCK_NOWAIT_ERROR

  For further information have a deeper look into the Oracle Text documentation, CTX_DDL Package, SYNC_INDEX procedures.

- **LDAPDirSyncTask:** Synchronizes master data with LDAP Directory Servers. For detailed information, please see section 9.6.5. Needed only when periodic LDAP synchronization is configured.

- **Log:** This timer will remove all log entries (excepting the current log entry/the last change) which are older as specified in field *Parameter*. If the timer parameter is a positive integer D, then all log entries older than D days will be removed. If the timer parameter is a property string, the retention period can be specified for individual classes. The property string consists of elements of the form classname=Dn (separated by line break). If zero is used as Dn, then the classes log entries will not be removed. If * is given as a classname, the corresponding Dn parameter applies to log entries for all classes not explicitly mentioned in the property (all other classes). e.g.

  ```
  *=30
  com.groiss.org.User=0
  com.groiss.org.OrgUnit=1000
  com.groiss.org.Role=1000
  com.groiss.org.UserRole=365
  ```

- **LogV2Migration:** A timer for migrating log entries of table avw_log due to new versioning implementation (introduced in June 2017). This timer is needed because a migration of table avw_log during database upgrade is not possible due to the huge number (several millions) of records in that table. Therefore the migration is done in steps of a defined *duration* (in seconds) which may be passed as argument to this timer. The second supported argument *lastMigratedOid* is used for performance tuning when querying the table avw_log and will be updated by the timer itself after each run - so please do not change it manually. If this timer is set to active and the migration is done successfully, the timer will be set to inactive automatically.

- **MailGetter:** Download mails and perform the configured actions. All emails of a mailbox are handled and if no error occurs for a message, the defined action is performed. For emails, which cannot be handled because of an error, an error message is thrown after processing all emails. Additionally detailed information of the erroneous emails is written to server log and if defined, the administrator is notified (entered under *Configuration/Communication/Administrator email address*). For more information concerning a mailbox see section 9.6.1. This timer is needed only, if any mailbox contents should be processed automatically.

- **MailQueueTimer:** This timer iterates in a predefined time (default 10 min.) over the mail queue and tries to send the appropriate mail. If an error occurs, a status message will be stored at the mail queue entry. If sending is successful, the entry will be removed from mail queue. More details about the mail queue could be found in section 9.6.2.

- **PasswordExpiration:** Checks, if the password of users will expire in future and sends a warning email to the users. The settings for validity and expiration warning can be set under *Configuration/Password policy*. The message template for sending the warning email is defined in default application (id *pwdExpiration*).

- **PerimeterReplicationTimer:** This timer is used for master data replication. It must be activated on the internal server if timer based replication is desired.

- **PerimeterSyncTimer:** Used for remote process creation and information about status changes. It interprets the handover specification files *externtask.xml* and *interntask.xml*.

- **ProcessStartTimer:** This timer starts the given process in given organizational unit. For this purpose the text field *Parameter* has to contain the attributes *process* and *ou*. Optionally the parameter *startNote* can be added (value could be an i18n-key, e.g. <app-id>:<resourcestring>) to attach a process note with entered subject:

  ```
  process=<procdef_id>
  ou=<ou_id>
  startNote=<note_subject>
  ```

  Example:

  ```
  process=jobproc
  ou=gi
  startNote=Started by timer
  ```

- **RecycleBin:** This timer deletes all entries from the DMS recycle bins of every user which are older than n days. The number of days can be specified as positive integer in field *Parameter*. More information concerning the recycle bin is available in the *User manual*.

- **ReportSubscriptionTimer:** The timer executes all reports where an active report subscription has been defined. More information about report subscriptions is available in the *Reporting manual*.
- **ReportTimer:** This timer executes stored reports in defined periods. Following parameters are needed in field *Parameter*:
  - query: A list of comma separated list of id's of stored reports are needed, e.g. query=q1,q2. The stored reports need to be define an exporter which is an instance of *FileReportingExporter* (e.g.: PDF, Excel, Chart, CSV or XML - Exporter etc.)
  - action: Define one of following action how reports should be created:
    - email: Report is sent to defined email address(= target)
    - dms: Report is created in DMS in defined folder (= target)
    - file: Report is stored on filesystem depending on parameter target
    - none: Report is executed, but without additional action (e.g. necessary for reports with Escalation Exporter)
  - target: Depending on defined action, an email address, a path to a DMS folder (e.g. COMMON/Reports) or a filesystem path (absolute or relative to server root path) must be entered.
  - filename: This parameter allows the definition of the filename (without extension) for the exported file(s). If more than one *query* was defined, the extension _1, _2, etc. is attached to the filename. The default file name is: <QueryId>_yyyy-MM-dd HH:mm:ss
  - nonempty: Setting this parameter to value *true* assures that reports without result are not sent or saved.
  - templateid: This optional parameter can contain an id to a message template(see section 6.11). By default the message template with id *reportTimer* of application *default* is used, if not templateid is entered.
  - Parameter: For each condition of a stored report a parameter-name can be defined. For each condition that's defined as 'parameter at execution' it is required to either define a default-value or specify a value and optionally an operator like in following example:

    ```
    <paramname>_value=test
    <paramname>_operator=like
    ```

    Reports with incomplete conditions will not be executed by the report timer.

  Example configuration:

  ```
  query=report1
  action=email
  target=heisenberg@frequentis.com
  filename=Report1
  nonempty=true
  id_value=15
  ```

```
id_operator==
subj_value=Error
subj_operator=like
```

If needed, an own implementation of ReportTimer could be created which must extend the class com.groiss.reporting.ReportTimer. More information can be found in **@enterprise** API.

- **SeenObjectCleaner:** Removes all see-information which is not needed anymore. The seen-information is used to indicate, if a work item is new (=unseen) or not. Keep it switched on.
- **Suspension:** This timer will investigate all suspended work items, if it is time to see those items again in the various worklists (i.e. it performs a time triggered automatic 'see again'). Furthermore all active wait steps are checked, if their period of time is exceeded (see section 7.2.17). Keep it switched on.
- **TokenRefresh:** Refreshes access tokens of OAuth authorizers. Those access tokens with less than half the original validity period remaining will be refreshed.
- **WfXMLTask/WfXML2Task:** Sends WfXML messages from outgoing buffer and gets messages from passive partners. This timer is only needed, if WfXML is used. For detailed information see section 9.6.7.

9.1.9 Pending changes

In the administration task list you find the entry *Pending changes* showing a list of objects having queued changes. You can also withdraw the changes in this list.

9.1.10 Event registrations

In the administration you can view the list of registrations and you can add and remove registrations. Processes waiting in a sync can be finished manually from the process history. The following informations are displayed in the event table:

- Event registrant: The id of the process registered for the event.
- Event name: The name of the event for which the registration took place.
- Context: The context object for the event.
- Event handler: The Java–class handling the event.

The following functions are available in the toolbar:

- *Refresh:* Activating this function, the table will be updated.
- *View:* If you activate this function, the process history associated with the process will be displayed. This function is also triggered when you double-click on a table entry.

- *Complete:* After activating this function, the process will be forwarded (like in the worklist).
- *Short search:* Enter an process ID in the text field and activate this function to get a limited result.
- *All entries:* Activate this function to display all entries in the table.

9.1.11 Batch jobs

With the help of this function it is possible to search after batch jobs. As search criteria the process id, the state of the batch job and/or the time-period where a batch job has been started, can be used.
After activating the button *Start search* a result table with all batch jobs are displayed depending on the search criteria. By performing a double-click on an entry the detail mask can be opened and subsequently edited. By activating the button *Abort and go back* the batch job will be aborted and returned to the last interactive task of the process. The button *Reset* deletes the values entered as search criteria.

More details about Batch Jobs can be found in the *Application Development Guide* in section *Batch processing*.

9.1.12 Wait steps

This function allows to search for process instances where a wait step is executed at the moment (see section 7.2.17 for wait step definition). As search criteria the process id and/or the time-period where a wait step has been started or should be finished, can be used. After activating the button *Start search* a result table with all process instance are displayed depending on the search criteria. The button *Reset* deletes the values entered as search criteria. By performing a double-click on an entry in result table the details of the process instance are displayed. The toolbar function *Change end time of wait step* allows either to finish the wait step immediately or change the end time (with optional comment).

9.1.13 Class path

For the convenience of application programmers we support the reloading of classes. A precondition for doing this, is to distinct between system classes and application classes (and resources). System classes are loaded by the system class loader and can not be unloaded. They reside in the lib directory of the installation.

The application classes are in the lib and classes directories of the applications. The form classes generated by the system are in the forms directory. These classes are loaded from the application class loader and are reloadable.

To enable class reloading check the checkbox in the configuration (parameter group tuning). To check your classpath use the Classpath link in the administration.

Show shadowed classed

This method lists all resources, which name is found more than once in the class path or in subfolders of the class path entries. resources, which are found more than once, are shown in the following syntax.

relative path of resource   Number of found resource with this relative path
    Absolute Path of the resource used by the system
    Absolute Path of shadowed (unused) files
    ...

9.1.14 Manage certificates

If SSL communication is needed, a certificate must be created. Certificates and the appropriate private and public keys are stored in the server keystore which must be defined before.

Hint: In **@enterprise** configuration under *Security* and *HTTP server* the appropriate settings must be done for using certificates (see *Installation- and configuration* guide). The server must be restarted to use the certificate management correctly.

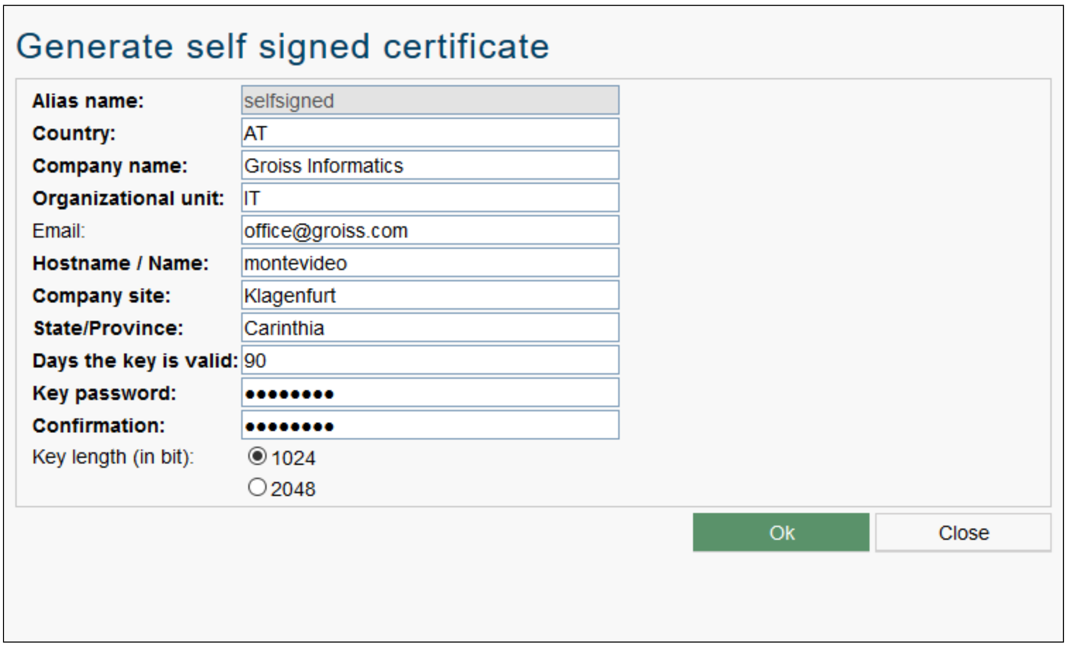
To communicate in a secure manner **@enterprise** server needs a certificate which proofs the integrity of the server's public key. You may generate a self signed certificate, which covers the needs for internal communication, or request an official certificate from a certification authority (CA). Anyway the server needs a RSA key pair (public and private key), which can be generated by clicking the button "Generate self signed certificate". **@enterprise** generates the key pair by using the keytool, which automatically generates a self signed certificate to this key pair.

Certificates are also used to sign PDF documents. Therefore users are allowed to create certificates at their own or can be done in the **@enterprise** administration. To allow users to sign as a role (e.g. sales) the administrator has to create a certificate for the appropriate role. User and role certificates do not need a server keystore (see settings in configuration area *Security*), i.e. the creation of this kind of certificates is always allowed!

Generate self signed certificate

To generate a key pair, the following parameters have to be specified.

- **Alias name**: The alias name is so to say the id of the specific entry in the keystore.
- **Country**: a two-letter country code, e.g., "US"
- **Company name**: The official name of the company.
- **Organizational unit**: the specific department
- **Email**: Email address of the administrator.



Generate self signed certificate

Alias name:	selfsigned
Country:	AT
Company name:	Groiss Informatics
Organizational unit:	IT
Email:	office@groiss.com
Hostname / Name:	montevideo
Company site:	Klagenfurt
State/Province:	Carinthia
Days the key is valid:	90
Key password:	••••••••
Confirmation:	••••••••
Key length (in bit):	● 1024 ○ 2048

Figure 9.3: **Generate self signed certificate**

- **Hostname / Name**: The hostname of the server
- **Company site**: The city where the specific department of the company is located
- **State/Province**: The state of the company site.
- **Days the key is valid**: The key and the assigned certificates may expire. The validation time of the entry can be specified in days. The default value is 90 days.
- **Key length (in bit)**: Can be chosen: 512, 1024 or 2048 bit of length.

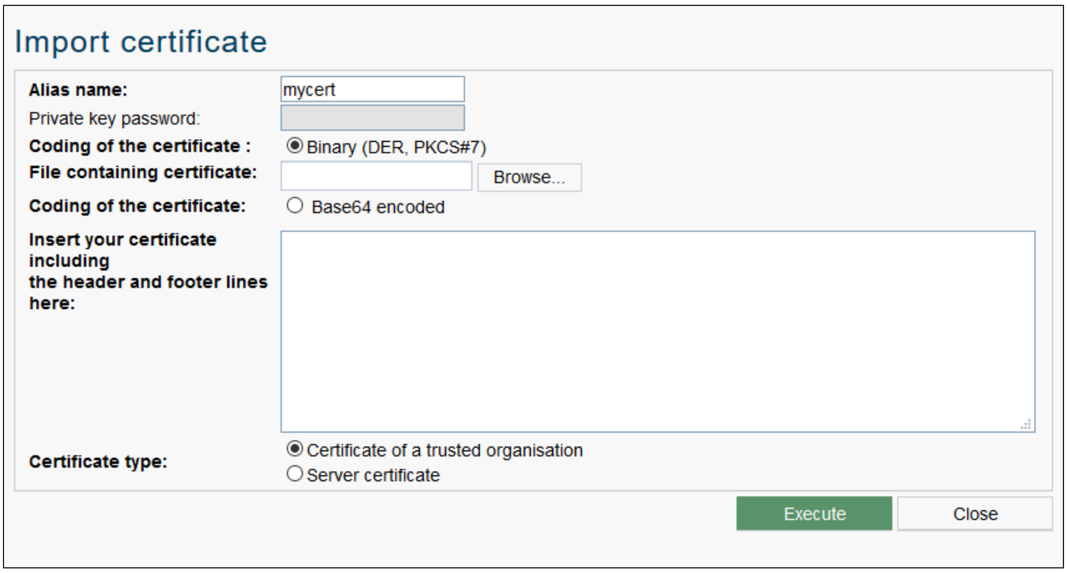
Create certification request

Choose the entry of the keystore, which you want to use to create a CR. You can download the CR by double-clicking it or by choose it and click the "create Certification Request" button. If you have created the CR you can request a certification at a certification authority (CA). How to do this can be found in the documentation of your CA.
You can get some example certificates at "www.secude.com/trustfactory/" or "www.trustcenter.de".

Import certificate

When the CA sends the requested certificate, you need to import it into the keystore. To do so, click on the button “Import certificates” and specify the following parameters.

- **Alias name**: Ensure that the alias name is the same as the alias of the key pair for which the request was generated.
- **Private key password:** A password for private key must be entered here.



Import certificate

Alias name: mycert

Private key password:

Coding of the certificate : ● Binary (DER, PKCS#7)

File containing certificate:

Coding of the certificate: ○ Base64 encoded

Insert your certificate including the header and footer lines here:

Certificate type: ● Certificate of a trusted organisation ○ Server certificate

Figure 9.4: **Import certificate**

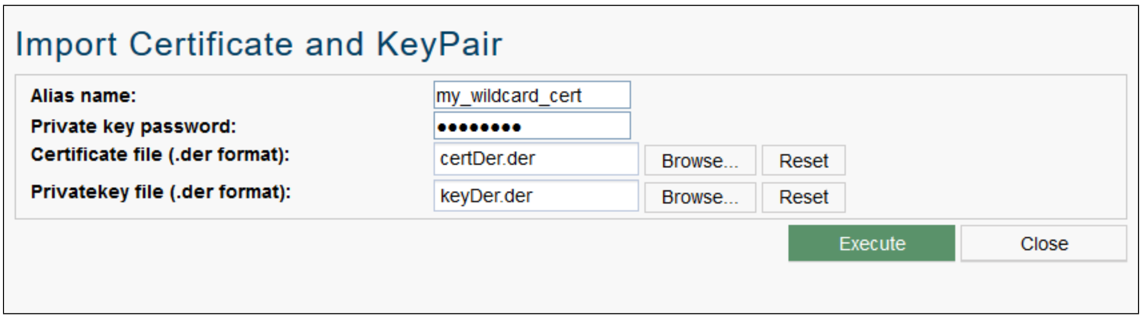
- **Coding of the certificate**
  According to the encoding of the received certificate, there are 2 different ways to import.
  - Binary (DER, PKCS#7): in this case you have to specify the file, which holds the certificate.
  - Base64 encoded: just copy the certificate including header and footer lines in to the textarea
- **Certificate type**: The certificate to import can be either the certificate of the server or the certificate of a trusted organization (also called trust anchors). A trust anchor is the root of a certificate chain an is needed, if the "require client certificate" option is selected. The server accepts only client certificates, which are signed by a certification authority, which certificate is stored in the keystore as a trust anchor. If the client can not provide a certificate which is signed by one of the trustanchors in the keystore, the connection will be refused.

If any entry of the keystore is not needed any longer, you can delete the entry by clicking on the delete button.
Note: After any modification of the keystore the server needs to be restarted.

Import Certificate and KeyPair

This function allows to import wildcard certificates. A wildcard certificate secures your domain and all your subdomains. The advantage of such a certificate is that only one certificate is needed and not multiple certificates for each domain.

The dialog *Import Certificate and KeyPair* contains following parameters:



Import Certificate and KeyPair

Alias name:	my_wildcard_cert		
Private key password:	••••••••		
Certificate file (.der format):	certDer.der	Browse...	Reset
Privatekey file (.der format):	keyDer.der	Browse...	Reset

Figure 9.5: **Import Certificate and KeyPair**

- **Alias name**: Ensure that the alias name is the same as the alias of the key pair for which the request was generated.
- **Private key password:** A password for private key must be entered here.
- **Certificate file:** Enter the path to certificate file which must be in DER-format.
- **Privatekey file:** Enter the path to Privatekey file which must be in DER-format.

9.1.15 Query tool

The query tool provides a simple interface to access databases in a read-only manner. Because direct database access may be a considerable security risk, the functionality is only available when the following two conditions are met:

- The configuration parameter database.direct.access has value *true*. You must directly edit it in the configuration file or activate the checkbox near the parameter *database.direct.access* in Configuration/Other parameters.
- The user must have the execute right on all objects (every user having the sys role has this). Substitutions are not considered here.

While it is primarily intended to execute SQL queries against the underlying main database of **@enterprise** it can also be used to determine connectivity issues to other databases. If the radio button *Local* is activated, the statement will be executed on the database schema of **@enterprise** .

If the radio button *Other Database* is activated, a set of fields will appear which allows you to enter the connection properties of an external database. You can use the help function (the question mark next to the *JDBC URL* field) to fill the fields *JDBC Driver Class* and *JDB -URL* with patterns for valid values. Change the specific parameters like host name, port and database IDs to the values appropriate for your environment. The *JDBC driver* that contains the JDBC Driver Class must be available in the class path (usually by placing the corresponding **.jar* file it in the *lib* directory of the **@enterprise** installation). Then enter any credentials needed in the fields *Database Userid* and *Database Password*.

If in *Communication → External Stores* some database connections are configured, you can create a connection with a defined database via *External database* option. All configured connections can be found in the *External database* drop-down list. You can find more information under 9.6.6.

Regardless whether the local or an external database is being targeted, any query (only *select* statements are allowed) in the text field **Statement** can be sent by activating the button **Execute**. The results of the query will be displayed in the lower area of the page.
After the results, the corresponding query plan can optionally be displayed. This works only when using *Oracle* and if the user has the *STAT* right. More information about how to configure this functionality can be found in section *Installation/ Database Preparation/Oracle* of the *Installation and Configuration* manual.

In addition to queries, the **describe** command can be used to access meta information about the database. For details about the results, please consult the appropriate Java API documentation for *java.sql.DatabaseMetaData*.
The *describe* commands can take the following forms:

- *describe DBSchemas* - shows the available database schemas
  c.f. *DatabaseMetaData.getSchemas()*
- *describe SQLTypes* - shows the available data types of the DBMS
  c.f. *DatabaseMetaData.getTypeInfo()*
- *describe table_name* - shows information about the table: [1]
  - Columns: c.f. *DatabaseMetaData.getColumns()*,
  - Primary keys: c.f. *DatabaseMetaData.getPrimaryKeys()*,
  - Foreign keys: c.f. *DatabaseMetaData.getImportedKeys()* and *DatabaseMetaData.getExportedKeys()*,
  - Indexes: c.f. *DatabaseMetaData.getIndexInfo()*.

The *table_name* can also be qualified by a *schema_name* or by a *catalog_name* as well as a *schema_name* e.g.:

- *describe table_name*
- *describe otherschema.othertable*
- *describe othercatalog.otherschema.othertable*

9.2 *Import/Export*

[1] Under Oracle, the *describe table_name* command can be quite slow (several seconds); some patience is required.

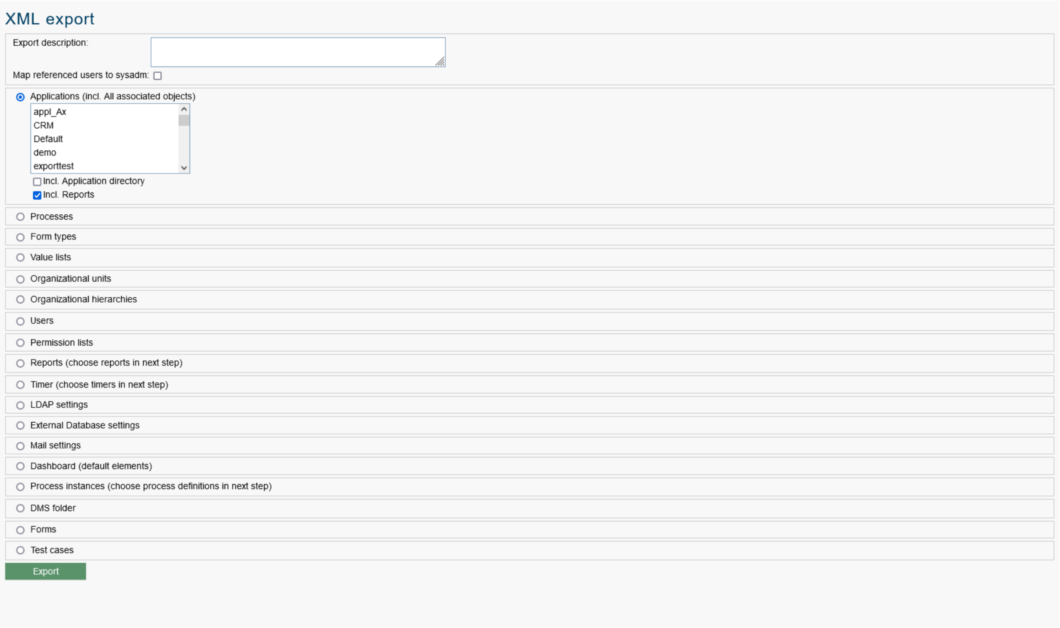
9.2.1 Import/Export in XML Format

The import/export functions allow you to export data (master data and runtime data) from one **@enterprise**installation and import it to another. The data are exported to a file in XML format.

Export

You can export different types of data. XML Export shows you a list of all exportable data types and lets you choose from options depending on the chosen data type. Figure 9.6 shows the available export types. You can export only one type of data at a time. If the selected type has additional options to choose from, an option section will become visible (like for organizational units, as you can see in the figure). The first element of the export screen is the "Export Description" text area - you can use this to optionally add a description to the export file. If you import the export file later, the description text will be displayed.

The checkbox *Map referenced users to sysadm* tries to set as often as possible the sysadm user as user reference. This is not done e.g. for permission list (acl) entries of step agents of a process. As well it is not wise to use this checkbox for every kind of export, because it falsifies the exported data.



XML export

Export description:

Map referenced users to sysadm: □

● Applications (incl. All associated objects)

appl_Ax
CRM
Default
demo
exporttest

□ Incl. Application directory
☑ Incl. Reports

○ Processes
○ Form types
○ Value lists
○ Organizational units
○ Organizational hierarchies
○ Users
○ Permission lists
○ Reports (choose reports in next step)
○ Timer (choose timers in next step)
○ LDAP settings
○ External Database settings
○ Mail settings
○ Dashboard (default elements)
○ Process instances (choose process definitions in next step)
○ DMS folder
○ Forms
○ Test cases

Figure 9.6: **Export in XML–Format**

@enterprisecan export the following data:

Applications Export one complete application with all process definitions and other master data defined in it. This includes all objects that are defined in the applications' processes (see *processes* below), plus data defined in the application: rights, object classes, task functions, tasks, form types, roles, etc.

Test cases are not exported with applications - for this purpose an own exporter is available (see beneath).

The checkbox *Incl. Application directory* is not ticked by default and indicates that the entered application directory on application detail mask is ignored at export, i.e. if the exported file is imported on target system, then the application directory will not be written for new created application object or replaced for existing application object. Activate this checkbox, if the application directory on target system should be the same as defined in application object on source system.
With checkbox *Incl. Reports* it is possible to define, if the reports of the selected application should be exported or not (by default they are exported).

Processes Export one process plus tasks, steps, form types, and roles used in the selected process definition, process interfaces and rights (e.g., rights on a form type). Rights will be imported only if the required agents and departments already exist on the import system.

Option *Incl. Roles*: If this option is selected, referenced roles are exported. Otherwise, they are marked as references in the export file. Option *Incl. Form types*: If this option is selected, referenced form types are exported. Otherwise, they are marked as references in the export file.

Form types Export of form types. The form-templates will not be included in the export-file (is usually part of application-jar file).

Option *Incl. Subforms*: If this option is selected, referenced forms are exported. Otherwise, these forms are marked as references in the export file.

Value lists Export of one or more value lists.

Organizational units Export all organizational units.

Organizational hierarchies Export of all organizational hierarchies and their organizational units.

Users Export all users. Optionally you can include roles and rights defined for these users, and user settings as well as the users' dashboard elements.

Mind: user settings can contain a link to a home page. This link will not be modified by the import/export of @**enterprise**- thus, if it contains OIDs of specific objects (e.g. applications, etc.), the link will most likely not work any more after importing it to another system. The same restriction also applies to dashboard elements, which can contain arbitrary OIDs, too.

Permission lists Export all permission lists (ACLs) of @**enterprise**.

Reports Export stored reports - you can choose one or more queries in a second step. Optionally you can include access rights defined for the exported stored reports. Referenced objects (such as process definitions, tasks, forms, etc.) will not be included in a stored reports export. Stored reports will be imported only, if these required objects already exist on the import system.

Timer Export one or more timers. If you select to export timers, you can choose the desired timers in step two.

External Database settings Export all external database configurations defined in *Communication → External Stores* .

LDAP settings Export all LDAP entries. This exports the LDAP entries defined in *Communication → LDAP* .

Mail settings Export all Mailboxes defined in *Communication → Mailboxes* .

Dashboard (default elements) Export the default dashboard elements. User dashboard elements will not be included in this export (they can be exported directly with the users). Default dashboard elements are the elements that an administrator saved as default.

Process instances Export process instances (runtime data) of one or more process definitions. This includes all step instances, form instances, adhoc steps, and so on. Rights on exported objects can optionally be included. You can restrict the exported process instances by defining a start restriction (only export process instances that have been started between two definable dates). The target process definitions can be selected in a second step.

Master data (like process definitions, users, roles, etc.) are not included in a process instance export. Process instances are only imported on a target system if the required master data already exists. Thus, on the target system you should first ensure that the required master data exists and afterwards import process instances.

DMS folder Export a folder of the DMS with its content (runtime data). This includes documents, forms, notes, web links and subfolders (recursive). Links to other DMS objects cannot be exported and will be ignored. Access rights defined on the exported objects can be included optionally. Agents (users or roles) and departments that occur in such right definitions will not be exported. The rights will be imported only if the required agents and departments exist on the target import system.

You can export the Common folder or a specific user's folder (or one of their subfolders). If you want to export a user's folder, first select the user and then the folder.

Forms Export of form instances. All forms (instances), which was created in **@enterprise**, can be exported. Before importing form instances, the form classes and other referenced objects (e.g. process definition where form instance is process form) must be available on the target system, i.e. the appropriate application with their form types must be available.

Test cases Export of all test cases of selected application (see section 6.12). The referenced objects of a test case (process definition, tasks, agents, etc.) are not exported here and must be available on target system!

Classifiers When selecting the *Classifiers* group, you can choose one or more process classifiers for export.

The server writes the XML file to its temporary directory. After an export file has been completely written, the browser will ask you if you want to download the file.

Import

Importing a XML file is done in three steps.

1. First you upload the XML file to the server.
2. The browser displays information about the XML file's content.
3. The content of the XML file will be imported and you will see information about the imported elements in the browser.

The import will be aborted and an error message will be displayed, if an error occurs. Imported objects are already stored in **@enterprise**!

If export-files of earlier versions of **@enterprise** (e.g. 7.0) should be imported, the user will be informed about the older export-file and has to select an application for the default objects. This selection is necessary for assigning application-objects (e.g. processes) to the right application. This selection will be ignored in some cases, e.g. if the email-settings are imported.

Hint: If an export of default application exists, the default objects of **@enterprise** will not be changed by the import! These default objects are created at **@enterprise** setup, e.g. roles (all, sys, home), form types, object classes, etc.

Import/Exports Dependencies

If you want to copy data from one server to another server, it is necessary to perform the imports in the right order. The exports can be done in any order. Runtime data (process instances, DMS content) and stored reports, as well as access rights usually require master data to exist on the import system. If the data does not exist, the objects will not be imported. If you perform imports in the following order, everything should work fine:

1. Users (without rights)
2. Organizational units
3. Organizational hierarchies
4. Applications, processes, form types, value lists
5. Users (incl. rights), ACLs
6. Process instances, DMS folder, stored reports, timer, LDAP settings, mail settings, dashboard elements

9.2.2 Archive processes

This function deletes process instances in the **@enterprise** database. If an archiving class is installed (see the configuration group "Classes"), the archive method of this class is called with each process instance. This can be used to store some information about

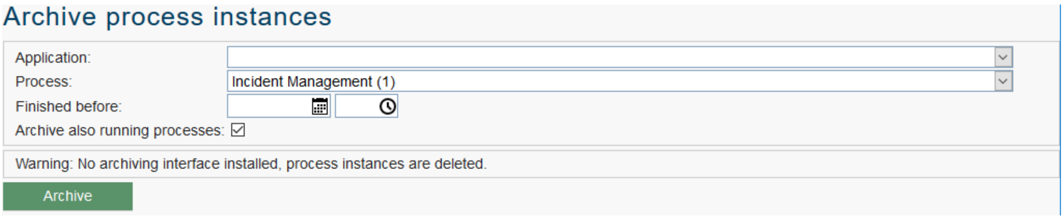
the process instance in an external storage. If archiving should be prevented, configure com.groiss.wf.NoArchiver as archiving class!
For archiving process instances perform the following steps:

1. Select an application or one specific process type.

2. Specify the finish date. All process instances of the given type which have been finished before this date are archived.

3. If you want to delete also running process instances, check the according checkbox.

4. Archive the processes with the button "Archive".



Archive process instances

Application:

Process: Incident Management (1)

Finished before:

Archive also running processes: ☑

Warning: No archiving interface installed, process instances are deleted.

Figure 9.7: **Archive process instances**

9.2.3 Export application

This function offers the possibility to put an **@enterprise** application into a ZIP archive (incl. optional application export) and install it with function *Install application) again on an other* **@enterprise** *system (see section 9.2.4*). It is aimed primarily for customers who create an application with the **@enterprise** administration user interface without writing Java code. By activating the button *Export* following steps are performed:

- All files of the *classes* folder within the defined application directory are collected and packaged in a JAR file. The name of the JAR file is the id of the selected application. The definition of the application directory is described in section 6.1.1. The set of possible files within the *classes* folder is described in the **@enterprise** application development guide in section *5.1 Organization of Files*.

- The previous mentioned JAR file is stored in folder *lib* within the ZIP archive.

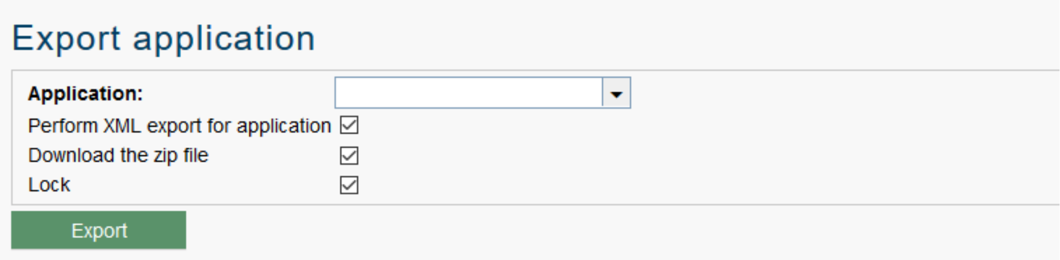
- Additionally the file appl.prop is created on top-level within the ZIP archive. This file is enriched automatically with parameters that are needed for a correct application import (see **@enterprise** application development guide, section *5.2 The Configuration File* for details).

- If the checkbox *Perform XML export for application* has been activated, a xml export is done and the file stored in the JAR file according to the described file structure in **@enterprise** application development guide, section *5.1 Organization of Files*.

- The ZIP archive is stored in folder *dist* of the definition application directory. By activating the checkbox *Download the zip file* the file could be downloaded with Browsers functionality.
- The checkbox *Lock* indicates, if the exported application can be adapted on target system. If activated, this means that no application elements can be created/adapted/deleted with some exceptions:
  - Adaption of application directory
  - Creation/Adaption of permissions on tab *Access* under following conditions:
    - Access for roles which are stored in an application with a higher startup position
    - Permissions of roles on objects which are stored in an application with a higher startup position
  - Creation/Adaption of decision support objects for a process definition
  - Assignment of functions in tab *Functions* of a process definition, if function is stored in an application with a higher startup position
  - Creation/Adaption of assignments in GUI configuration objects, if role is stored in an application with a higher startup position
  - (De)activation of timer or change the period of a timer
  - Adaption of mailbox credentials
  - Adaption of URLs in Webservice Client objects
  - Creation of new language resources in resource editor

  The information, if an application is locked, is stored in the manifest of the created JAR file with following attribute: *Locked: true*

  Hint: In case of an application upgrade or a XML import, the lock of an application is nullified for these operations!


Export application

Application:	
Perform XML export for application	☑
Download the zip file	☑
Lock	☑

Figure 9.8: **Export application**

9.2.4 Install/Update application

This function allows to install a new application and to update it. For both options an archive file (*.zip or *.jar file) is needed which should be created ideally with administration function *Export application* (see section 9.2.3).

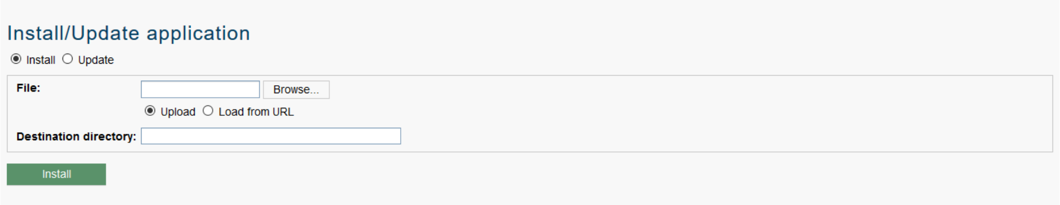
Hint: If the archive creation is done manually, the file should be created with UTF-8 encoding to ensure e.g. unpacking files/folders with umlauts in their names correctly!

Install

There are 2 ways to install an application:

- Upload: If an archive file exists on file system, the application can be installed with this option. Select the corresponding file from file system, enter the destination directory for the new application into the field "Destination Directory" where the application should be installed on file system and activate the "Install" button. This will transfer the zipped application to the server, extract the content, and perform the installation. Afterwards you are requested to restart the **@enterprise** server (via information icon in toolbar).
- Load from URL: Enter an URL to an archive file on a foreign system. The next installation steps are the same as for option *Upload*

1



Install/Update application

● Install ○ Update

File: Browse...

● Upload ○ Load from URL

Destination directory:

Figure 9.9: **Install/Update application**

Update

The way to update an application is quite the same as for a new installation (see description above), i.e. create an archive file first and select it/enter URL for the update procedure. After activating the button *Update*, the selected file will be stored in the *patches*-folder of the already installed application on file system and the administrator will be requested to restart the **@enterprise** server. After the restart the upgrade procedure of **@enterprise** is performed automatically and in case of the updated application all (application) files on file system are replaced by the files of the archive, excepting the file *appl.prop*. Afterwards the **@enterprise** server can be started in the ordinary way.

9.2.5 File import

The new file import component allows the specification of the structure of the import source and the target objects:

- *Import Definition:* An import definition file (*import.xml*) is necessary to use this function. This file must be stored in classes-folder of **@enterprise** or within an application-folder (see *Application Development Guide* - section *Organization of files*). Following an example of an import definition:

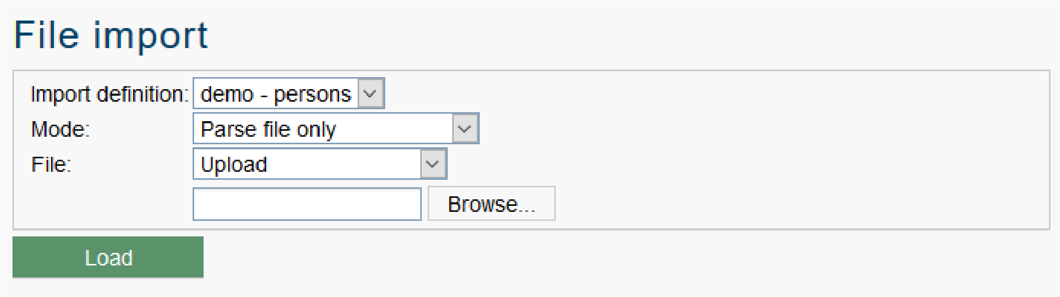
  ```
  <?xml version="1.0" encoding="iso-8859-15" standalone="yes"?>
  <importDeclarations>

   <import name="resources">
   <targetClass>com.groiss.calendar.pers.Resource</targetClass>
   <columns>
   <column name="name"/>
   <column name="description"/>
   </columns>
   <keyField>name</keyField>
   <delimiter>;</delimiter>
   </import>

  </importDeclarations>
  ```

  The keywords of the Import definition are described in section *Keywords of Import Definition*.

- *File:* Choose a source to upload a file:
  - Upload: If this function is selected, you have the possibility to enter a path.
  - Local: Selecting this option allows to upload files, which are stored in **@enterprise**-folder (=root).
  - Class path: This function allows to upload files, which are in classpath only.
  - According to definition: The file, which is entered in the *Import Definition* (import.xml), is used.

- *Mode:* This dropdown-list offers following three upload-modes:
  - Parse file only: The file will be parsed only and no object are created in **@enterprise**.
  - Skip database operations: The file will be parsed and compared with existing objects (without database operations).
  - Import: The file will be uploaded and objects will be created in **@enterprise** (with database operations).

- *Load:* Activating this function loads the selected file.



File import

Import definition: demo - persons

Mode: Parse file only

File: Upload

Figure 9.10: **File import**

Keywords of Import Definition

- <import>: The import description which has the format *<import name="name">*. Following attributes can be defined for this keyword:
  - ignoreHeader: If *true*, the first row is ignored.
  - useOrgData: If *true*, the OrgData-methods of @**enterprise** are used instead of Store-methods.
- <targetClass>: Symbolizes the import type (= target class).
- <targetCondition>: Restriction of *targetClass* elements. Only these elements are compared with the imported ones, not existing elements will be deleted.
- <keyField>: Field of target class, which contains the key (necessary for import).
- <importHandler>: If no *keyField* was set, a import handler must be entered which implements the interface *com.groiss.fileimport.ImportHandler*.
- <constants>: Contains a set of constants (*<constant name="name" value="val"/>*), which are added to the set of values of each row.
- *<extensionClass>:* Name of the class for additional data of master data objects (users, OUs)
- <delimiter>: Delimiter for fields, e.g. ;
- <escapeMode>: Exception handling, if a character occurs which has to be escaped. Backslash or Duplicate, e.g. special character is quoted: dÁrtangnon or d"artangnon
- <commentchar>: Rows are ignored which start with this character.
- <charset>: All valid Java charsets (default: StringUtil.getCharset());
- <file>: Path to file.
- <columns>: Contains a set of rows which will be imported:
  <column name="name" startcol="1" endcol="10" length="100" [format="dateformat"] [mapping="mappingName"] />

- <dateformats>: A set of dateformats can be entered:
  <dateformat name="name" timezone="timezone" locale="locale"/>
  Example:

  ```
  <dateformats>
  <dateformat name="date">ddMMyyyy</dateformat>
  </dateformats>
  ```

- <mappings>: Definition of mappings in format *<mappings name="name"> <mapping*><keys><key>M</key></keys><value>1</value></mapping> </mappings>*.
  Example:

  ```
  <mappings>
  <mapping name="lang">
  <keys><key>EN</key></keys>
  <value>en_US</value>
  </mapping>
  </mappings>
  ```

File import with timer

In **@enterprise** is possible to define time-controlled file import. For this purpose it is necessary to define a timer. The class name of the timer is *com.groiss.fileimport.ImportTimer* and as a parameter you should enter a combination of the application ID and the id of the import (*<application_id>:<import_id>*). Import-ID corresponds to the following information in *import.xml*: <import name = "import-id"> ... <import>.
For example:

```
myappid:importid
```

Further information about timers and how to define one can be found in chapter 9.1.8.

9.3 Cluster

9.3.1 Cluster Monitor

A cluster is a set of **@enterprise** engines which share a common database schema and which are configured identically. The aim of this configuration is to provide enhanced availability and scalability. Further informations on clusters can be found in the Installation manual.

Informations about the cluster architecture of **@enterprise** can be found in the installation guide. The attributes of a cluster and node respectively are described there also.

9.3.2 Servers

This meta data object is still offered for the reason of downward compatibility to prior versions of **@enterprise**. There it has been relevant for the distribution mechanism.
Since version 6.1 **@enterprise** has a new so called *cluster architecture* and therefore the distribution mechanism is not used any longer. However, one server object is still required. It represents the current installation of an **@enterprise**–server. If this server is deleted accidentally it has to be inserted again with the attributes which are defined in the configuration file of **@enterprise**.

Hint: The port-settings on this mask are used for e.g. email notifications or if **@enterprise** is running in a load-balanced cluster enviornment. The port-settings for the operation of **@enterprise** must be set in *Configuration* of **@enterprise**.

9.4 DMS

9.4.1 Full-text search

The status of the full-text search may be administrated in the system configuration. There you can activate or deactivate the full-text search and if you are activating it, you may initialize it afterwards. Initialization must be done if you want to use full-text search for all documents and forms which were last amended while the full-text search was not active. The full-text search will be available for all forms and documents created or changed after the specified date (or for all if no date is specified).

Furthermore this function allows to update the stored information of changed name attributes of formtypes (table avw_formfieldvals). The discrepancy arises when the name attribute or name pattern of a formtype has been changed via administration.

9.4.2 Keywords

By clicking this link a HTML–page will be opened, where you can administrate a list of keywords. The entered keywords can be assigned to individual documents in the DMS (see User Manual). These keywords can be used in the document-search.

9.4.3 Search in Recycle Bins

With help of this function an administrator is able to search for all deleted DMS objects located in recycle bins of the users. For this purpose an **@enterprise** Reporting search mask is offered where following conditions can be defined:

- *Name:* The name of the document.
- *Deleted from* and *Deleted to:* Search for DMS objects which have been deleted within a certain period of time.
- *Recycle Bin of:* The entries found should be located in these users recycle bins.

- *Origin:* Definition of the origin storage location of the DMS–object (DMS–folder, process instance).
- *Form type:* The entries found should be of this form type.

The button/function *Executes* starts the search. The report result contains following columns:

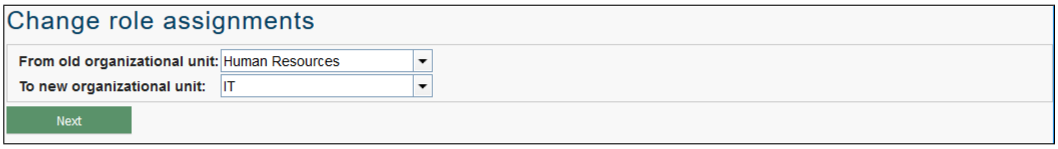
- *Name:* The name of the document; by activating the link the content of the document will be displayed (folders are not clickable).
- *Origin:* Tis column contains the information of the origin storage location of the DMS–object (DMS–folder, process instance).
- *Recycle Bin of:* The name of the user who is owner of the recycle bin.
- *Deleted at:* The column displays the date when DMS–object has been deleted/moved to recycle bin.
- *Form type:* This column lists the name of the document type.
- *Deleted with:* Information, if the element has been deleted directly or indirectly. Indirect means that a folder has been deleted and the element is part of this folder. In this case the element cannot be restored only: either the function *Cut* must be used or the appropriate folder must be restored.

In addition to the provided Reporting toolbar functions *Restore* and *Cut* are available.
Restore allows to restore selected DMS-objects to origin storage place, i.e. the DMS-objects are moved from recycle bin to origin storage place. If the origin storage place is not available anymore, an appropriate error will be displayed. In this case you have to use the toolbar function *Cut*.
The function *Cut* allows to restore the selected DMS-objects from recycle bin to an arbitrary storage place. For this purpose select the DMS-objects in the table, activate toolbar function *Cut*, move to an arbitrary DMS-folder and activate the toolbar function *Insert*.
For both functions the administrator must have the appropriate permissions, i.e. if the administration has no appropriate rights, e.g. to manipulate the content of a DMS folder, he will be informed when the function is executed!

9.5 Reorganize

9.5.1 Change role assignments

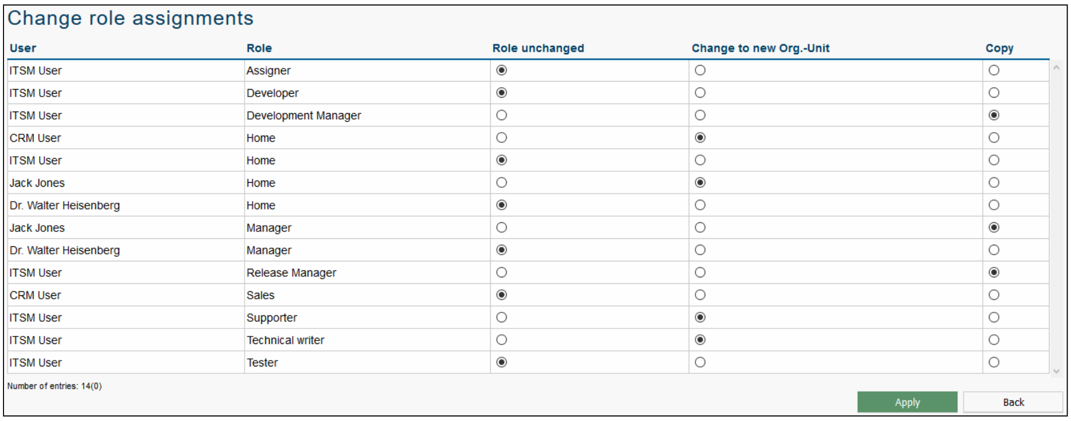
Change the role assignments of a set of users from one organizational unit to another.
Select in the field "from old Department" the organizational unit, from which you want to move or copy role assignments to another organizational unit (see Fig. 9.11).
After clicking "Next" you can select which role assignment should be moved, copied or remain unchanged.



Change role assignments

From old organizational unit:	Human Resources
To new organizational unit:	IT

Figure 9.11: **Role assignments (1)**



Change role assignments

User	Role	Role unchanged	Change to new Org.-Unit	Copy
ITSM User	Assigner	●	○	○
ITSM User	Developer	●	○	○
ITSM User	Development Manager	○	○	●
CRM User	Home	○	●	○
ITSM User	Home	●	○	○
Jack Jones	Home	○	●	○
Dr. Walter Heisenberg	Home	●	○	○
Jack Jones	Manager	○	○	●
Dr. Walter Heisenberg	Manager	●	○	○
ITSM User	Release Manager	○	○	●
CRM User	Sales	●	○	○
ITSM User	Supporter	○	●	○
ITSM User	Technical writer	○	●	○
ITSM User	Tester	●	○	○

Number of entries: 14(0)

Figure 9.12: **Role assignments (2)**

9.5.2 Analyze process instances

A list of process instances is shown, which have no valid agent. This case (no valid agent) can happen, when an organizational unit is deactivated, or role assignments are deleted. **Example:** An existing process will be finished, but has no valid following agent. The process instance occurs in the table with problem status *Finish not completed*. Now you can click on the process instance id to open the detail-view and assign an agent who is able to finish the task. For this purpose you have to activate the link of the last active agent to assign the task to a new agent. The 3 question marks (???) in the process-history symbolizes that the instance has no following agent; should not changed in this case, otherwise a new process instance will be created.

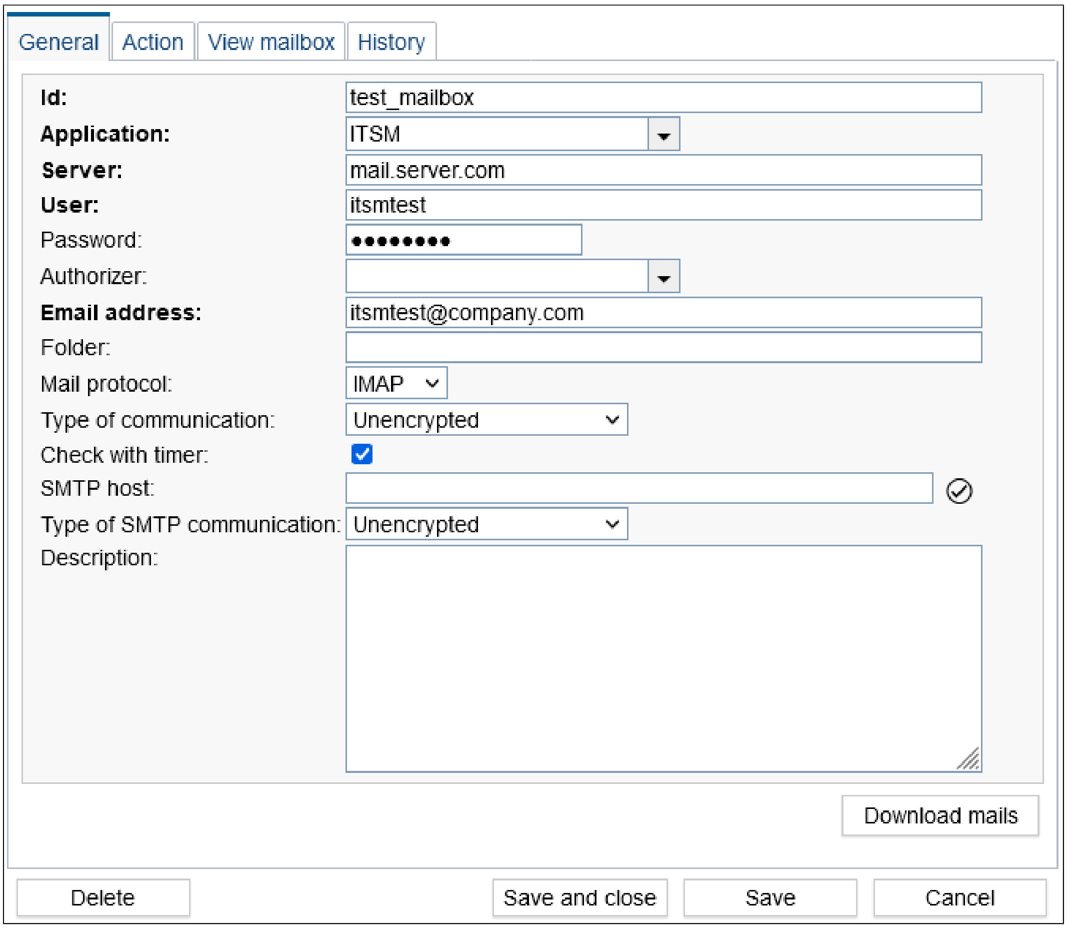
9.5.3 OU history

Here you can capture the history of changes to organizational units manually. This might be interesting if you want to know which organizational unit emanated from another during the process of changing your organizational structure.

9.6 *Communication*

9.6.1 Mailboxes

The system can handle incoming emails. Several mailboxes can be defined together with an action to perform for emails. Access to the mailboxes is performed with the IMAP4 protocol.



Id:	test_mailbox
Application:	ITSM
Server:	mail.server.com
User:	itsmtest
Password:	••••••••
Authorizer:	
Email address:	itsmtest@company.com
Folder:	
Mail protocol:	IMAP
Type of communication:	Unencrypted
Check with timer:	☑
SMTP host:	
Type of SMTP communication:	Unencrypted
Description:	

Figure 9.13: **Tab: General (Mailbox)**

Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** An unique id.
- **Application:** An application which the mailbox belongs to. The mailbox is listed in the mailbox-table of the appropriate application.
- **Server:** Mail server (in the form hostname or hostname:port).
- **User:** User name for the mailbox.
- Password: password for accessing the mailbox. Must stay empty if an authorizer is used.
- Authorizer: Email Authorizer. More information about Authorizers can be found in *Installation and Configuration* manual in section *OAuth 2.0 authentication*.

- **Email address:** the email address of the mailbox - is also used by the email tab of processes (tab definition is described in section 6.5.4).
- **Folder:** Accessed folder.
- Protocol: This parameter specifies the protocol, which is used to get your mails from your mail server. The possible options are IMAP and POP3.
- Type of communication: The level of security is set by this parameter. There are 3 possible options:
  - Unencrypted: Unencrypted communication means, that the data is transmitted in plain text.
  - Encrypted: In this case the data is SSL encrypted, but the certificate of the mail server will not be validated.
  - Trusted (with certificate): To communicate secure, the mail server has to authenticate itself to **@enterprise**. This is done by checking the certificate of the mail server. To add trusted server you have to import the certificate into the **@enterprise** keystore (chapter 9.1.14).
- Check with timer: The MailTimer reads the mailbox and performs the specified action. If a mail should be sent via mailbox, this parameter the parameters *SMTP host* and *Type of SMTP communication* need to be properly configured. Otherwise those will be ignored and the configuration parameters form *Administration/Configuration/Communicati* are going to be used!
- SMTP host: Server for outgoing emails (in the form hostname or hostname:port).
- Type of SMTP communication: The level of security is set by this parameter. There are 4 possible options:
  - Unencrypted: Unencrypted communication means, that the data is transmitted in plain text.
  - STARTTLS: The communication is encrypted using Transport Layer Security (TLS).
  - Encrypted: In this case the data is SSL encrypted, but the certificate of the mail server will not be validated.
  - Trusted (with certificate): Please see the same option by *Type of communication*.
- Description: Free text.
- Download mails: Performs the defined action on the contents of the mailbox. All emails of a mailbox are handled and if no error occurs for a message, the defined action is performed. For emails, which cannot be handled because of an error, an error message is thrown after processing all emails. Additionally detailed information of the erroneous emails is written to server log.

The tab *View mailbox* lists the contents of the mailbox.

Tab: Action

This tab contains the area *Common* and action details with following settings:

- **Restrict to these senders:** This field allows to define email addresses or patterns (separated by a new line). If defined, the mailbox action will be executed for these email senders only. If nothing is defined, the mailbox action will be executed always (depending on defined junk filter under *Configuration/Communication*. In all other cases the email is removed from the server without action.
  Examples:
  - *frequentis* - If email address contains string "frequentis", action will be executed
  - *frequentis.com - If email address contains string "frequentis.com" at the end, action will be executed
  - max.muster@* - If email address contains string "max.muster@" at the beginning, action will be executed
  - max.muster@frequentis.com - If email address contains exactly the string "max.muster@frequentis.com", action will be executed
- **Action:** One of following standard actions can be defined here which is executed, if an email has been received:
  - *Start a process:* If this action is selected, the entered *Process* will be started in given *Organizational Unit*, if no assignment via *Subject pattern* (see *Installation- and Configuration Guide* - section *Communication*) could be performed. If a *Receipt text* is entered, this text is send to the sender of the email automatically in case of an incoming email (only for new started processes).
  - *Customized action:* Specify a Java class which implements the interface com.groiss.mail.MailHandler2. The checkbox *Assign automatically to process* defines, if the email should be assigned automatically to the process according to *Subject pattern* (see *Installation- and Configuration Guide* - section *Communication*) before the defined action is performed.
  - *None*

9.6.2 Mail-Queue

Sometimes mail servers go down, this used to cause an error message to be prompted to the user and the notification to be lost. With mail queueing the messages remain in the queue until they are sent successfully.
An entry consists of following columns:

- Email: The mail object to send.
- Created at: The creation date of a mail queue entry which is used by the *MailQueueTimer* to check on the max. time for attempts to send. This max. time can be set with parameter *Max. time for mail queue item* under *Configuration/Communication*.

- Last attempt: If an error occurs during processing entry, the timestamp of the occurence will be stored. If no error occured, the entry will be removed from mail queue.
- State: The state message of mail queue entry is displayed. If a new entry has been created, the state *New* is set. If an error occurs, the appropriate error message is set as state. If no error occured, the entry will be removed from mail queue.
- Referenced object: If available, a referenced object is displayed which is could be an **@enterprise** Persistent. Generally a object of form type *Email* is displayed. The link opens the DMS folder in a new popup where object is stored.

The entries are handled generally by the *MailQueueTimer*, but can be processed with the toolbar function *Send now*. Following toolbar functions are available:

- **Show mail details:** If an entry is selected and this function activated, the details of the mail are shown.
- **Send now:** By selecting an entry and activating this function the mail of the queue entry is tried to send. If sending fails, the user will be informed and the appropriate state message will be written.
- **Delete:** The selected entries will be removed from mail queue with this function.
- **Delete incl. referenced object:** The selected entries will be removed from mail queue and the referenced object will be deleted with this function. If the referenced object is a process instance (or activity instance), the main process instance will be determined and aborted/archived!
- **Refresh:** This function refreshes the table.

Mail queue entries are created in various ways, e.g. via the user interface by using the compose window of the mail tab of an process instance. Furthermore the API *com.groiss.messaging.Message* provides methods to send mails. More details can be found in the *Application Development Guide*.

9.6.3 Mail journal

The mail journal is a protocol about all outgoing emails using a message template with active checkbox *Log message in journal* (see section 6.11.1). The mail journal is divided into 2 sections: the search mask and the result table.

The search mask allows to restrict the result. All fields are AND-related, excepting the fields *Process Id* and *Document name*: these 2 fields are OR-related, i.e. either entries with process context or entries with document context are listed. If no condition is entered and the button *Start search* is activated, all entries of the mail journal will be listed in result table.

The result table contains following columns:

- Subject: The subject of the message which has been sent.

- Sender: The sender of the message; generally the standard **@enterprise** mail sender or a alternative sender defined in the message template.
- Recipients, CC and BCC: A comma-separated list of recipients which received a message.
- Sent: The time when message has been sent.
- Context: The column contains the referenced object of sent message. In case of processes a link to the process detail is displayed, in case of a DMS object the name of the affected object with a link to the appropriate DMS folder is displayed.

✖ The toolbar function *Delete items in journal* allows to delete all entries created until the selected/entered date.

9.6.4 Authorizers

More information about Authorizers can be found in *Installation and Configuration* manual in section *OAuth 2.0 authentication*.

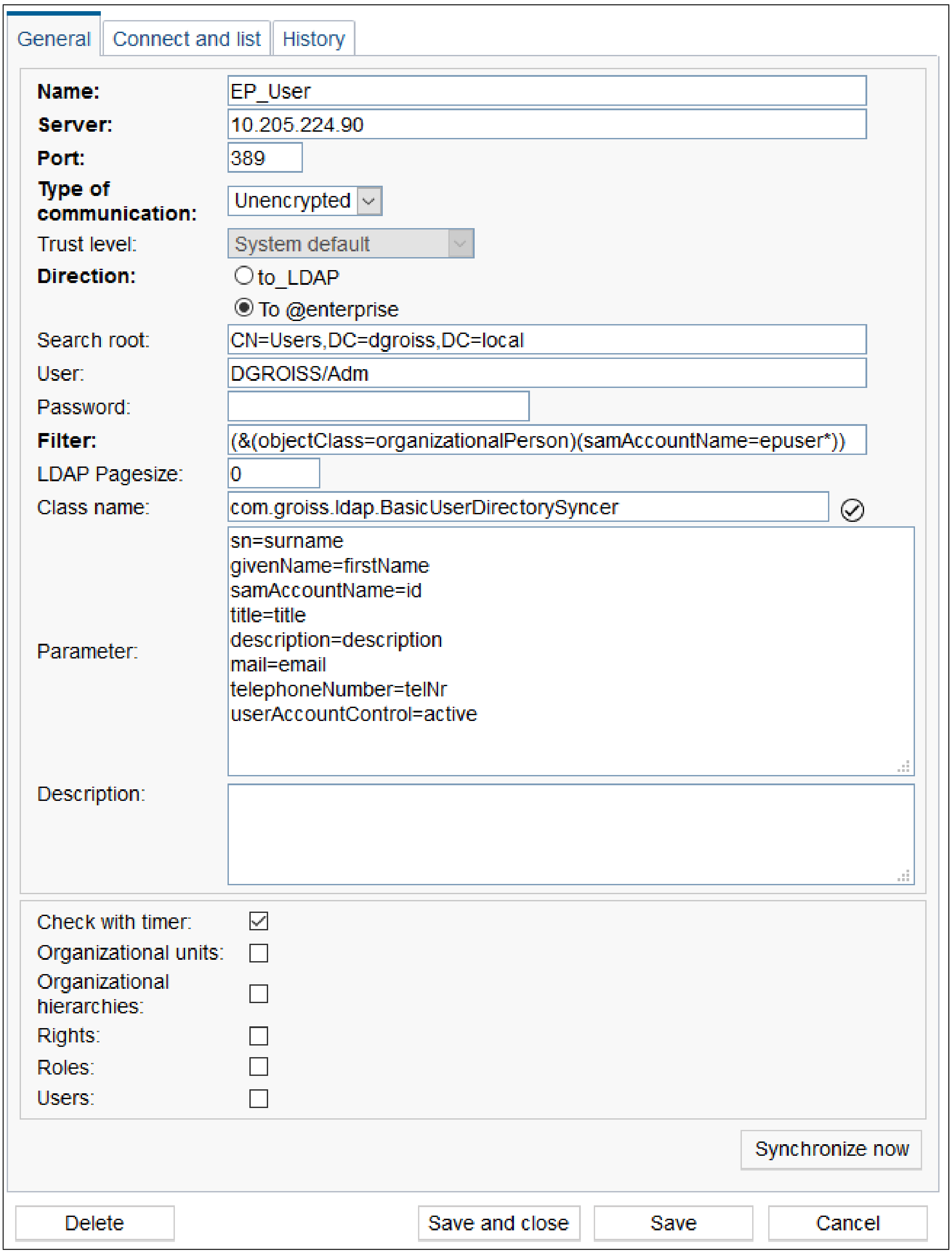
9.6.5 LDAP

Here you can define LDAP (Lightweigth Directory Access Protocol) server entries. They can be used to synchronize **@enterprise** organizational data with existing directory services. We provide a predefined LDAP schema and a corresponding mapping mechanism. Customer specific synchronization semantics can be implemented as well. Details for such mappings can be found in the programming manual.

Tab: General

You can edit the following attributes (required fields are bold):

- **Name:** Name of the Server
- **Server:** Hostname of the LDAP Server
- **Port:** Port of the LDAP Server. Usual ports are 389 (for unencrypted communication and STARTTLS) and 636 (for encrypted communication).
- **Type of communication:** One of the following communication types can be defined here:
  - *Unencrypted:* LDAP connection without encryption - this is the standard communication type.
  - *Encrypted:* The LDAP connection will be SSL–encrypted.
  - *STARTTLS:* This is an extension to plain text communication protocols, which offers a way to upgrade a plain text connection to an encrypted connection instead of using a separate port for encrypted communication.



Name:	EP_User
Server:	10.205.224.90
Port:	389
Type of communication:	Unencrypted
Trust level:	System default
Direction:	○ to_LDAP ● To @enterprise
Search root:	CN=Users,DC=dgroiss,DC=local
User:	DGROISS/Adm
Password:	
Filter:	(&(objectClass=organizationalPerson)(samAccountName=epuser*))
LDAP Pagesize:	0
Class name:	com.groiss.ldap.BasicUserDirectorySyncer

Parameter:	sn=surname
	givenName=firstName
	samAccountName=id
	title=title
	description=description
	mail=email
	telephoneNumber=telNr
	userAccountControl=active

Description:	

Check with timer:	☑
Organizational units:	□
Organizational hierarchies:	□
Rights:	□
Roles:	□
Users:	□

Figure 9.14: **Tab: LDAP**

- **Trust level:** To assure a secure transmission, the LDAP server has to authenticate itself against **@enterprise**. This is achieved by checking the LDAP server certificate. For communication types *Encrypted* and *STARTTLS* one of following trust levels must be selected:

  - *System default:* The standard trust mechanisms of Java is being used, this is appropriate when the certificate of the directory server is an official one. Recommended for production use.
  - *Blind:* No real check of server certificate, no check of hostname. While blind trust may be fine for development environments or initial tests, it is strongly discouraged to use it in a production environment.
  - *Certificate in truststore:* The **@enterprise** truststore is being used: if the certificate of the LDAP server has been explicitely imported to the key store (trust store) of **@enterprise**, it is being trusted, even if it is a self signed one.

- **Direction:** Direction of synchronization: either
  - To LDAP or
  - To @enterprise
- Search root: LDAP Root, e.g. *dc=my,dc=org*
- User: LDAP–Account, e.g. cn=admin,dc=my,dc=org
- Password: Password for the Account.
- **Filter:** LDAP Filter: allows to select just specific LDAP entries e.g.: (objectClass=*)
- LDAP Pagesize: with this parameter the results could be read in a paged way. Needed when the LDAP server imposes some limits on the number of returned entries.
- Class name: by specifying a class which implements com.groiss.ldap.DirectorySyncer, one can realize proprietary schema mappings. **@enterprise** offers a basic implementation for importing Active Directory users. For this purpose the class name *com.groiss.ldap.BasicUserDirectorySyncer* must be entered (see section *Active Directory Sync* below for more details).
- Parameter: Additional parameter for *Active Directory Sync* - see the correspondingly named section below for more details.
- Description: free text.
- Check with timer: if checked, the LDAPDirSyncTask-Timer executes the synchronization automatically.
- Organizational units: if checked, Organizational Units are synchronized.
- Organization hierarchies: if checked, Organization Hierarchies are synchronized.
- Rights: if checked, Rights are synchronized.
- Roles: if checked, Roles are synchronized.
- Users: if checked, users are synchronized.

The synchronization can also be carried out by clicking the **Synchronize Now** button.

Active Directory Sync

As mentioned above, **@enterprise** offers an implementation for Active Directory synchronization to import users. For this purpose the class *com.groiss.ldap.BasicUserDirectorySyncer* must be entered at field *Class name* and the definition of field mappings as lines of the form *LDAP-attribute name=Java field name* is necessary in field *Parameter*, e.g.:

```
sn=surname
givenName=firstName
samAccountName=id
title=title
description=description
mail=email
telephoneNumber=telNr
userAccountControl=active
```

Before a synchronization can be performed (by a timer or manually), a prototype user must be defined in **@enterprise**. This prototype user should be inactive. The ID of the prototype must be the name of the LDAP server object followed by the string *_prototype*, e.g. EP_User_prototype. The user rights, role assignments, user properties and the language of this user will be attached to each newly imported user. More information about the definition of a user can be found in chapter 4.3.

According to the entered search root all filtered LDAP objects are synchronized in the following way:

- If the user with the ID is not available in **@enterprise** and is inactive in Active Directory, it will not be imported.
- If the user with the ID is not available in **@enterprise** but exists in Active Directory, a new user in **@enterprise** will be created. The values from the fields in the Active Directory entry are used according to the field mapping and also the rights, role assignments, user properties and the language of the prototype user are being used.
- If a user in **@enterprise** exists which has not been imported from Active Directory, this user will be ignored.
- If a user in **@enterprise** exists which has been imported from Active Directory, the values according to field mapping would be taken. Only if discrepancies exists, the user in **@enterprise** will be updated.
- If an active user in **@enterprise** exists which has been imported from Active Directory, but is not available in the Active Directory anymore, the user in **@enterprise** will be deactivated.

The *active* field of the imported user will be set according to the *userAccountControl* attribute from the Active Directory. If the LDAP server is not an Active Directory, then the *userAccountControl* attribute will usually not be available. In this case, the imported user will be activated (since it exists in the LDAP tree).

For non Active Directory installations, any boolean LDAP attribute could be used to map the *active* field of the imported object. If no mapping for the *active* field is given, no activation is performed during import.

Tab: Connect and list

By choosing this tab, one gets a listing of the contents of the LDAP Server according to the defined search root and filter.

9.6.6 External Stores

Here you can define connections to external SQL Databases. Each configuration must have an unique ID and must be configured with the correct settings for the JDBC framework. The JDBC driver class, JDBC URL, username and password for the remote database must be specified. Please make sure that the corresponding database driver (JAR file) is in the class path.
Correctly defined data connections can be used directly from the **@enterprise** Query-Tool (see 9.1.15). Defined connections can be exported using the administration function *Export in XML* (further details are described in 9.2). In the programming manual, you can find further information about accessing the external databases via the API.

Tab: General

You can edit the following attributes (required fields are bold):

- **Id:** Unique ID of the database connection.
- JDBC Treiber Klasse: Class name of the JDBC driver. You can use the icon next to the field to check whether the name is correct and whether the driver is in the class path. Using the *JDBC Help page* (the question mark icon next to the field) you can import the class name and JDBC URL for all database systems supported in **@enterprise**Ẏou are not confined to DBMS which are supported as the main data store for **@enterprise**. Arbitrary JDBC-capable DBMS can be used here. For format of the connection information for such constellations, pleas consult the manuals of the target systems.

  You can find further information in the *Installation and Configuration* manual, in chapter *Extract and Install*.
- **JDBC URL:** A database connection URL appropriate for your DBMS. You can also set the field via the *JDBC help page*. Imported values have to be adjusted, additional information can also be found in the *Installation and Configuration* manual, in the *Extract and Install* chapter.
- Database Userid: User ID in the external database.
- Database password: User password in the external database.
- Query timeout: The query timeout option specifies the operation timeout interval in seconds.

- Description: Free text or the description of the database connection.
- Check connection: Activate this button to see whether the entered configuration is correct and whether the connection to the external database is working. Please note that the entry must be saved first!

9.6.7 WfXML

Wf-XML is a protocol for process engines that makes it easy to link engines together for interoperability. Wf-XML 2.0 is an updated version of this protocol, built on top of the Asynchronous Service Access Protocol (ASAP), which is in turn built on Simple Object Access Protocol (SOAP).
@enterprise contains an implementation of the standard. **@enterprise** can receive Wf-XML messages to start a process, get the current state of a process and change a process' state; and the system can also send all types of messages.

Detailed Information about this topic can be found in the *Application Development Guide* of **@enterprise**.

9.6.8 Local services

The link *Local services* provides a table of all found web services in **@enterprise**. It is possible to add a new web service, delete and (un)deploy it. The creation of web service clients/server is possible per application where the appropriate functions are available.

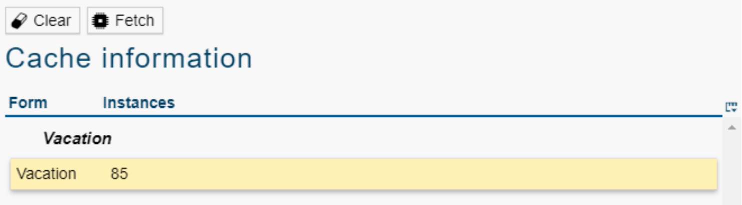
Detailed information about this topic can be found in the *Application Development Guide* of **@enterprise**.

9.7 Decision support

This section offers functions to assist the administrator keeping an eye on the machine learning part of the system.

9.7.1 Cache Information

It is possible to view information about the stored forms used for classifying. Also it is only possible to select whole process instances.



Cache information

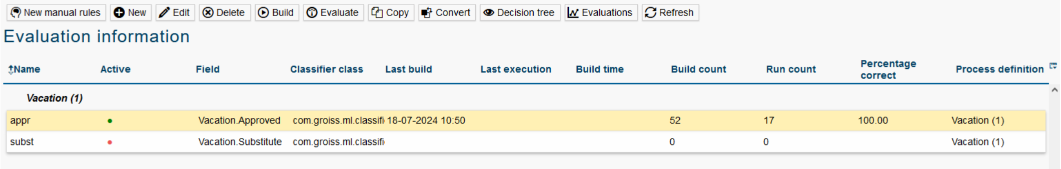
Form	Instances
Vacation	
Vacation	85

Figure 9.15: Cache Information

The toolbar actions allow the administrator to run the particular classifiers, remove the selected forms from the cache or fetch the forms related to the selected process instance. When the forms are already loaded to cache, they get fetched again and replace their old versions by selecting the appropriate table entry and execute the toolbar function *Fetch*.
It is worth mentioning that running the classifiers always imply fetching the necessary forms when they are not already in cache and removing them from cache afterwards.

9.7.2 Evaluation information

As it is interesting how the classifiers are performing, the evaluation can be shown in the administration interface. This includes for example the sensitivity (true positive rate) and the precision. It can be seen from the toolbar actions that it is possible to run the classifier related to the selected items. When a process definition gets selected, all classifiers belonging to it will be executed.



Evaluation information

↕Name	Active	Field	Classifier class	Last build	Last execution	Build time	Build count	Run count	Percentage correct	Process definition
Vacation (1)										
appr	●	Vacation.Approved	com.groiss.ml.classifi	18-07-2024 10:50			52	17	100.00	Vacation (1)
subst	●	Vacation.Substitute	com.groiss.ml.classifi				0	0		Vacation (1)

Figure 9.16: Evaluation information

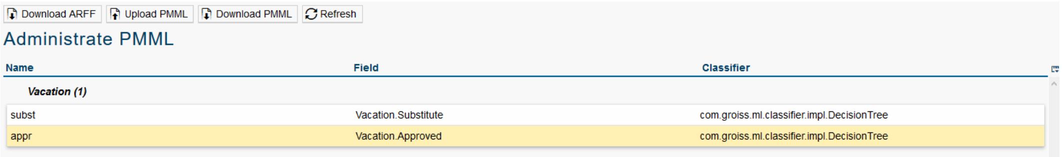
Toolbar functions

The toolbar functions are the same as mentioned in the process definition administration (see chapter 6.5.13), but extended by two additional ones:

- **Decision tree**
  This action is only available for tree classifiers as they can be shown in a meaningful way.
- **Evaluation**
  Using this action, some properties about the evaluation of the classifier can be seen. These include some metrics about each label (sensitivity, precision, . . .), a confusion matrix (shows classified values in contrast to actual ones) and the percentage of correctly classified instances.
- **Evaluations**
  Shows all evaluations made for the chosen classifier.

9.7.3 PMML administration

Using this function it is possible to import and export PMML models. Predictive models including some additional data can be stored in them. PMML models get stored in the XML format. A predefined structure has to be followed.



Administrate PMML

Name	Field	Classifier
Vacation (1)		
subst	Vacation.Substitute	com.groiss.ml.classifier.impl.DecisionTree
appr	Vacation.Approved	com.groiss.ml.classifier.impl.DecisionTree

Figure 9.17: PMML Administration

Toolbar functions

There are various toolbar functions available for the given classifier assignments.

- **Download ARFF**
  All instances represented by the given classifier assignment will be stored in the Attribute-Relation File Format (ARFF). This could be used to train a model using external tools.
- **Upload PMML**
  This function is only available when the used classifier is able to import a model given as in PMML. To do so it has to implement the interface PMMLImportable. It allows the administrator to upload a model which could be built by another tool.
- **Download PMML**
  This action allows the user to download the trained model in PMML. Exporting and downloading the model is only possible when the related classifier implements the interface PMMLExportable.

10 Configuration

This chapter describes the configuration of **@enterprise**–server. Further information about

- License
- HTTP server
- Database
- Directories
- Logging
- Classes
- Localization
- Communication
- Cluster
- Workflow
- DMS
- Search
- Tuning
- Security
- Password policy
- Calendar
- Process cockpit
- Decision Support
- Other parameters
- Change administrator password
- Style configurator

are available in the *Installation Guide - Chapter Configuration*.

11 Dashboard

In the system administration of **@enterprise** it is possible to create a dashboard, which an be aligned for the needs of the system administrator or user. After activating the link *Dashboard* under *Admin-Tasks* initially an empty site appears with following toolbar functions:

11.1 New

By activating the button *New* a new dialog will be shown, where you can add new windows to the dashboard. Several possibilities are provided:

- URL: Enter an URL of a HTML–site, which you would like to see in a window on your dashboard and confirm your inputs with *Return*.
- Reports: By activating this link all stored reports will be shown in a table. Select an entry and activate button *Ok* to add the query to dashboard.
- Calendar: By activating this link a calendar will be shown in a window on your dashboard.
- Worklist overview: By activating this link an overview about the number of worklist entries will be shown in a window on your dashboard.
- Appointments: By activating this link the appointments of the present day will be shown in a window on your dashboard.
- News: By activating this link news will be shown in a window on your dashboard. Therefor a folder with the name *News* under *Common* must be created in the DMS, where messages can be lodged (e.g. a note).

Note: Each window in a dashboard can be moved (like in Windows) to any place inside the dashboard and/or be changed in its size.

11.2 Open

By activating the button *Open* an existing dashboard profile can be loaded. First the profile must be stored with the function *Save*. There are 2 kinds of dashboards: the personal and other dashboard(s). The personal dashboard list contains all dashboards, which are stored by the current user. Other dashboards has been stored by other users which have set the *share*-right for the current user (via tab *Access*).

11.3 Save

By activating the button *Save* the current dashboard will be saved. A new dialog will be opened with following attributes:

- **Name:** The unique name of the dashboard must be entered here.
- *Save as:* This checkbox allows to store the current dashboard under a new name. If a user changes the dashboard by activating the buttons *New* and *Save*, it will be his personal dashboard and the Default–Dashboard remains unchanged. The user has the possibility to open an existing (default) dashboard profile by using the function *Open*. The identification is made by the URL parameter *id*.
- *Description:* Free text
- *Default:* Select between
  - Dashboard <dashboard-id> for <user>: Dashboard settings are stored for current user as default.
  - Dashboard <dashboard-id> for all users: Dashboard settings are stored for all users as default. If a user has no own dashboard, this dashboard will be displayed.
- *Columns:* This attribute allows the definition of columns which means how many dashboard windows can be placed in one row. The default setting is 2 rows.
- *Owner:* This field is read-only and shows the owner of this dashboard.
- *Dashboard-Id:* This field is also read-only and shows, if the dashboard is/was created in worklist (user) or in administration (admin) of **@enterprise**. With this mask dashboard with id *admin* can be created only.

It is also possible to define *share*-rights by using the tab *Access*. In this case other users are permitted to open this dashboard (see function *Open*).

11.3.1 Delete

This button deletes the current dashboard settings (dashboard profile). After deleting a dashboard, the default dashboard is displayed, if none is available then a blank page.

12 Administration Shell

This chapter describes the administration shell which allows to administrate **@enterprise** via a command line. It can be used to:

- Assemble administration actions as a script and execute it on several servers
- Synchronize changes between development system and production system
- Send a script to a system operator
- Document actions

12.1 Architecture and invocation

The administration shell has a client and a server component. The server component is integrated into the **@enterprise** server. The client component is packaged in a separate jar file *adminshell.jar* in the *bin* directory of **@enterprise**. The client connects to the **@enterprise** server via plain HTTP or secure HTTPS. This can be configured on the configuration mask *Communication*. The administration shell must be activated via the hidden parameter *ep.adminshell.enable*. More details can be found in the *Installation- and Configuration-Guide*. Please note that the operating user needs the right *execute* on all objects for the connection to the server! Furthermore the user needs the corresponding rights for perform the server commands.

The admin-shell client can be invoked with the following call:

```
java -jar adminshell.jar url user [password]
 [-log logfile | -append logfile] [-passwdfile file] [-execute scriptfile]
```

Parameters:

- **url:** The URL of the server, e.g. *http://localhost:8380/wf/*. If no context-root is entered, *wf* will be used by default.
- **user:** The username of the operating user
- **password:** The password of the user (if existing). If you do not specify a password, you must use the option *-passwdfile* or you will be asked for the password at the login.

Options:

- **-log logfile:** The logfile defines a file where the admin-shell logs the interactions (on the client).
- **-append logfile:** Same as *-log* except that the logfile is appended to.
- **-passwdfile file:** The file contains the plain password for the given user in the first line without any preceding and trailing characters.
- **-execute scriptfile:** Executes the script in scriptfile.

12.2 Commands

Two groups of commands can be executed:

1. **Client commands** are executed on the client and define some behavior of the script client.
2. **Server commands** are executed on the server and contain the functions of the administration.

12.2.1 Client commands

Following client commands are available:

- **exit**: Exits the client.
- **help** or **?**: Print a command summary
- **log <file>**: Log commands to the given file
- **log off**: Commands are not logged anymore
- **append <file>**: Log commands to the given file. If the file already exists, commands are appended.
- **execute <file>**: Executes the given script file

Commands not in this list are sent to the server.

12.2.2 Server commands

The commands on the server are interpreted as Groovy expressions. Groovy is a script language based on Java. Comments have the same syntax as in Java (inline- and block-comments). Server commands are terminated by a line containing only the character . (dot) and will be logged in serverlog at loglevel 1 and higher.

The following variables are in the initial context (varname and instance of):

- **admin**: com.groiss.server.Admin

- **store**: com.groiss.store.Store
- **engine**: com.groiss.wf.WfEngine
- **dms**: com.groiss.dms.DMS
- **orgdata**: com.groiss.org.OrgData
- **config**: com.groiss.component.Configuration (the System Configuration)
- **user**: com.groiss.org.User (the current user)
- **session**: javax.servlet.http.HTTPSession (the HTTPSession)

They can be used as starting points for the execution of methods (see API for details). Every command is executed in its own transaction. After executing, a commit, if an error occurs, a rollback is performed.

If you want to use (own) variables for the script, you can define them with the command:

```
set(varname,value);
```

Retrieve the value of the variables with:

```
get(varname);
```

Own declared variables have the advantage to survive transactions, because they are written into the session.

12.3 Examples

12.3.1 Setting a configuration parameter

```
config.setProperty("database.connections",5);
config.store();
.
```

Alternative formulation with a variable:

```
set("connections",5);
.
config.setProperty("database.connections",get("connections"));
config.store();
.
```

12.3.2 Restart the server

```
admin.restartServer(); //restarts the server - no login necessary for current user
.
```

12.3.3 Add a role to or remove one from a user

```
u = orgdata.getById(com.groiss.org.User.class,'my_user'); //replace by existing user
role = orgdata.getById(com.groiss.org.Role.class,'sys'); //get SYS role
checkuserrole = store.get(com.groiss.org.UserRole.class,"role = ? AND userid = ?",
  role.getOid(), u.getOid()); //with prepared statements - new Object[] {args}
//If User has no sys-role, add it
if(checkuserrole == null) {
 userrole = orgdata.createUserRole();
 userrole.setRole(role);
 userrole.setUser(u);
 userrole.setActive(true);
 orgdata.insert(userrole);
}
//If User has sys-role, remove it
else {
 orgdata.delete(checkuserrole);
}
.
```

12.3.4 Set the interval of a timer

```
t =  orgdata.getById(com.groiss.timer.TimerEntry.class,'Suspension');
t.setPattern("360");
store.update(t);
.
```

12.3.5 Worklist handling

Check worklist of application *default* and finish expired tasks:

```
appl = orgdata.getById(com.groiss.org.Application.class, "default");
worklist = engine.getWorklist(appl,true);
for(com.groiss.wf.ActivityInstance ai:worklist) {
 duedate = ai.getDuedate();
 //if ai's duedate is expired, finish task
 if(duedate != null && duedate.getTime() < new java.util.Date().getTime()) {
  try {
   engine.finish(ai);
  }
  catch(ex) {/*Do nothing, but continue with finishing other ai's*/};
 }
}
.
```

12.3.6 Session handling

Check session and invalidate it, if lastAccessed is not in tolerance time. Log session information in server-log on level 2:

```
attrbnames = session.getAttributeNames();
invalidate = false;
log = " \n";
log = log + "Session-Parameter:\n";
for(String attrname:attrbnames) {
 attrvalue = session.getAttribute(attrname);
 if(attrname.equalsIgnoreCase("lastAccessed")) {
  if(attrvalue instanceof java.util.Date) {
   onehour = 60*60*1000; //tolerance time
   //invalid, if not in tolerance time
   if((attrvalue.getTime()+onehour) >= new java.util.Date().getTime() ||
      (attrvalue.getTime()-onehour) <= new java.util.Date().getTime()) {
    invalidate = true;
   }
  }
 }
 log = log + "Attribute-Name: " + attrname + "/Attribute-Value: " + attrvalue + "\n";
}
log = log + " ";
com.groiss.util.Settings.log(log,2); //write all session parameter to Server-Log on Level 2
if(invalidate == true) {
 session.invalidate();
}
.
```

13 Restricted administration

@enterprise offers beside the full-version of administration also a restricted one where users and org-units are administrable only. For this purpose the role *User administrator* is available which contains following rights:

- **Administration**
- **Execute objects** for org-units (hierarchically in role-ou)
- **Execute objects** for role *Home*
- **Create objects** for org-units and users (hierarchically in role-ou)
- **Edit objects** for org-units and users (hierarchically in role-ou)
- **Edit objects** for organizational hierarchies (dept trees)
- **Delete objects** for org-units and users (hierarchically in role-ou)

This bunch of rights allows to administrate users and org-units

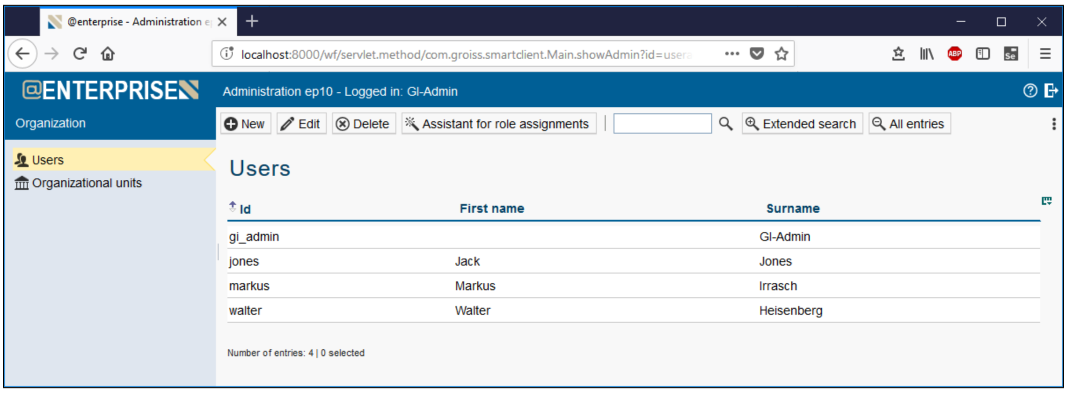
- in the org-unit where home-role of current logged-in user is assigned and
- in all org-units which are placed in organizational hierarchy beneath the current org-unit (= sub org-units).

These org-units must be part of organizational hierarchy *default*!
If the user has assigned home- and useradmin-role in the same org-unit, the restricted administration will be displayed after login, i.e. the gui-configuration with id *useradmin* will be loaded (no other administration rights must be assigned, e.g. sys-role!).

13.1 User

The administration of users is analog as described in section 4.3, but with some restrictions/differences:

- When creating a user via toolbar function *New* a simplified mask is displayed first. After entering the necessary fields and activating the button *Create*, a user object will be created with role assignment *home in the org-unit of the current logged-in user*.


@enterprise - Administration e
localhost:8000/wf/servlet.method/com.groiss.smartclient.Main.showAdmin?id=user
@ENTERPRISE
Administration ep10 - Logged in: GI-Admin
Organization
Users
Organizational units
New
Edit
Delete
Assistant for role assignments
Extended search
All entries

Users

Id	First name	Surname
gi_admin		GI-Admin
jones	Jack	Jones
markus	Markus	Irrasch
walter	Walter	Heisenberg

Number of entries: 4 | 0 selected

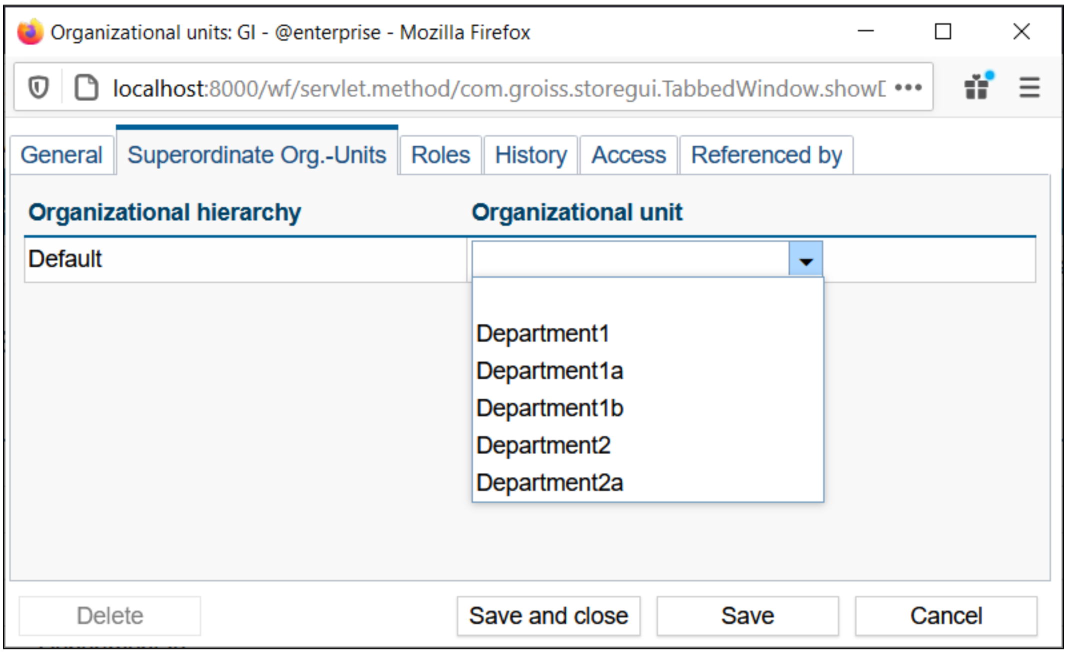
Figure 13.1: **Restricted administration**

- In role assignment the adaption of org-units is possible only, i.e. only sub org-units are selectable. If the role assignment *home* is deleted, the administrator of restricted administration is not able to edit or delete this user object anymore!
- The definition of substitutes or other permissions is not possible.

13.2 Organizational units

The administration of org-units is analog as described in section 4.4, but with restrictions/differences:

- When creating an org-unit via toolbar function *New* a simplified mask is displayed first. After entering the necessary fields and activating the button *Create*, a org-unit object will be created. The new org-unit will be inserted in organizational hierarchy beneath the org-unit of the current logged-in user.
- The tab Superordinate organizational unit allows to change the org-unit, i.e. the position in organizational hierarchy can be changed here. Only following org-units are selectable:
  - the org-unit where home-role of current logged-in user is assigned
  - all org-units which are placed in organizational hierarchy beneath the current org-unit (= sub org-units).



Organizational units: GI - @enterprise - Mozilla Firefox
localhost:8000/wf/servlet.method/com.groiss.storegui.TabbedWindow.show[
General
Superordinate Org.-Units
Roles
History
Access
Referenced by
Delete
Save and close
Save
Cancel

Organizational hierarchy	Organizational unit
Default	

Department1
Department1a
Department1b
Department2
Department2a

Figure 13.2: **Restricted administration - tab *Superordinate organizational unit***