Version

2.5

CMDBuild®

» Workflow Manual

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ENG

CMDBuild ® uses many great technologies from the open source community:
PostgreSQL, Apache, Tomcat, Eclipse, Ext JS, JasperReports, IReport, Enhydra Shark, TWE, OCS Inventory, Liferay, Alfresco, GeoServer, OpenLayers, Prefuse, Quartz, BiMserver.
We are thankful for the great contributions that led to the creation of these products.

CMDBuild ® is a project of Tecnoteca Srl. Tecnoteca is responsible of software design and development, it's the official maintainer and has registered the CMDBuild logo.

In the project also the Municipality of Udine was involved as the initial customer.

The official website is http://www.cmdbuild.org

Contents

Introduction....4
CMDBuild modules....4
Available documentation....5
Description of the workflow system....6
General Information....6
Purposes....6
Used tools....6
Terminology....7
Refactoring 2.0....8
Implementation method....10
Workflows as special classes....10
Building the workflow....10
Defining a new process....11
Initiation and progress of a process....12
Interaction of the workflow with external tools....14
General Information....14
Start of a process from an intranet portal via CMDBuild GUI Framework....14
Example of configuration of a new process....16
General Information....16
Description of the RfC process used as example....16
Phase 1 – Items creation in CMDBuild....17
Phase 2 – Configuration of the flow with TWE....23
Phase 3 – Importation of the XPDL file in CMDBuild....26
Phase 4 – Implementation of the process from CMDBuild....27
Widgets prompted to use in the user activities of the workflow....36
Widget list....36
API prompted to use in the automatic activities of the workflow....44
General Information....44
Key words....44
Management of CMDBuild items....44
Access methods to CMDBuild....47
Methods for types conversion....58
Appendix: Documentation to use TWS 2.3....60
Foreword....60
Automatic methods used in the workflow....60
Template automatic methods usable in the workflow....67
APPENDIX: Glossary....69

Introduction

CMDBuild is an Open Source web application designed to model and manage assets and services controlled by the ICT Department, therefore it handles the related workflow operations, if necessary according to ITIL best practices.

The management of a Configuration Database (CMDB) means keeping up-to-date, and available to other processes, the database related to the components in use, their relations and their changes over time.

With CMDBuild, the system administrator can build and extend its own CMDB (hence the project name), modeling the CMDB according to the company needs; the administration module allows you to progressively add new classes of items, new attributes and new relations. You can also define filters, "views" and access permissions limited to rows and columns of every class.

CMDBuild provides complete support for ITIL best practices, which have become a "standard de facto" by now, a non-proprietary system for services management with process-oriented criteria.

Thanks to the integrated workflow engine, you can create new workflow processes with external visual editors, and import / execute them inside the CMDBuild application according to the configured automatisms.

A task manager integrated in the user interface of the Administration Module is also available. It allows to manage different operations (process starts, e-mail receiving and sending, connector executions) and data controls on the CMDB (synchronous and asynchronous events). Based on their findings, it sends notifications, starts workflows and executes scripts.

CMDBuild includes also JasperReports, an open source report engine that allows you to create reports; you can design (with an external editor), import and run custom reports inside CMDBuild.

Then it is possible to define some dashboards made up of charts which immediately show the situation of some indicators in the current system (KPI).

CMDBuild integrates Alfresco, the popular open source document management system. You can attach documents, pictures and other files.

Moreover, you can use GIS features to georeference and display assets on a geographical map (external map services) and / or an office plan (local GeoServer) and BIM features to view 3D models (IFC format).

The system includes also a SOAP and a REST webservice, to implement interoperability solutions with SOA.

CMDBuild includes two frameworks called Basic Connector and Advanced Connector, which are able - through the SOAP webservice - to sync the information recorded in the CMDB with external data sources, for example through automatic inventory systems (such as the open source OCS Inventory) or through virtualization or monitoring systems.

Through the REST webservice, CMDBuild GUI Framework allows to issue custom webpages on external portals able to interact with the CMDB.

A user interface for mobile tools (smartphones and tablets) is also available. It is implemented as multi-platform app (iOS, Android) and linked to the CMDB through the REST webservice.

CMDBuild modules

The CMDBuild application includes two main modules:

- the Administration Module for the initial definition and the next changes of the data model and the base configuration (relation classes and typologies, users and authorization, dashboards, upload report and workflows, options and parameters)
- the Management Module, used to manage cards and relations, add attachments, run workflow processes, visualize dashboards and execute reports

The Administration Module is available only to the users with the "administrator" role; the Management Module is used by all the users who view and edit data.

Available documentation

This manual describes the workflow process included in the CMDBuild application, through which you can configure (Administration module) and run (Management Module) processes for the management of collaborative activities.

You can find all the manuals on the official website (http://www.cmdbuild.org):

- system overview ("Overview Manual")
- system administration ("Administrator Manual")
- system usage (“User Manual”)
- installation and system management ("Technical Manual")
- webservice details and configuration (“Webservice Manual”)
- connectors to sync data through external systems (“ConnectorsManual”)

Description of the workflow system

General Information

In order to support ITIL methodological indications, CMDBuild is able not only to manage the update of the asset inventory and their functional relations, but also to enable the definition and control of the processes for IT service management.

A process includes an activity sequence, carried out by operators and/or computer applications, every application represents an operation that has to be carried out within the process, related, in this case, to the IT asset management with quality criteria.

Given the amount of processes options, the organizational procedures and the flexibility pursued by the CMDBuild project, we chose not to implement a series of rigid and predefined processes, but a generic workflow engine to model processes case-by-case.

In the first part of this document you wil find general concepts and basic mechanisms implemented in the system with the CMDBuild 2.0 refactoring.

In the second part there is a sample of simplified workflow, described in its configuration steps.

In the third part, you will find the technical tools available for the configuration of a workflow: widgets definition, description of API functions which can be used in the scripts for the definition of automatisms, performed in the workflow.

In appendix there is the specified technical documentation of the workflow system used until CMDBuild 1.5, whose compatibility is maintained also in CMDBuild 2.0; it will be discarded as soon as possible.

Purposes

The workflow management system is an important feature of CMDBuild and provides:

- a standard interface for users
- a secure update of the CMDB
- a tool to monitor provided services
- a repository for activities data, useful to check SLA

ITIL processes, which can be configured in CMDBuild, include: Incident Management, Problem Management, Change Management, Configuration Management, Service Catalogue Management, etc.

Other workflow types concern asset movement, entry of new staff, activation of new work projects, ect.

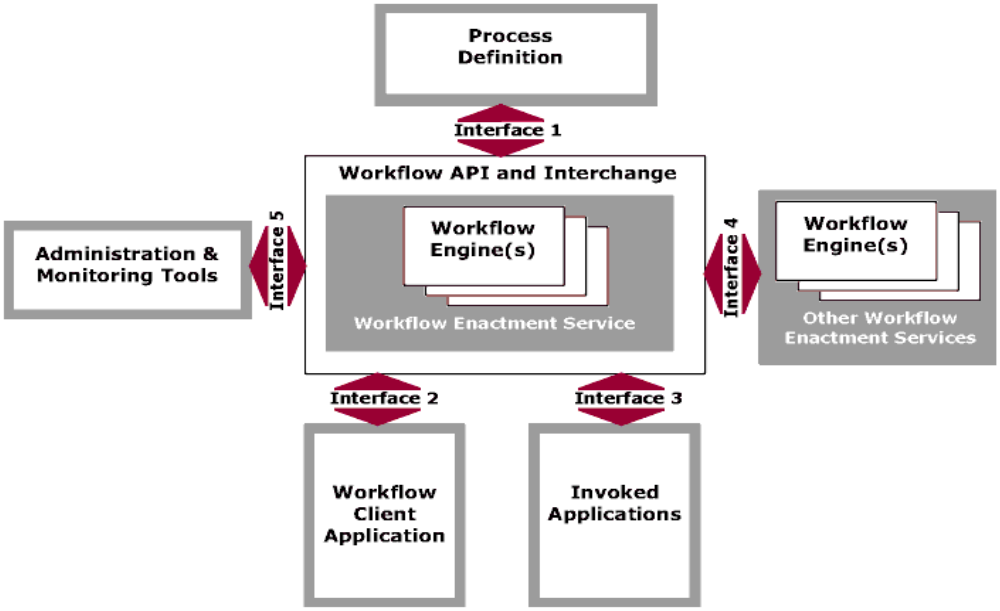
Used tools

The application chosen for the workflow management uses the following tools:

- XPDL 2.0 (http://www.wfmc.org/xpdl.html) as definition language (standardized from WfMC, WorkFlow Management Coalition according to the model as follows)
- open source TWS Together Workflow Server 4.4 engine (http://www.together.at/prod/workflow/tws), an extensible framework for a complete and standard implementation of the specific WfMC (http://www.wfmc.org/) and OMG, using XPDL as a native language
- the graphical editor TWE Together Workflow Editor 4.4 (http://www.together.at/prod/workflow/twe) for the workflow design and for the definition of

integration mechanisms with CMDBuild

The following schema shows the workflow management according to the model standardized with the WfMC.



Terminology

The following "vocabulary" includes the following terms:

- process: sequence of steps that realize an action
- activity: workflow step
- process instance: active process created executing the first step
- activity instance: creation of an activity, accomplished automatically or by an operator

The above terms are arranged into CMDBuild as follows:

- each process is related to a special class defined by the Administration Module under the heading "Processes"; the class includes all attributes of the scheduled activities
- each "process instance" corresponds to a card of the "process" class (current activity), combined with the list of its versions (ended activities)
- each activity instance corresponds to a card of the "process" class (current activity) or to a historicized version (ended activity)

Each process has a name, one or more participants, some variables and a sequence of activities and transitions which carry out it.

The process status can be:

- “active”, i.e. it is still in an intermediate activity
- “complete”, i.e. it ends its activity
- “aborted”, i.e. unnaturally terminated
- “suspeded”, i.e. maintained only for retrocompatibility with workflow system until CMDBuild

1.5

Each activity can be distinguished by:

- a name
- a performer, which necessarily corresponds to a "user group" and optionally to an operator
- a type: process start, process ending, activity performed by an operator, activity automatically carried out by the system
- any attributes coming from CMDBuild or inside the workflow, which will be set during its implementation
- any widgets (visual controls of some predefined typologies) that will be activated during its implementation
- a script (in the Beanshell, Groovy or Javascript languages), provided in the automatic activities, through which the operations between an user activity and the following can be carried out

Refactoring 2.0

With the 2.0 release we revised the workflow system, with upgrade to Together Workflow Server 4.4, 2.0 XPDL standard adoption, full support in CMDBuild to the native parallelism in the flow and important performance improvements.

In order to simplify the writing we decided to provide a different definition modality of the automatic activities, supporting the scriptwriting and excluding the use of "tools", available in the previoius version of CMDBuild.

The scripts can be written in the BeanShell, Groovy or Javascript language and can use API functions provided for the definition of automatisms (manipulation of process variables, card creation and relations in CMDB, e-mail sending, report creation, etc).

The adoption of the new workflow system implies the lost of the retrocompatibility with workflows developed up to the present day.

In order to grant longer period for the migration of the old workflows to the new adopted solutions we decided to maintain in CMDBuild 2.0 the possibility to work - alternatively - both with Together Workflow Server 2.3 (the version used until CMDBuild 1.5, based on XPDL 1.0) and with the new version Together Workflow Server 4.4 (based on XPDL 2.0).

Then the adopted solution allows:

- new CMDBuild users to work with the new Together Workflow Server 4.4 and with the new functionalities developed in the version 2.0 (native parallelism, automatisms configured through scripts)
- old users to split the migration into two steps:
    1. to activate the 2.0 version immediately to make use of the new dashboards and other implemented functionalities, maintaining Together Workflow Server 2.3 active (with improved performances)
    2. to commute to Together Workflow Server 4.4 just after the test of the new environment on the test instance, when the conversion tool is available.

The support tool to the workflows migration developed with the previous CMDBuild versions will be then released.

It is advisable to migrate in a short time, since the double CMDBuild compatibility with Together

Workflow Server 2.3 (XPDL 1.0) and Together Workflow Server 4.4 (XPDL 2.0) will be maintained for a limited period.

Implementation method

Workflows as special classes

The mechanisms for the workflow management are implemented in CMDBuild through concepts and procedures entirely consistent with the mechanisms already in the system for the management of the cards.

The workflow management includes:

- “special” Process classes; each corresponds to a type of workflow
- attributes, corresponding to the information presented (for read or write) in the forms which manage the realization of each single step of the process
- relations with other process instances or standard cards involved in the process
- users' groups, that will be able to perform every activity, coinciding with CMDBuild users' groups
- special tools for customizing the behavior of the workflow (widgets and scripts written with proper APIs)

Within the same homogeneity criteria between "normal" and "process" classes, we adopted the following technical tactics:

- the new "confidential" superclass called "Activity" contains some attributes shared with specific workflows, whose workflows are underclasses
- the "history" mechanism was used to draw the progress reports of a process
- the "relations" mechanism has been kept to create automatic or manual links between a card and a process instance, or between two process instances

Building the workflow

The tools usable through the workflow visual editor are of utmost importance in enabling the design of complex processes, and include:

- the choice of those attributes which can be placed on each form corresponding to a user activity
- the choice of those widgets (visual controls) which can be placed on each form corresponding to a user activity (viewing or creating or editing cards, viewing or creating relations, single or multiple selection of cards, upload of the attached files, implementation of reports)
- flow-control mechanisms, among them parallel activities and subprocesses
- scripting language (BeanShell, Groovy or Javascript) for the definition of those automatisms which must be carried out between a user activity and the following
- API functions which can be called in the scripts

If you are interested in the documentation of further mechanisms used in the workflows, developed for CMDBuild versions until 1.5 (and supported in CMDBuild 2.0 if you use Together Workflow Server 2.3), see the documentation in Appendix (dedicated to the presentation of basic tools and to the mechanism which defines the custom tool through proper templates).

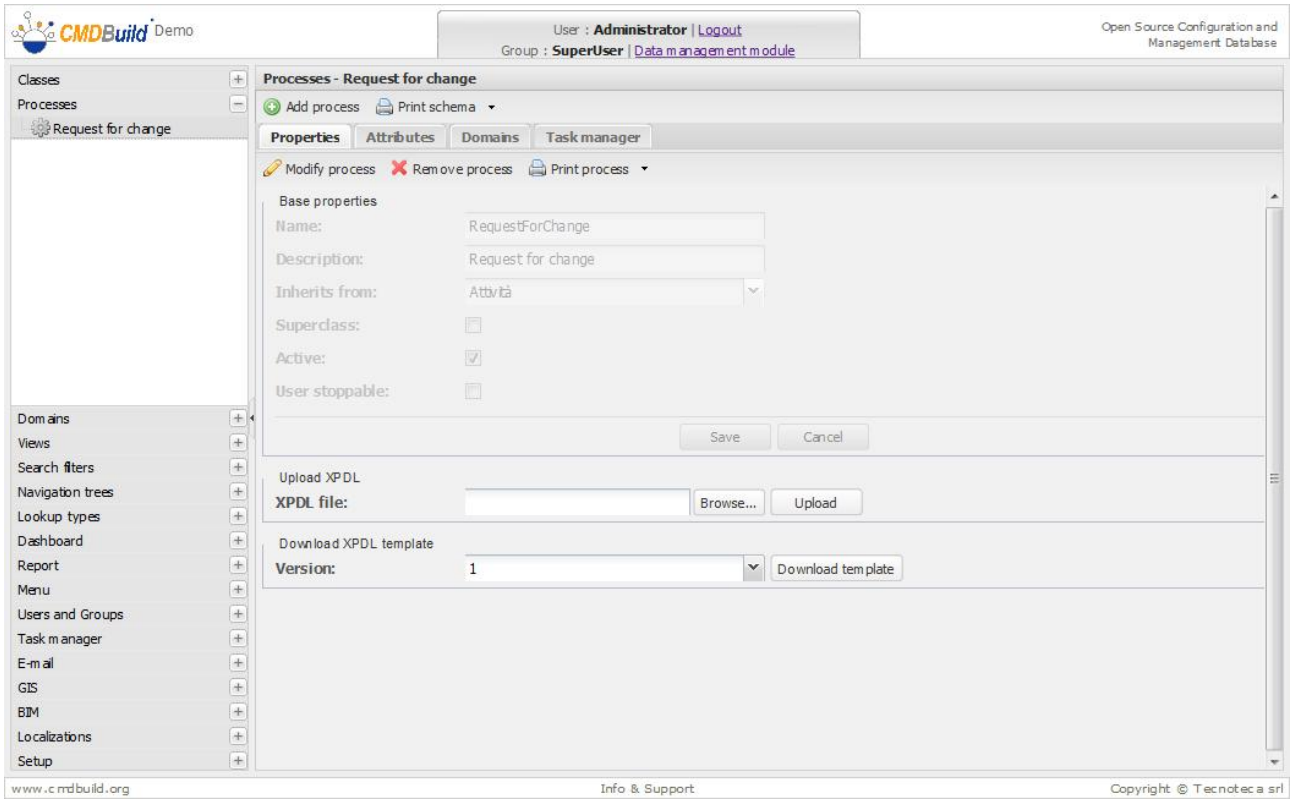
Defining a new process

To create a new "Process" class, you should follow the next logic sequence of passages:

- analysis of the new process which has to be implemented, in order to single out:
  - list of the users' groups involved in the process
  - workflow: user activities, automatic activities, transition conditions, etc
  - descriptive attributes of the process in its user activities and the related typologies (strings, integer, etc) and the presentation mode (read-only, reading and writing, possible compulsoriness)
  - predefined lists of values required for the creation of "Lookup" attributes
  - domains required to deal correlations between the new process and other classes or other pre-existing processes (which might also be used to create the "Reference" attributes)
  - widgets to configure in every user activity
  - widgets to configure in every automatic process activity
- creation of the new process class, which will be defined in the "Processes" section of the CMDBuild Administration Module, complete of:
  - specific attributes identified in the previous step
  - domains identified in the previous step
- creation of missing users' groups, that should be added through the Administration Module
- through the Administration Module (from the “XPDL” TAB available for each “Process” class) export of the new process template, which includes:
  - process name
  - list of process attributes, that will be placed in the various user activities
  - list of "actors" (users) that interact with the process (the "System" role is automatically created to position system activities)
- design of detail flow of the workflow using the TWE external editor, which will help the completion of the template exported by CMDBuild
- save, using the special functions of TWE external editor of the XML file (to be exact XPDL 2.0) corresponding to the designed process
- import of the process schema in CMDBuild, using the special “XPDL” TAB, available under the heading "Processes" in the Administration Module

Once concluded the operations described above, the new process can be used in the Management Module, (Menu “Processes” or headings like “process” in the Navigation Menu), thus the process can be executed using the workflow engine Together Workflow Server 4.4.

The above mentioned operations can be carried out when you need to edit an imported process, but the changes must be received only through the new process instances which will be started.



Initiation and progress of a process

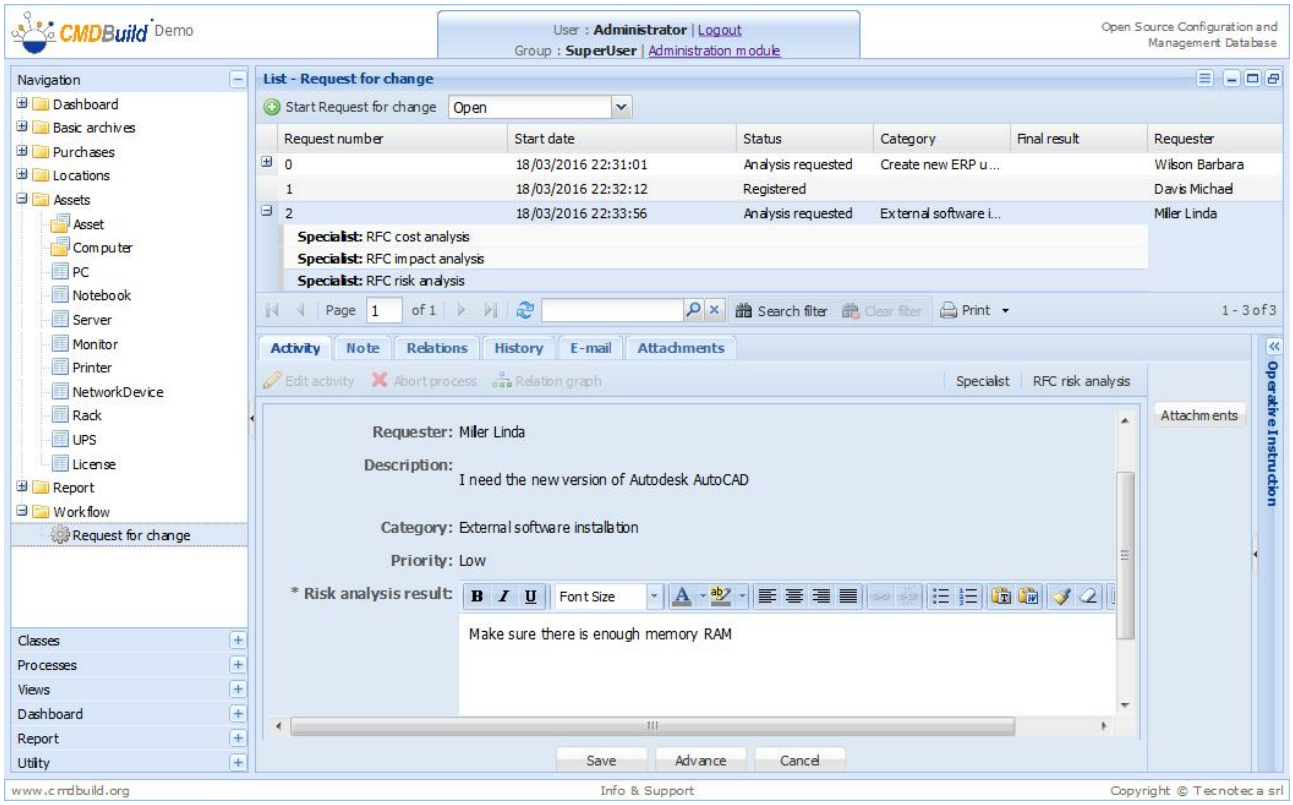
In the Management Module, CMDBuild can perform, through the support of the TWS Together Workflow Server engine, the processes designed with TWE Together Workflow Editor and then imported through the Administration Module.

In order to keep the greatest coherence with the CMDBuild functionalities, dedicated to the management of the items cards in the system, the user interface of the Management Module was designed so that it is consistent with the management of the normal data "classes":

- there is a special menu item "Processes" consistent with the "data sheets" (otherwise "process" elements can be inserted in the Navigation menu with "data sheets" elements or reports and dashboards)
- the process management draws on the standard managements which already exist for the normal cards: “List”, “Card”, "Details" “Notes”, “Relations”, “History”, "Attachments"
- in the “List” TAB of a specific process, the user can see the activities instances, in which he/she is involved (since he/she attends that activity or previous activities of that process) with:
  - filters by status (started, completed, suspended)
  - data area with tabular display of the information (process name, activity name, request description, process status and further attributes defined as "display base" in the Administration Module), which you can click on in order to access to the management card of that activity
  - possible evidences of parallel activities for that process instance
  - buttons to create a new activity or to make that choice

- in the “Card” TAB you can visualize or fill in the attributes provided for that process activity instance (write or read-only access can be set up through the TWE editor) otherwise you can carry out further operations through the proper widgets (visual controls) configured with the TWE editor
- in the “Notes” TAB you can visualize or insert notes about the activity instance
- in the “Relations” TAB you can visualize or insert relations between the activity instance and the instances of other classes (“cards”)
- in the “History” TAB you can visualize the previous versions of that activity instance (instances already carried out)

The list of activities is displayed high up in the following exemplifying form, while you can carry out an activity filling in the card at the bottom.



Since workflows are peculiar classes, you can find the control buttons also in the upper right of the workflow management form to display full screen the upper or lower side of the form.

Interaction of the workflow with external tools

General Information

In some cases it may be required that a process (like a new request of HelpDesk) is started by a user who is not expert enough at using CMDBuild (such as the user of the item or of the IT service).

This can be solved using the CMDBuild GUI Framework, described as follows.

Start of a process from an intranet portal via CMDBuild GUI Framework

The GUI Framework is a javascript / Jquery development environment, used to implement a simplified user interface. Thanks to it, non-expert users can interact with the CMDBuild application.

The GUI Framework includes the following main features:

- it can be activated in portals based on different technologies
- it allows an (almost) unlimited freedom when projecting the graphic layout, defined through an XML descriptor and with the possibility of intervening on the CSS
- it grants a quick configuration thanks to predefined functions (communication, authentication logics, etc.) and to native graphic solutions (forms, grids, upload buttons and other widgets)
- it adapts to workflow advancement forms designed through the visual editor TWE
- it interacts with CMDBuild through the REST webservice
- it is able to gather data from the database of other applications, allowing the management of mix solutions

An sample of implementation based on the CMDBuild GUI Framework is the Self-Service portal, which is part of the preconfigured version CMDBuild Ready2Use.

The CMDBuild Ready2Use Self-Service portal allows non-technician users to interact with the IT employees in order to point out their needs and to keep up to date on the resolution activities.

Every user can access to the portal upon local authentication or authentication connected to the Active Directory repository of the company.

The home page of the portal includes:

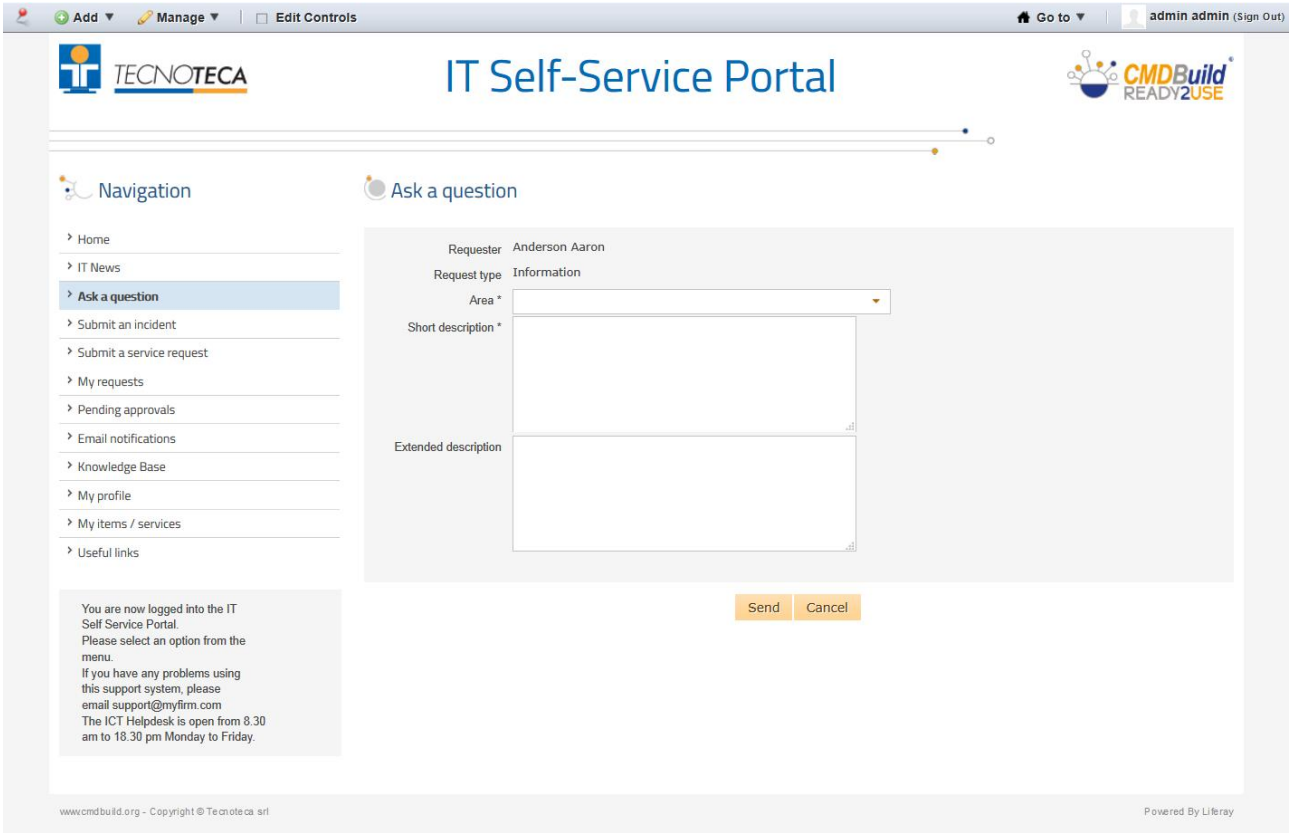
- a complete menu, on the left
- a quick access to the main features, up on the right
- the most recent IT news
- the advancement situation of the last forwarded requests

CMDBuild suggests an implementation of the functioning portal as portlet in the open source Liferay portal. The used CMDBuild GUI Framework can be activated on portals based on different technologies, since it is developed in javascript / JQuery environment. So, you can ask for custom implementations of the self-service portal, which can work on various portals.

The CMDBuild Ready2Use Self-Service portal implements the following features:

- publication of IT news
- request for technical information

- opening of a damage notice
- request for an IT service, selected from the services catalogue
- consultation of the advancement of your own requests
- approval of authorization requests
- FAQ
- summary of received notification emails
- connected user profile
- list of assets and services assigned to the connected user
- useful links



The CMDBuild GUI Framework is not the only one possible option.

You can even implement external web interfaces from the beginning, using your favourite development language and interacting with CMDBuild through its REST and SOAP webservices.

But this solution is less efficient if compared to the re-use of the available GUI Framework.

Example of configuration of a new process

General Information

The chosen process that describes the various passages necessary for its configuration is a simplified Request for Change (or RfC) process.

It is an extremely simplified process, modelled only for educational purposes; it was suggested for configuration modalities, not for a real use in the production.

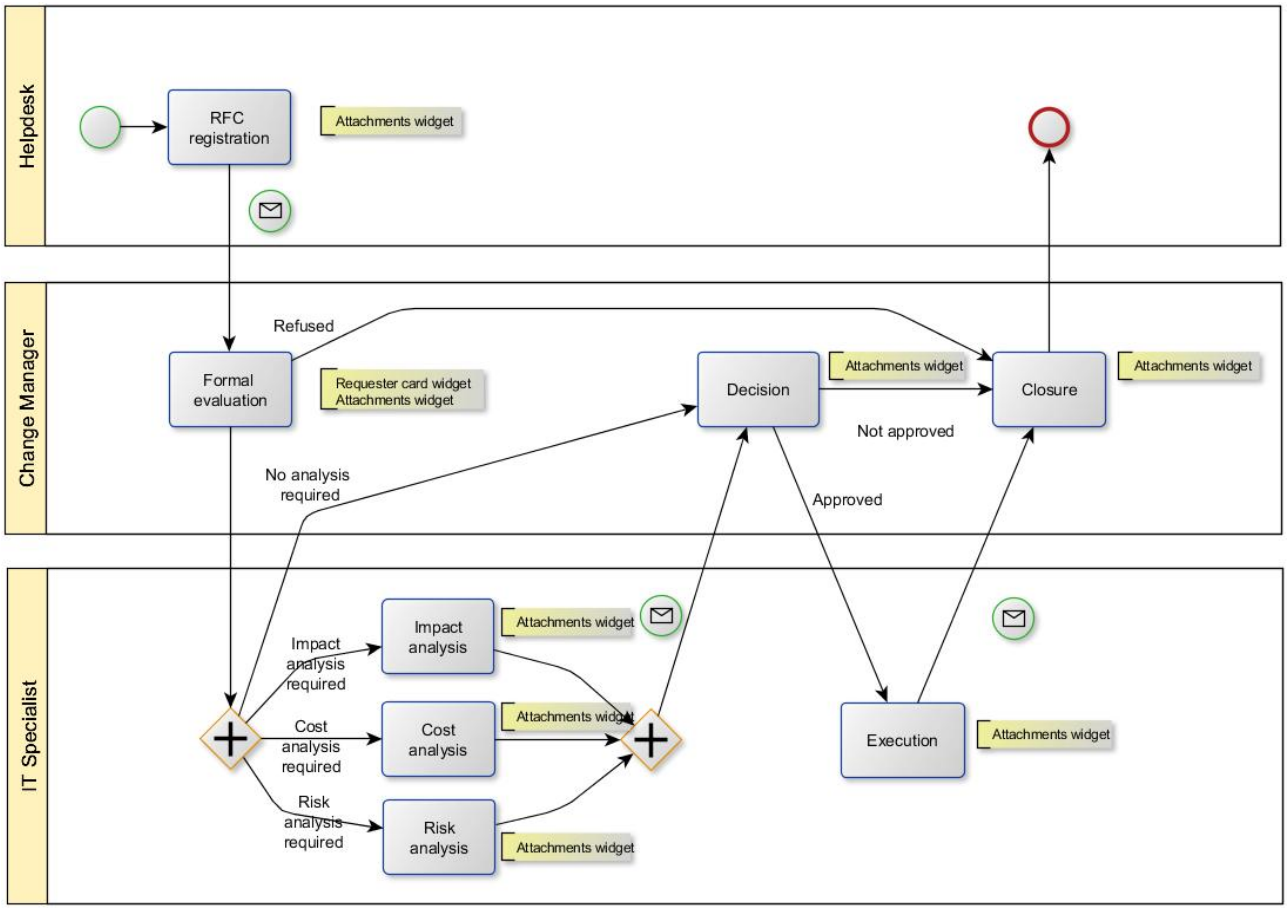
The sample process, complete with the definition in CMDBuild and the XPDL flow designed with TWE, is available on the demo database supplied with CMDBuild.

Description of the RfC process used as example

The actors of the process are the users' groups:

- Helpdesk, which carries out the initial registration of the request received by a user
- Change Manager, responsible for the changes to the IT assets of the company
- IT expert, involved for the production of analysis documents and for the change execution

Here's a logic schema of the process:

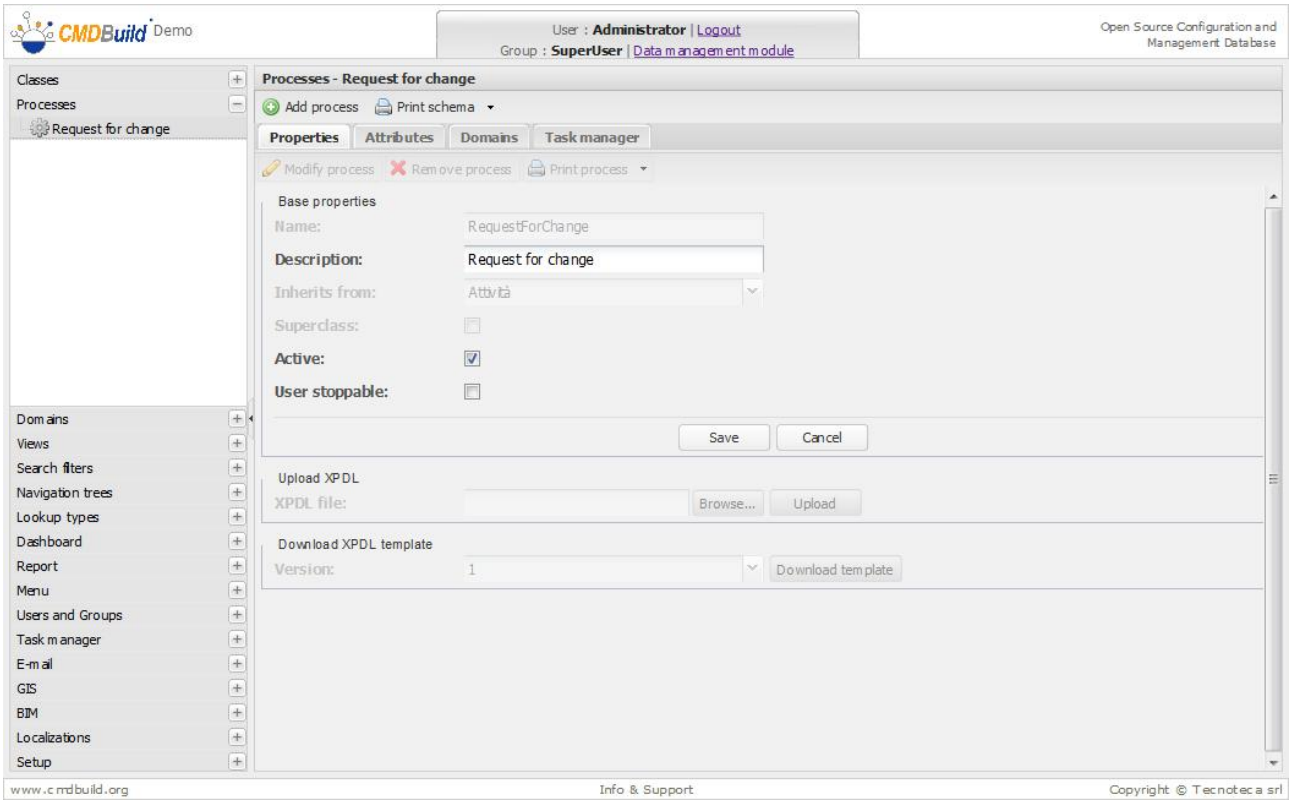


The process includes the following operations:

- RfC recording
- evaluation of the request's formal aspects:
  - direct closing if the RfC is not acceptable
  - shift to the decisional step, if analysis activities are not requested
  - execution request of one or more analysis typologies, among impact, cost, risk analysis
- execution of the requested analysis typologies (impact, cost, risk analysis)
- decision by the Change Manager, which might be closed if the RfC is not approved
- RfC execution by an IT expert, if the RfC is approved
- final closing

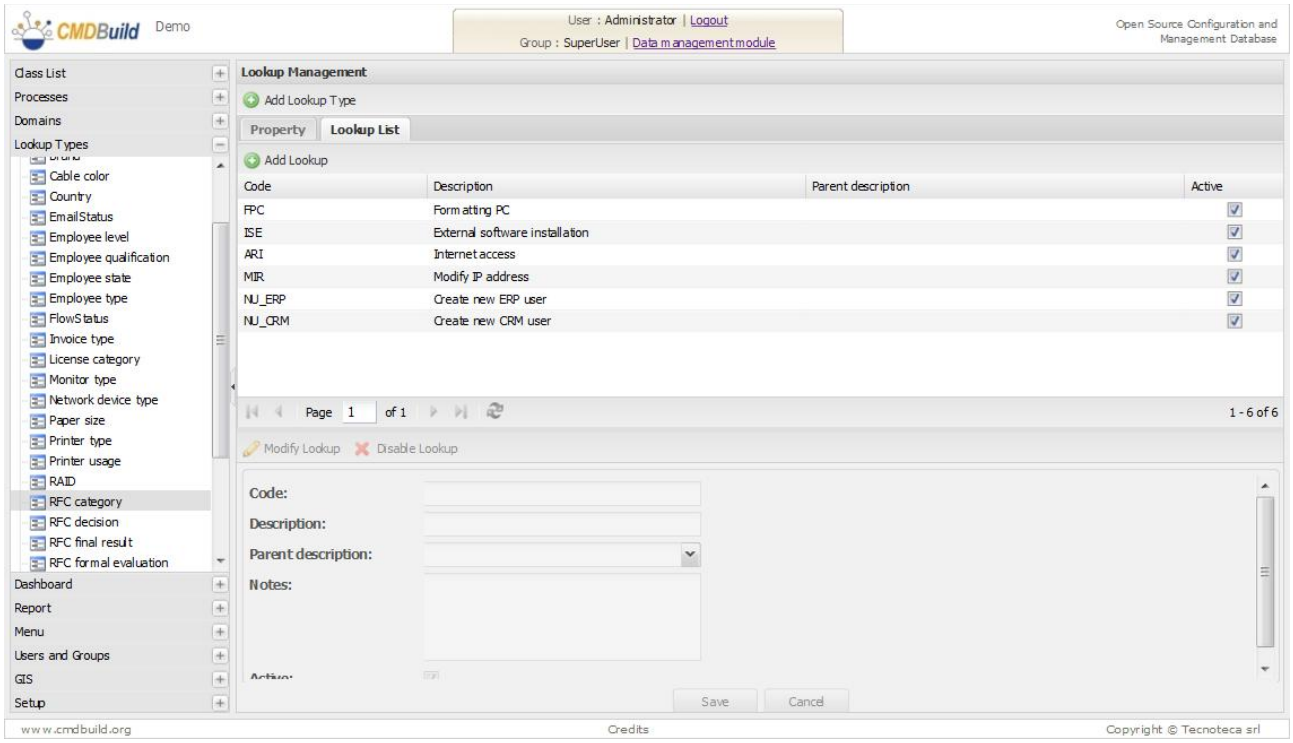
Phase 1 – Items creation in CMDBuild

Through the Administration Module, under the heading Menu Processes, the process RequestForChange is created in order to manage the workflow:

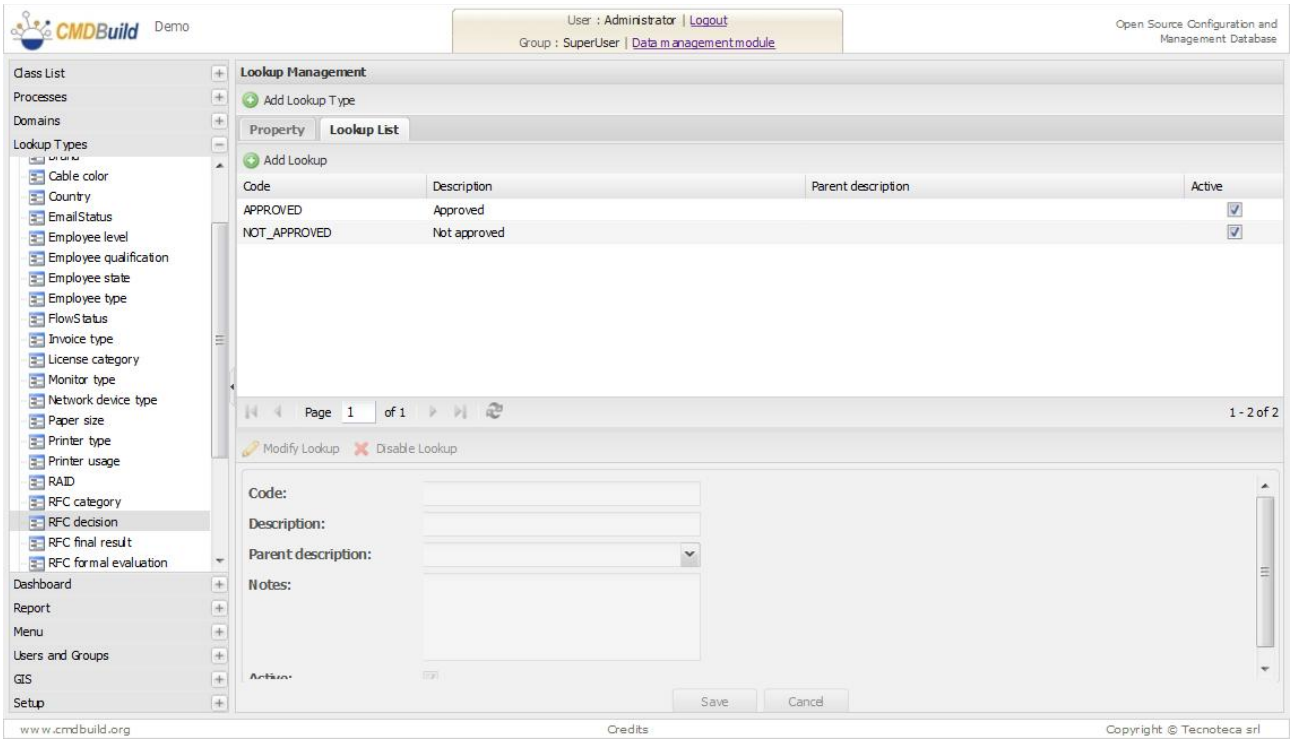


Some attributes provided in the process are Lookup, so they require the preventive definition of the related lists, as you can see in the following screenshots.

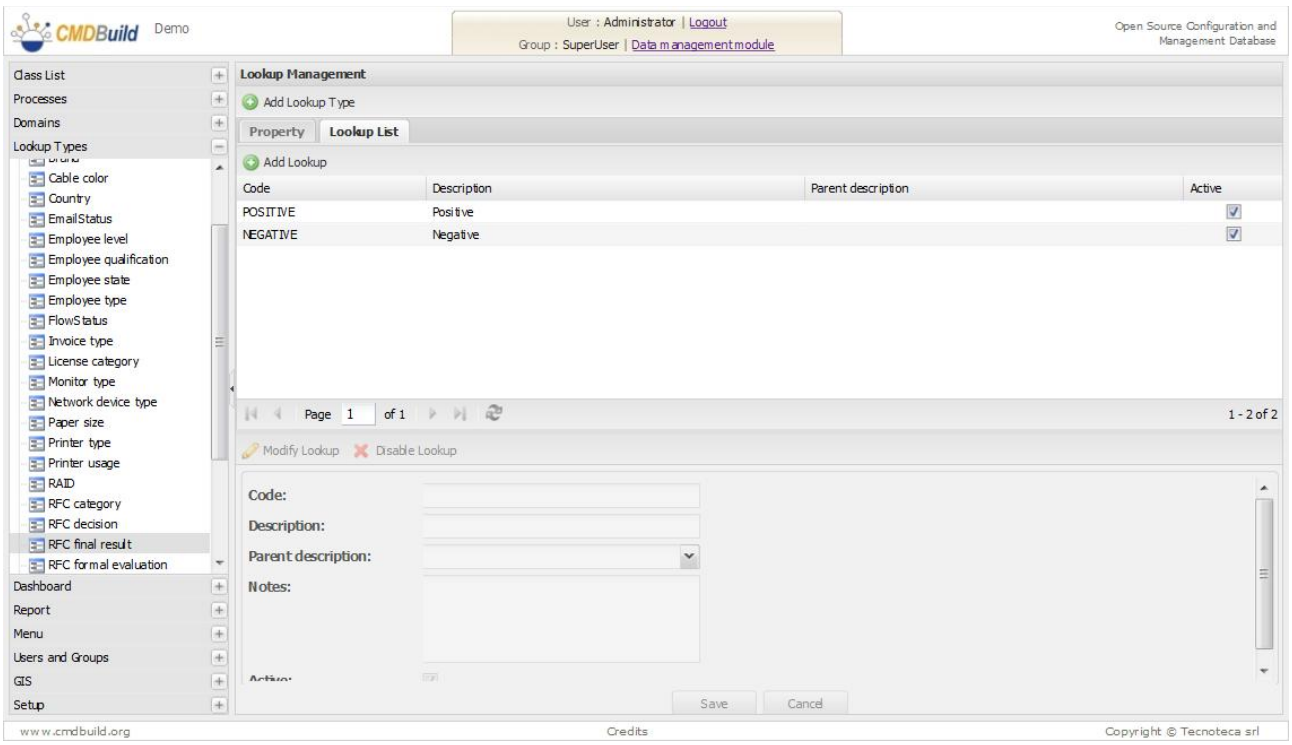
Lookup RFC category (linked to the “Category” attribute of the process)



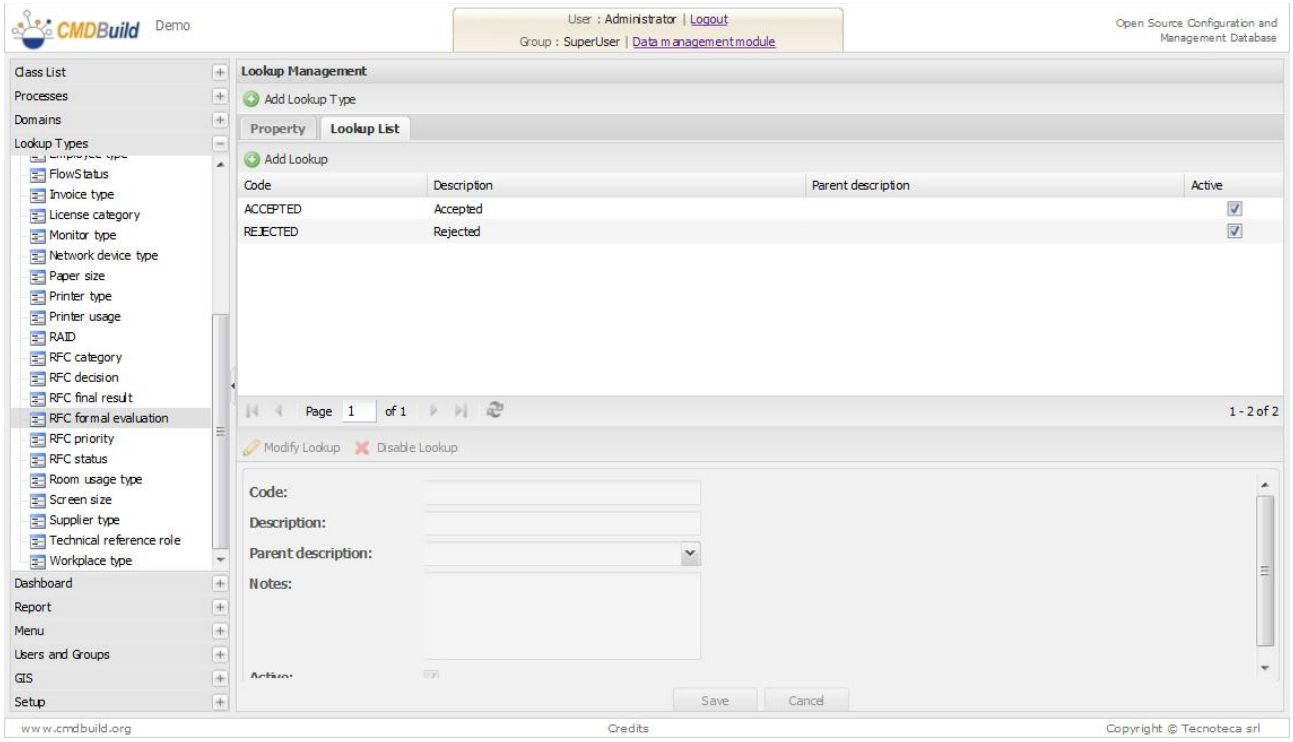
Lookup RFC decision (linked to the “Decision” attribute of the process)



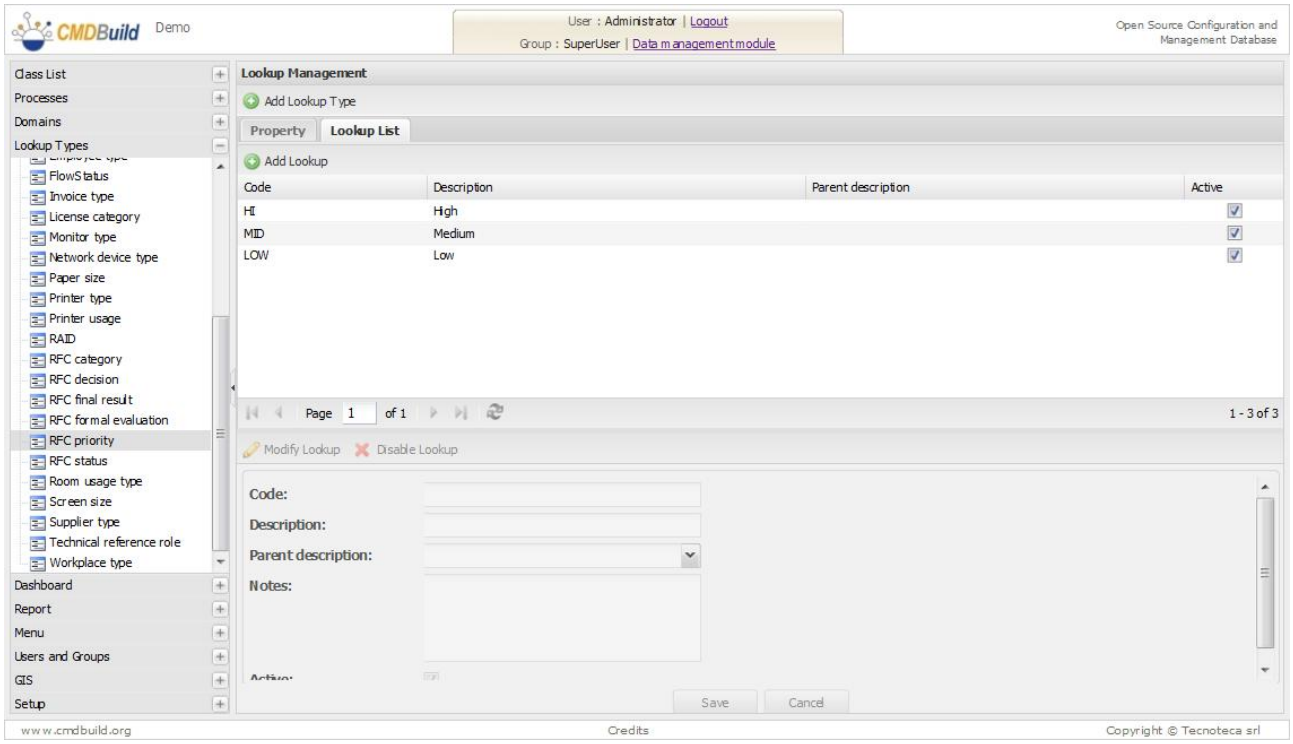
Lookup RFC final result (linked to the “FinalResult” attribute of the process)



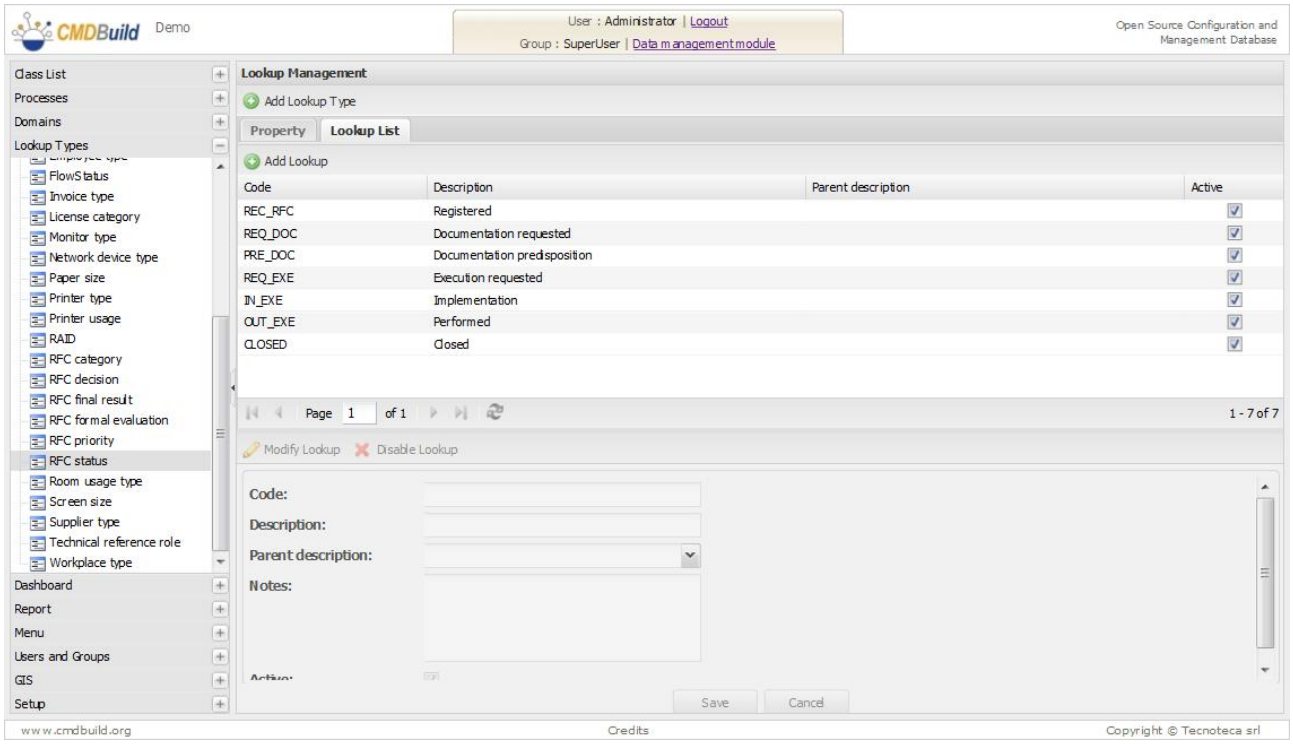
Lookup RFC formal evaluation (linked to the “FormalEvaluation” attribute of the process)



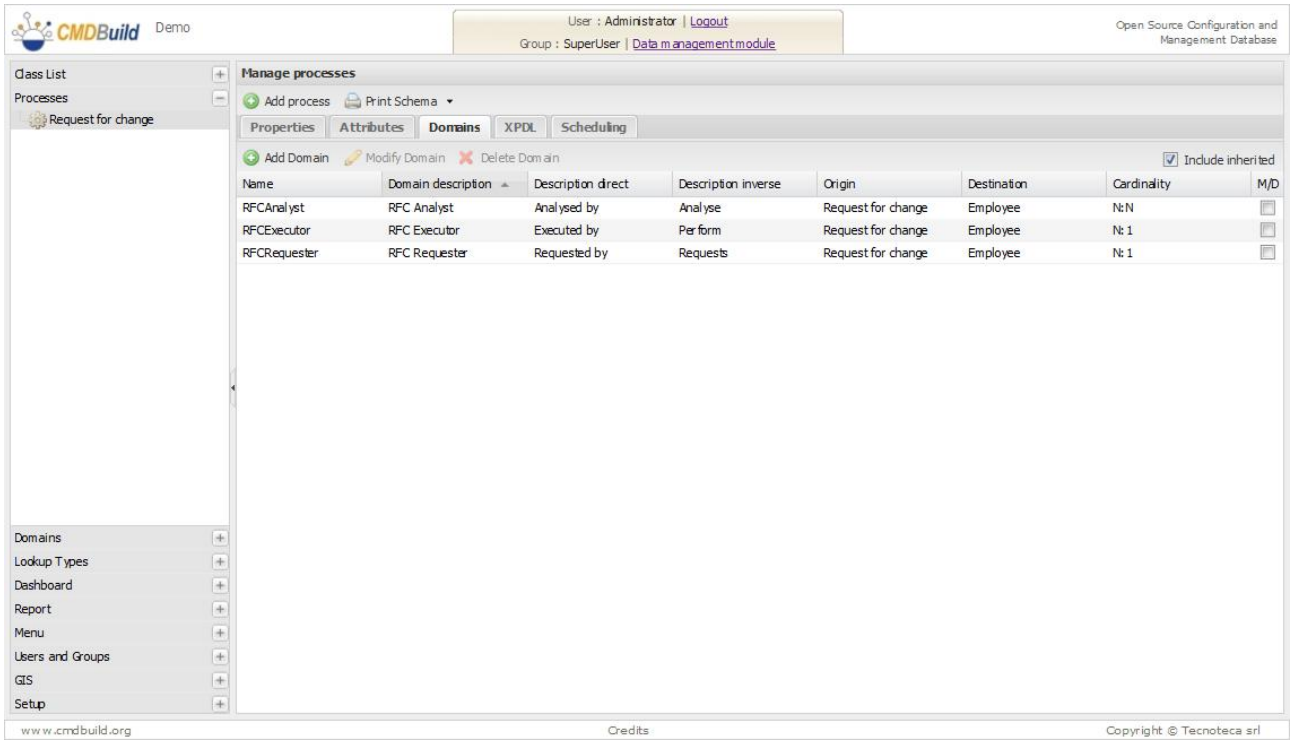
Lookup RFC priority (linked to the “RFCPriority” attribute of the process)



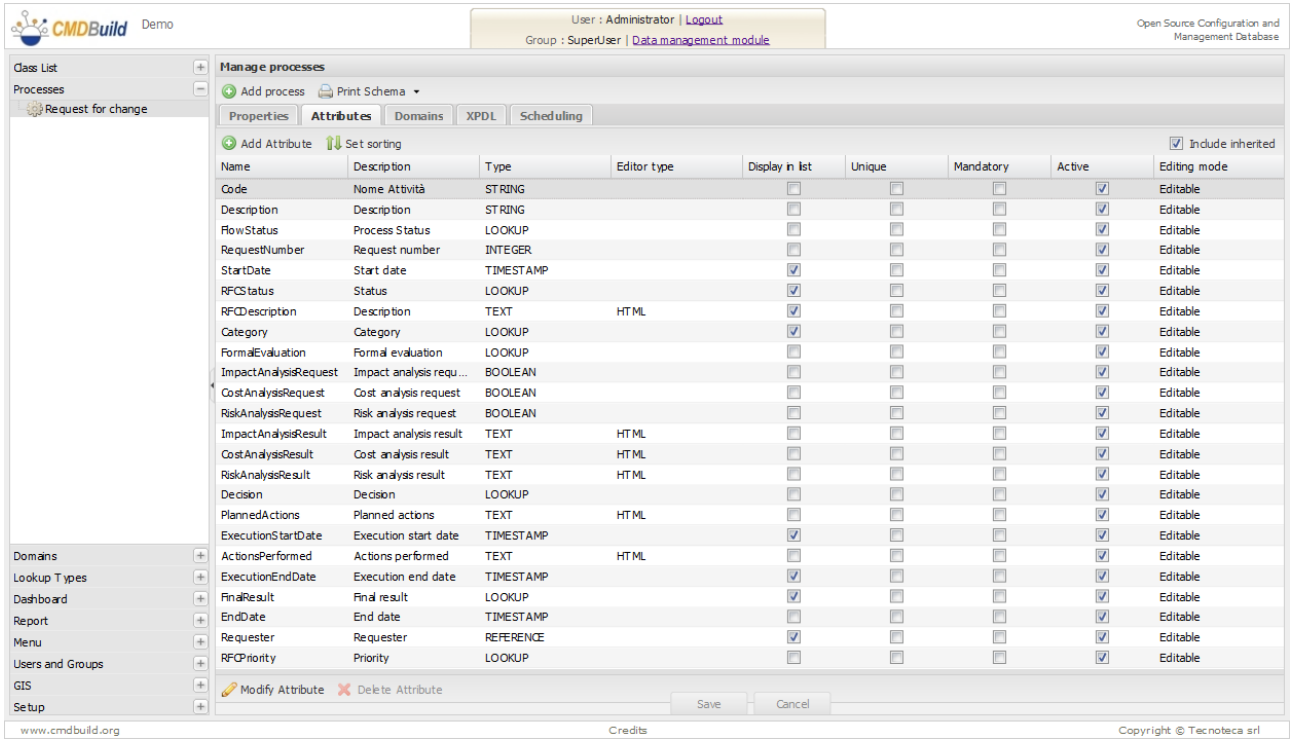
Lookup RFC status (linked to the “RFCStatus” attribute of the process)



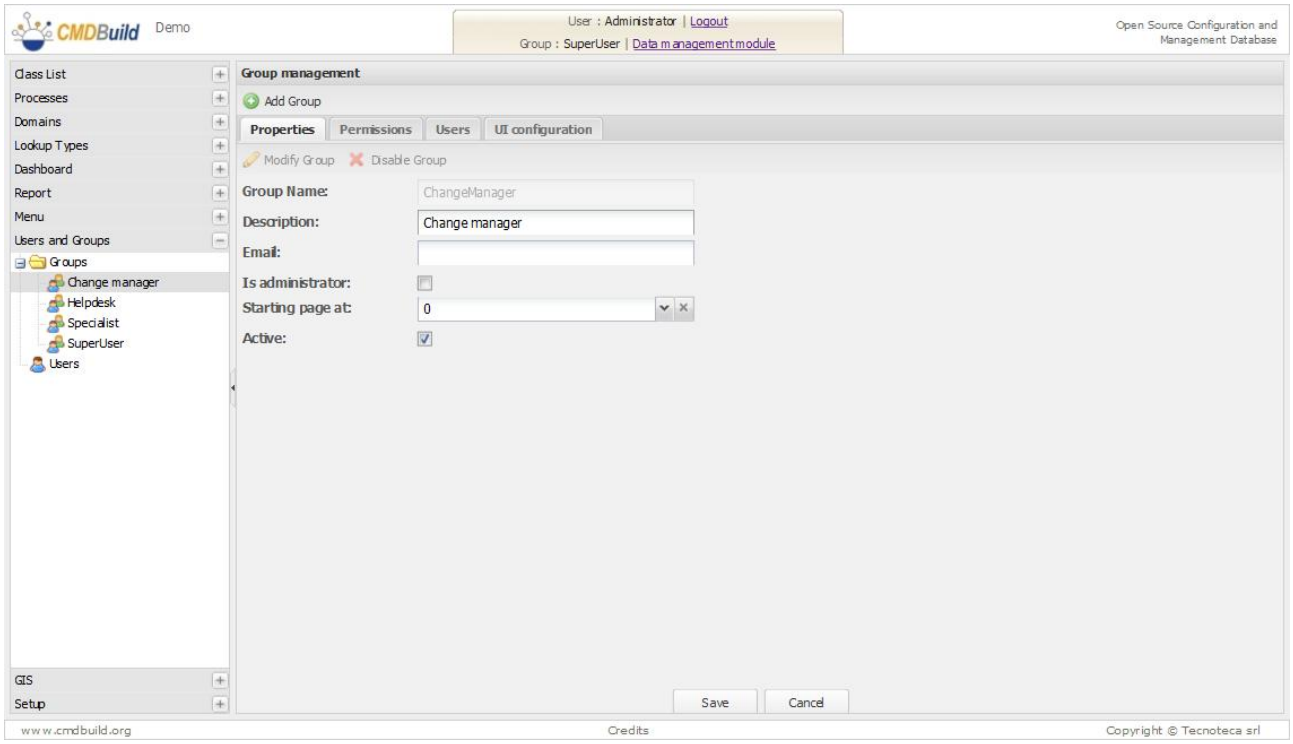
The following "domains" are created in order to define in the process the “Requestor” attributes as foreign keys on the class “Employee” and the relations with the Change Manager and IT experts, who respectively assesses and execute the RfC:



At this point the attributes of the process can be created:

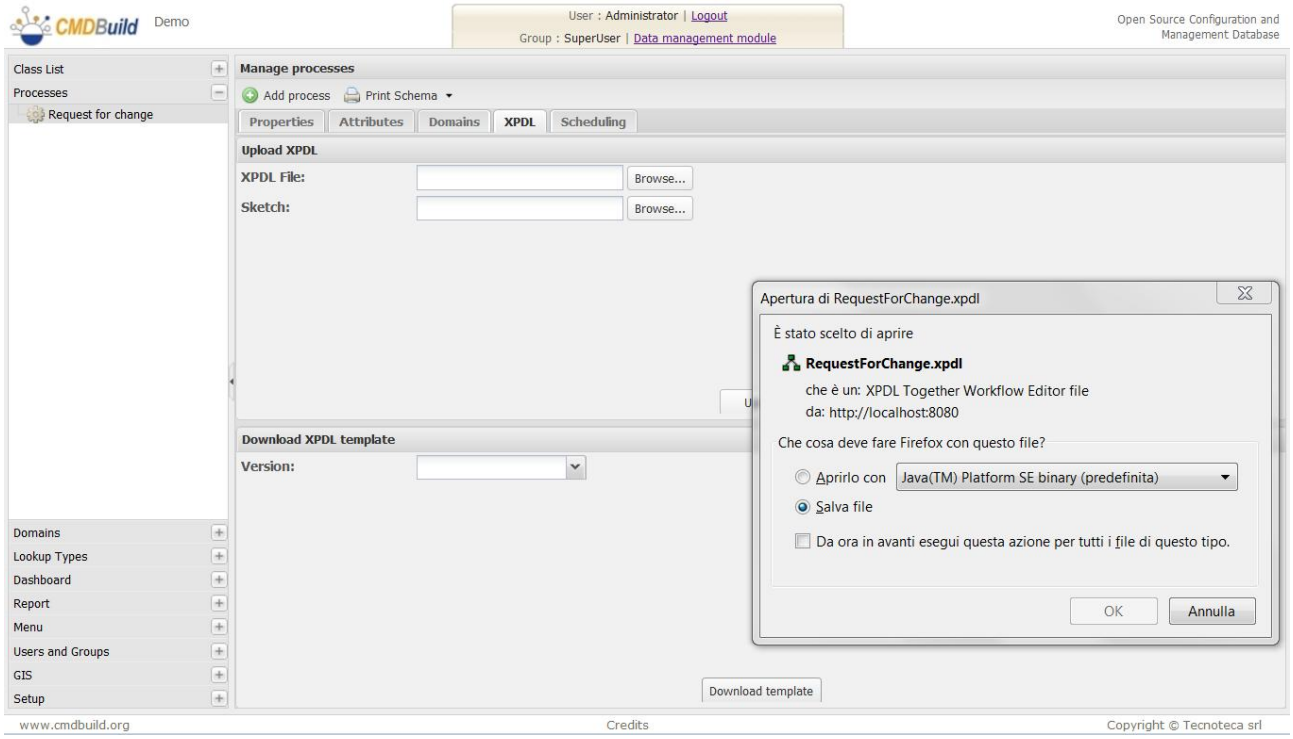


Last thing you can create the users' groups involved in the workflow:



At this point you can export the XPDL schema produced by CMDBuild, used with the visual editor

TWE to design the detail flow of the process itself:



The XPDL file will include only the general data available at the moment:

- process name
- list of unreserved process attributes present in the process management class
- list of the roles defined in the system

Those data will be the starting point of the activities carried out through the TWE editor, in which all aspects related to the specific process flow will be enriched.

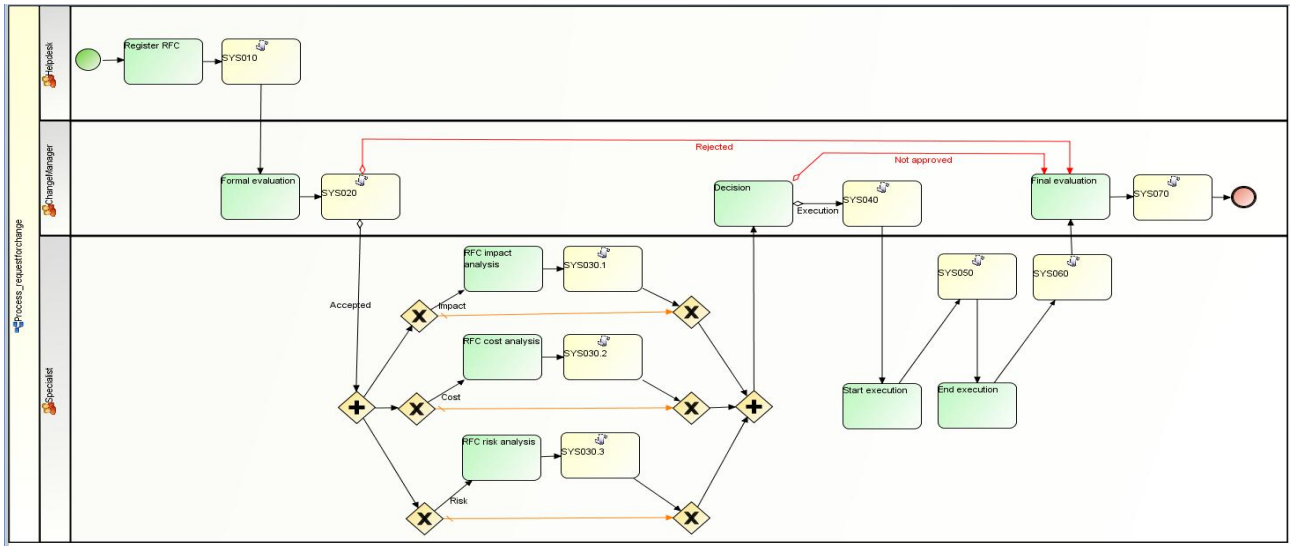
Phase 2 – Configuration of the flow with TWE

Through the TWE editor it's possible to perform the following operations:

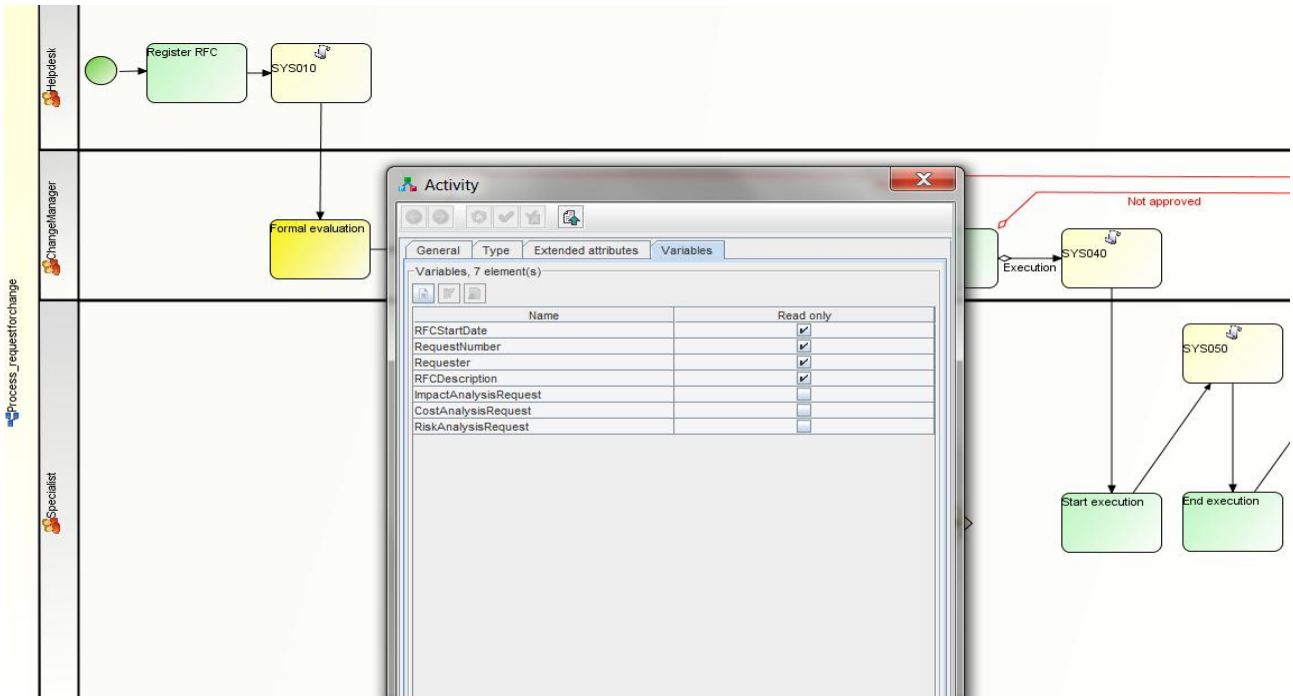
- flow design by placing the activities of the various provided typologies (process starting and ending, user activities, automatic activities, routing activities for the parallelism management) and their connection according to the provided transition typologies
- completion of user activities, specifying what process attributes will be shown in the form related to that activity (by indicating if read-only or read/write) and what widgets will be made available in the same form (by indicating the parameters provided for each one)
- completion of automatic activities, writing the script which implements the automatisms required in that activity (using the API available for that aim)
- completion of transitions among activities, specifying the criteria for the flow to cover a transition or another, when the choice is binding

Here are some descriptive screenshots of the above mentioned activities.

General flow design:

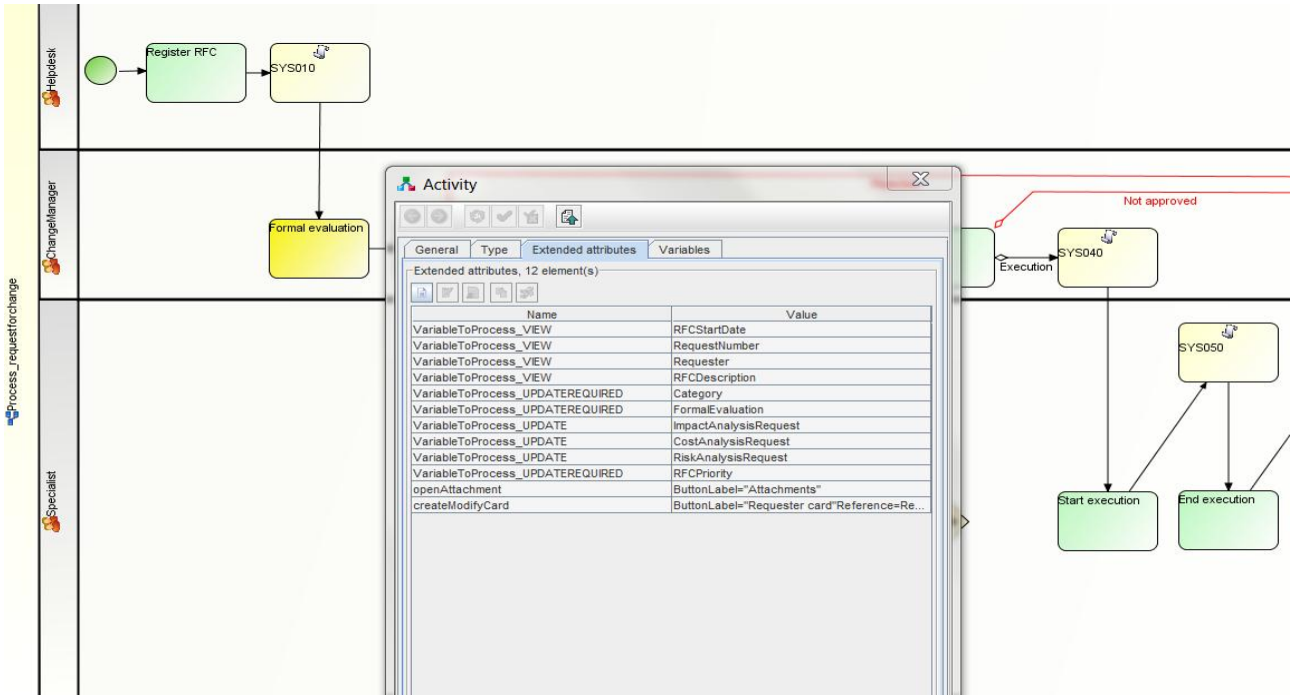


User activities - “Variables” TAB, used to choose the attributes which must appear in the form (with possible indication of read-only modality):

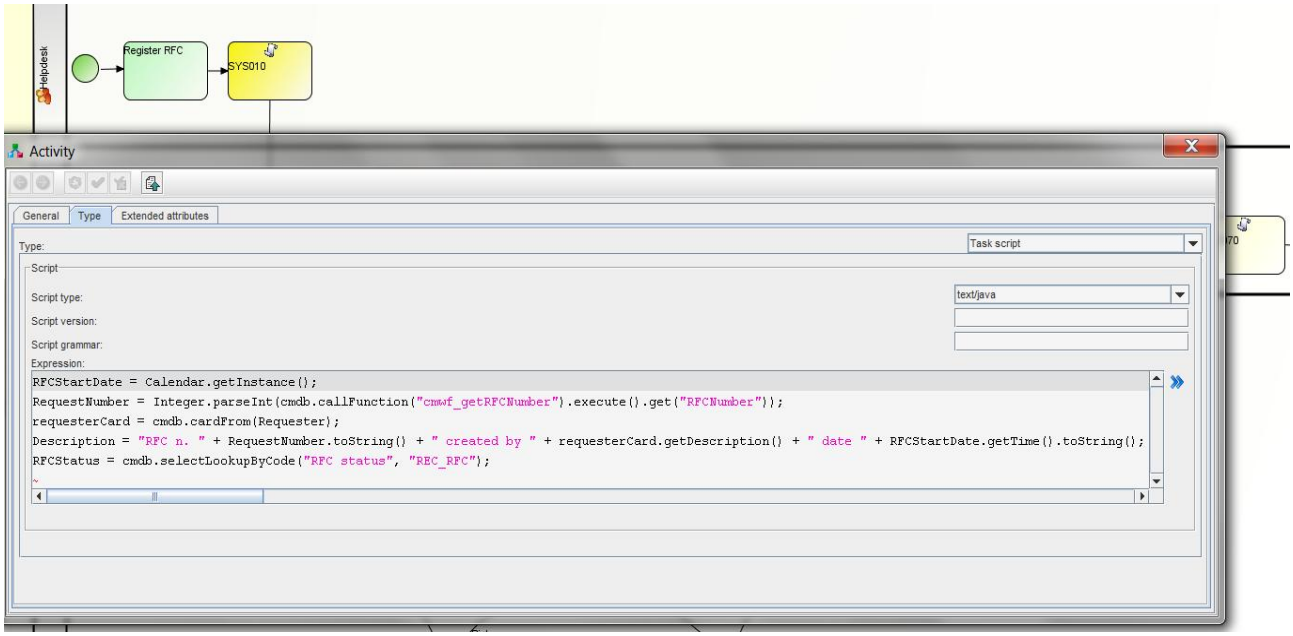


User activities - “Extended Attributes” TAB, used to indicate the compulsory attributes (“UPDATEREQUIRED”) and to request the input in the form of one or more widgets (in the sample

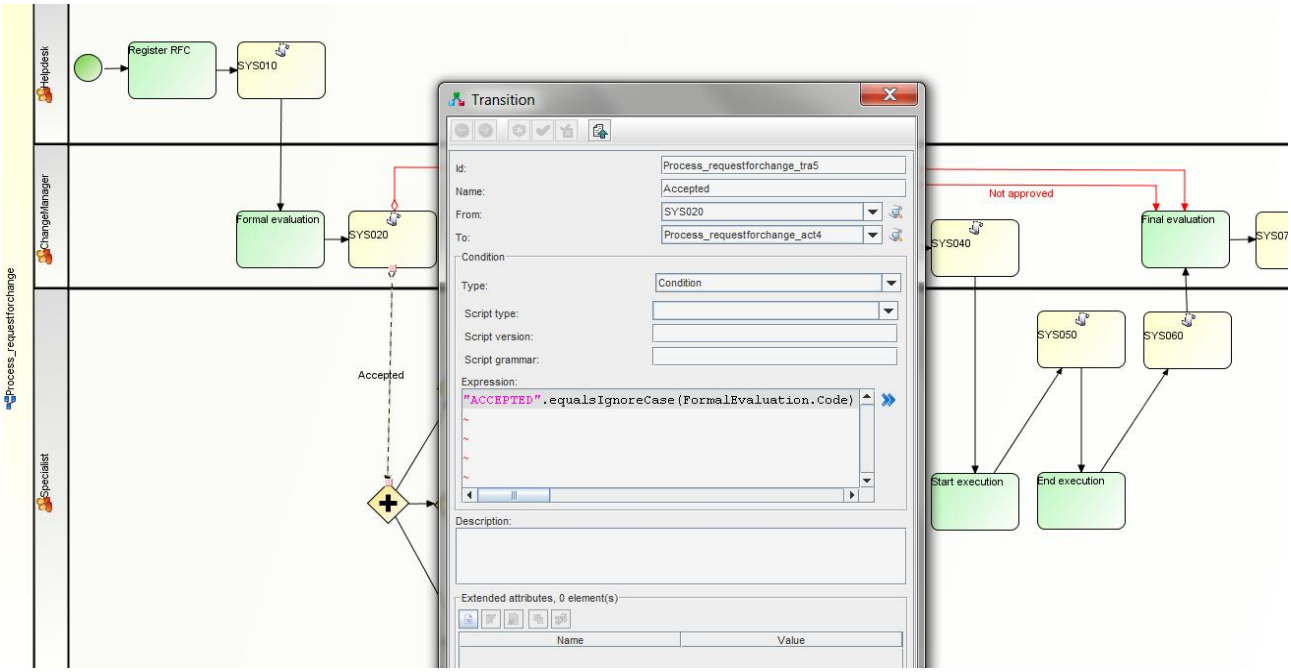
openAttachments for the attachments and createModifyCard to consult the requester card)



Automatic activity - “Type” TAB, used to write the script that implements the provided automatisms (in the sample, the activity SYS010 carries out the automatic structuring of the system date, the automatic attribution of a univocal progressive number, the building of a significant description, the structuring of a new state reached by the process).



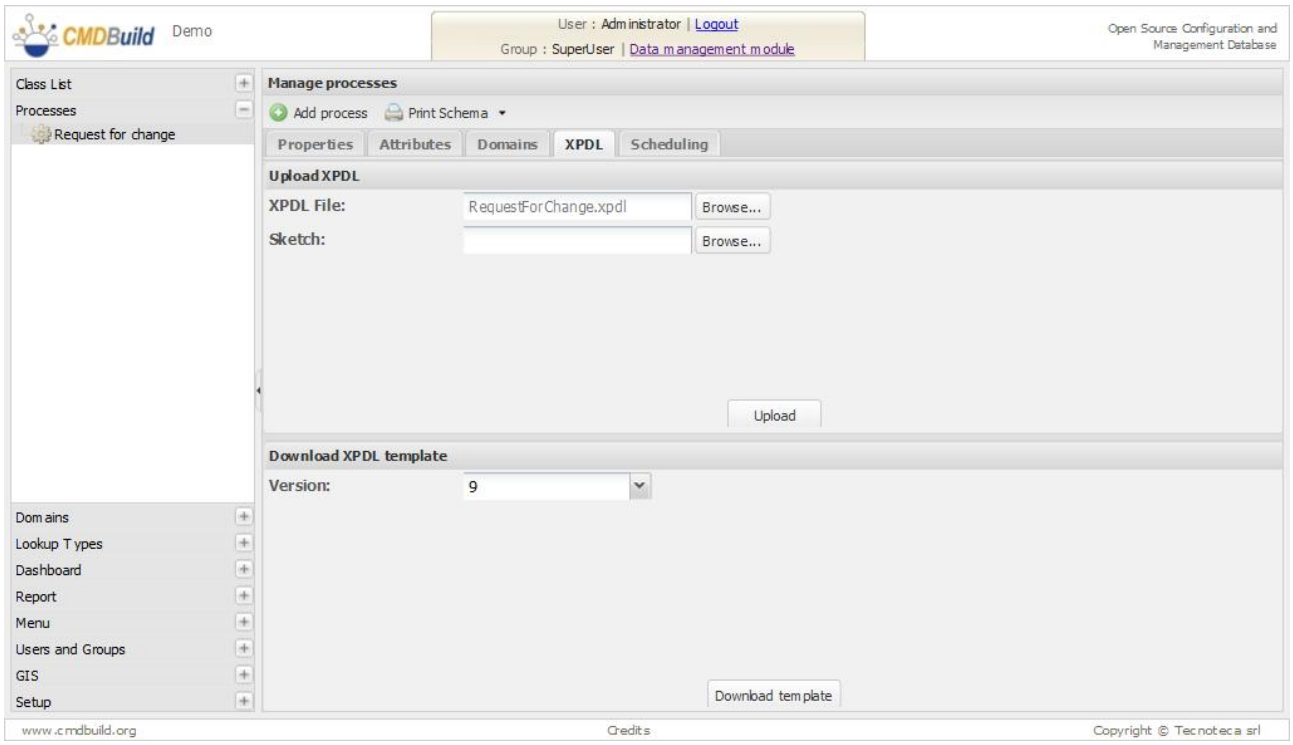
Transition, used to link two activities, conditionally or not (in the example it is provided a condition related to the formal acceptance of the RfC)



Phase 3 – Importation of the XPDL file in CMDBuild

When the configuration of the process in TWE is complete, you will load in CMDBuild the related XPDL file.

The process flow can be then modified several times, only exporting the last version from CMDBuild, editing it with TWE and importing it again in CMDBuild. You have to consider that the new version will be used when new processes are started, while each current process will go on with the XPDL version valid when they first started.



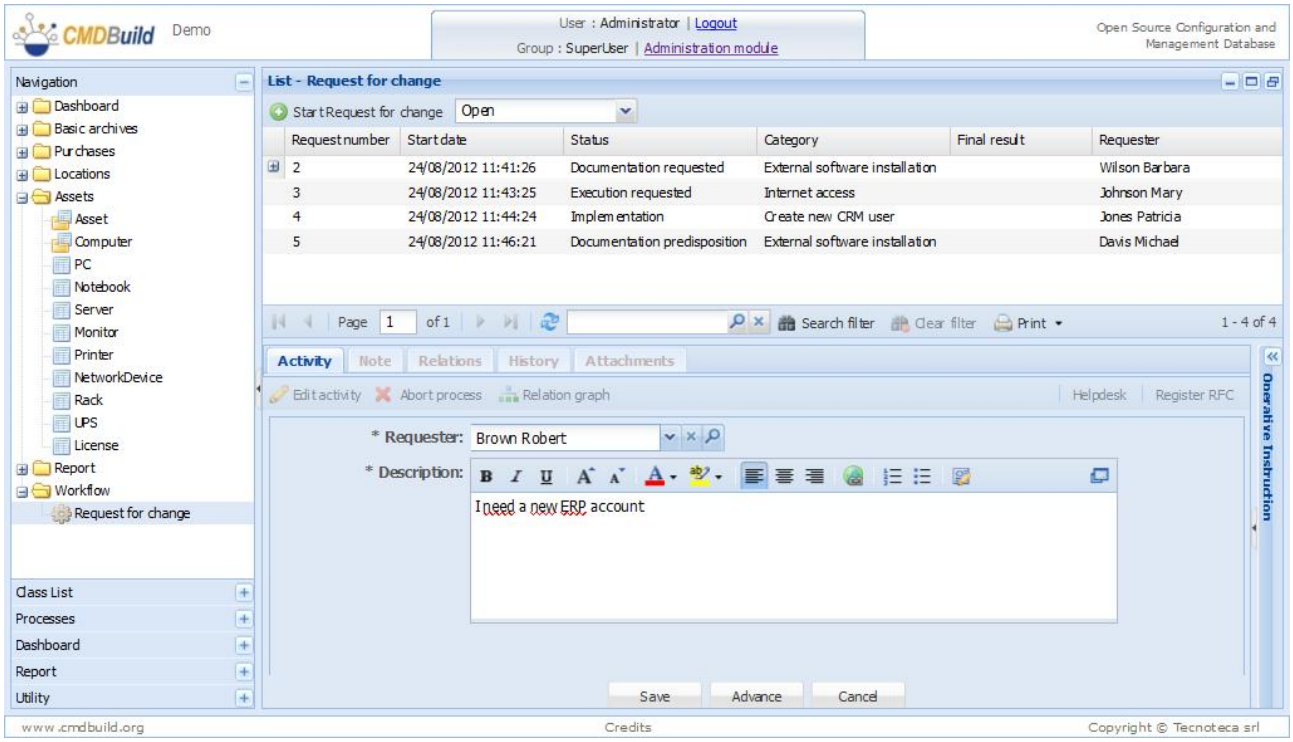
Phase 4 – Implementation of the process from CMDBuild

The workflow imported in CMDBuid is available to be used by the provided operators groups.

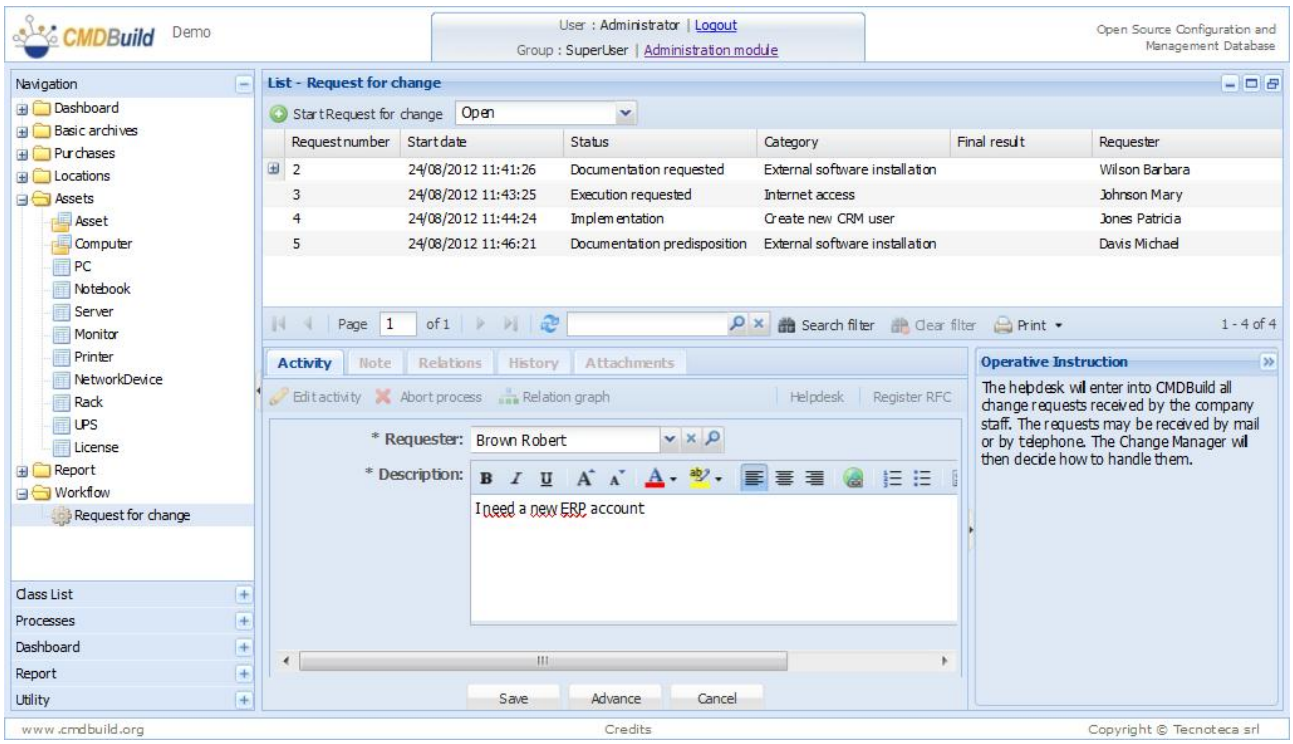
In the example, the management workflow of the RfC will be started by an operator of the Helpdesk group, valued by an operator of the Change Manager group, analysed and carried out by an operator of the IT expert group. You have to consider that the operators of the SuperUser group can "personify" any other group defined in CMDBuild.

From the RfC process management, the RfC are presented as open (or in the state selected on the upper list: open, suspended, complete, aborted, all).

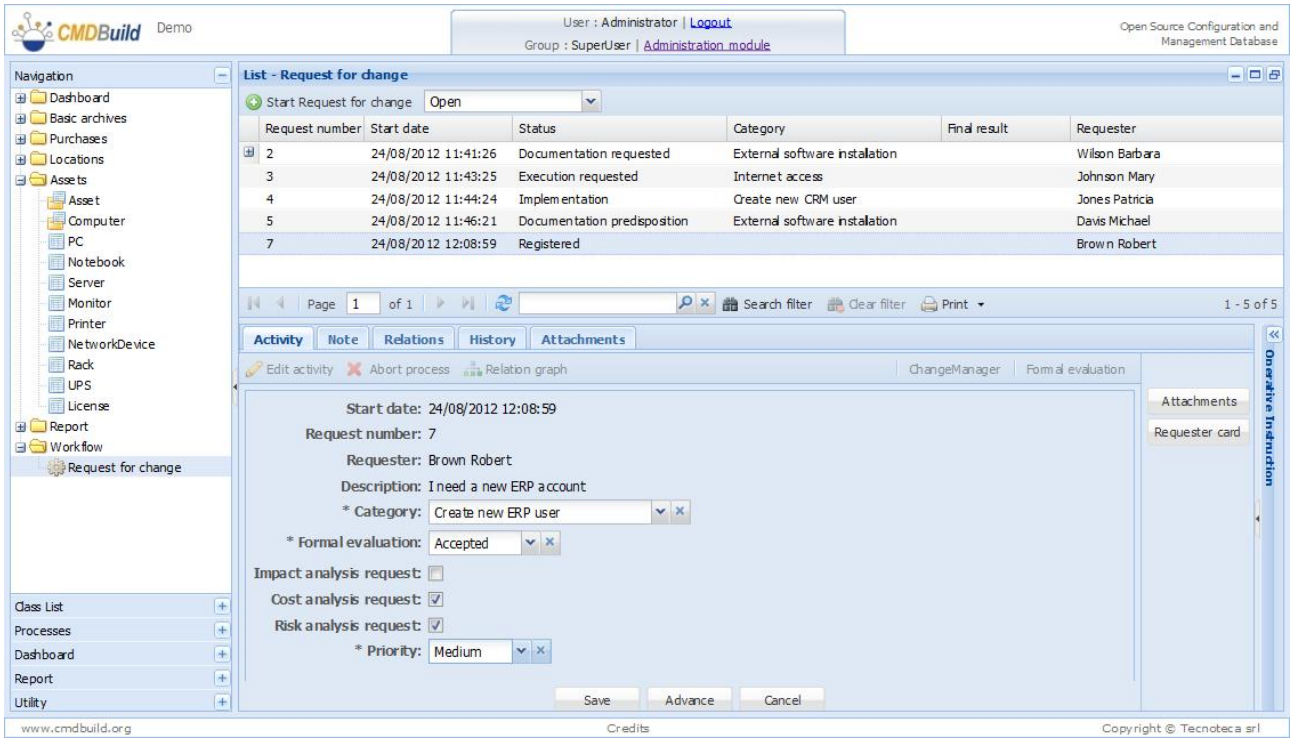
Through the button “Start Request for Change” the Helpdesk can register a new request.



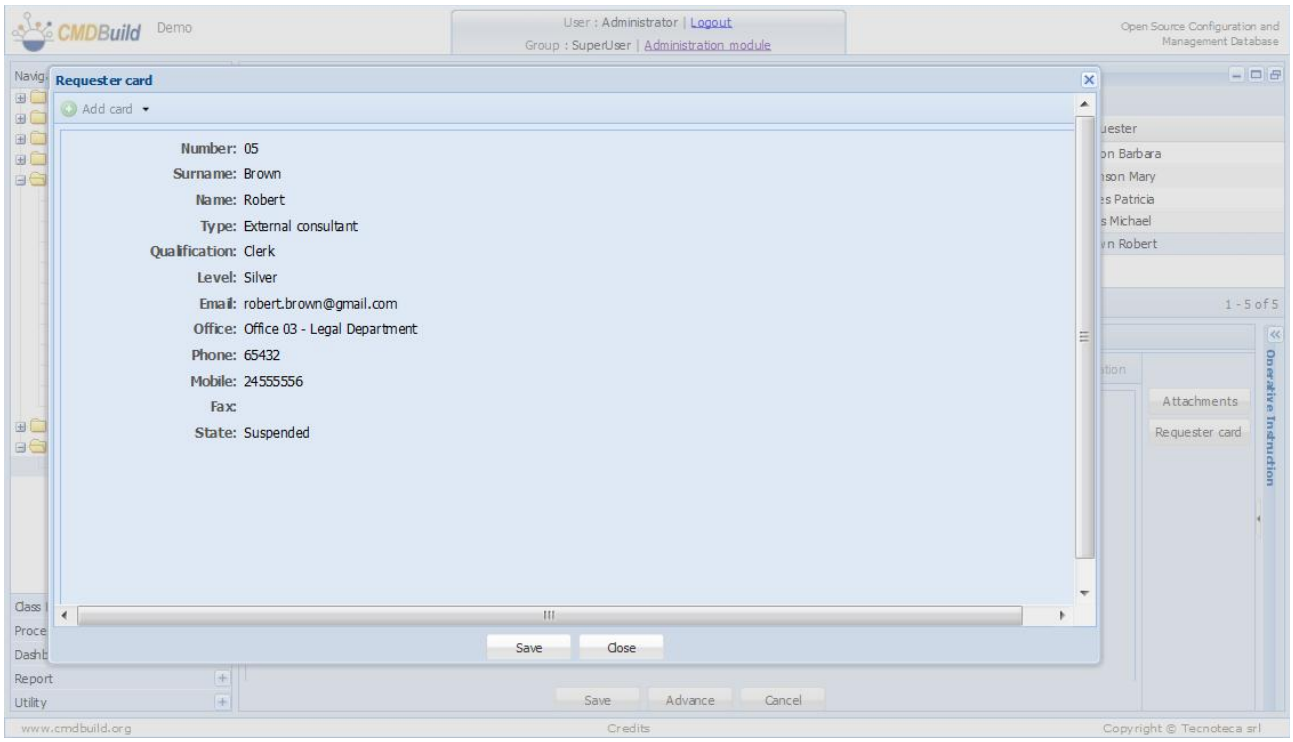
Previous to filling in the form, the operator can refer to the operative instructions associable with every user activity (which can be formulated with TWE, filling in the field “Description” in the “General” TAB of the activity).



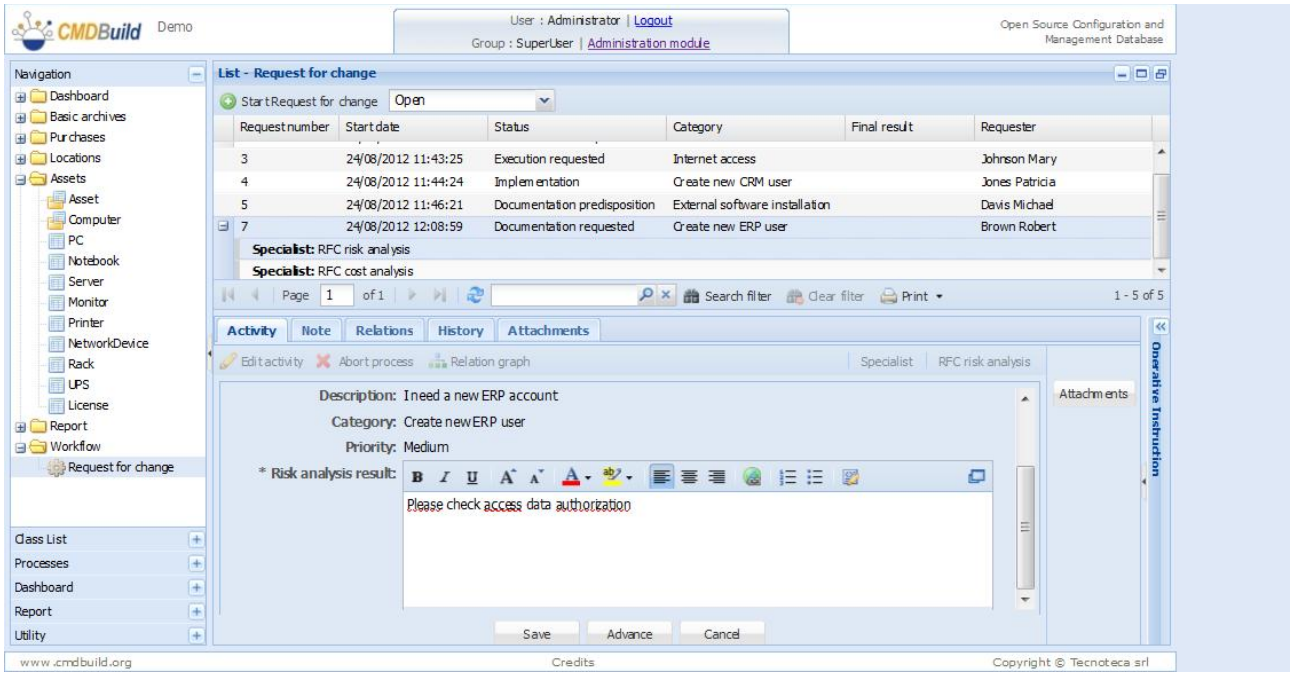
By validating the progress at the following step, the activity is taken by the Change Manager, that - in our simplified example - will fill in the following information:

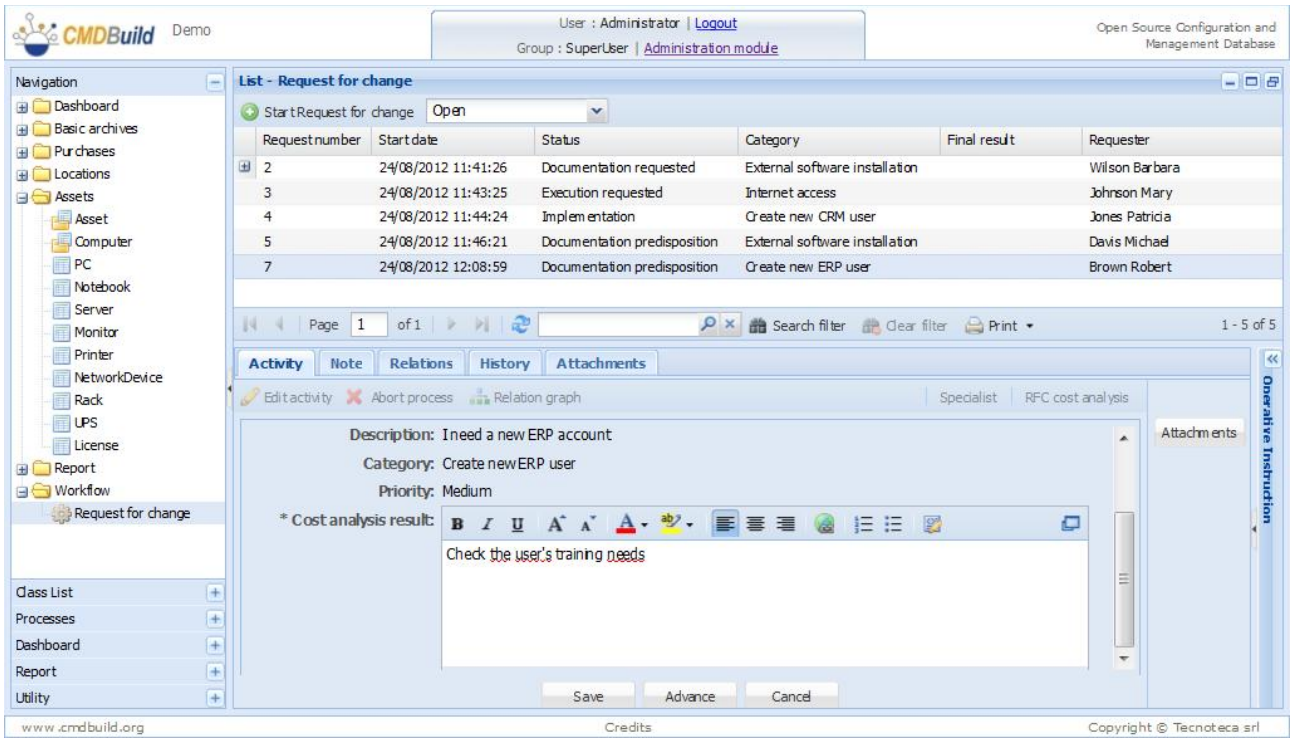


In the example we provide at this step the possible use of the enclosed loading widgets and those for the reference of the complete requester card:

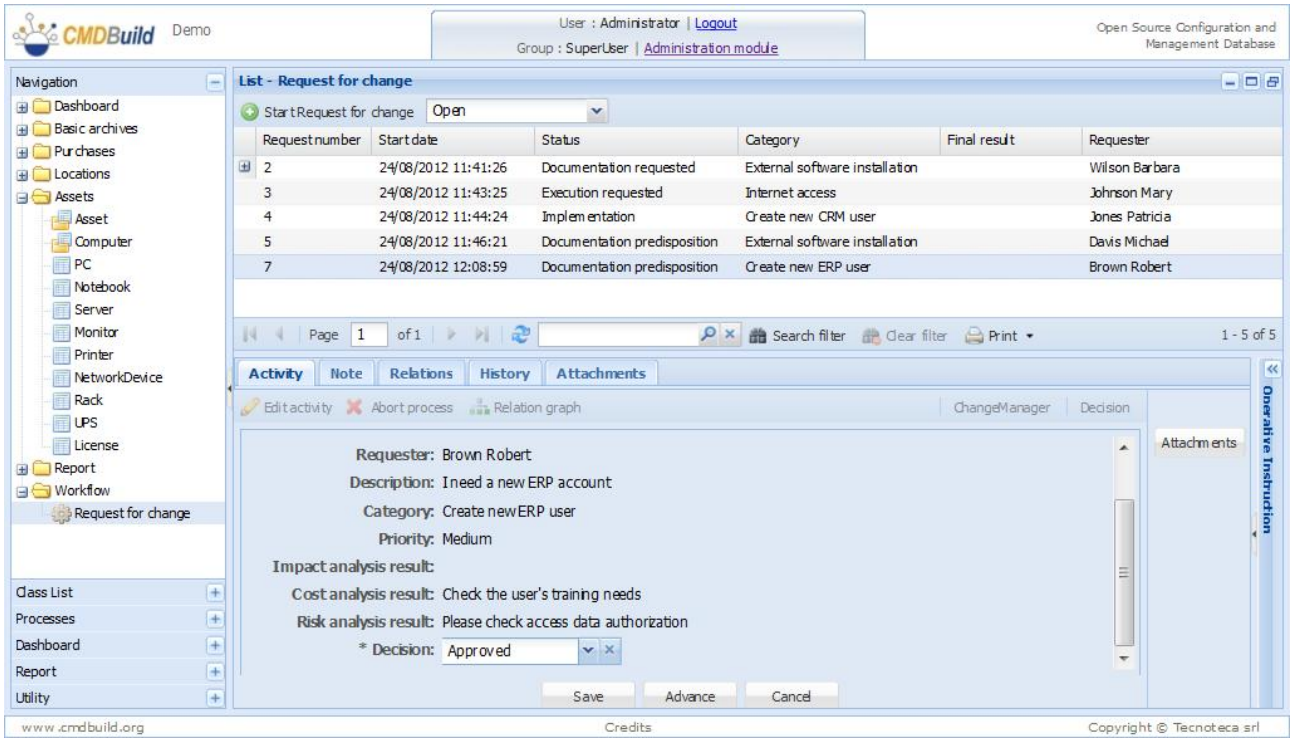


The Change Manager demanded in our example two typologies of analysis, so the workflow moves to IT experts, that, in parallel (using one of the new functionalities implemented in CMDBuild 2.0), can carry out their analysis (respectively risk and cost analysis) and transfer the results.

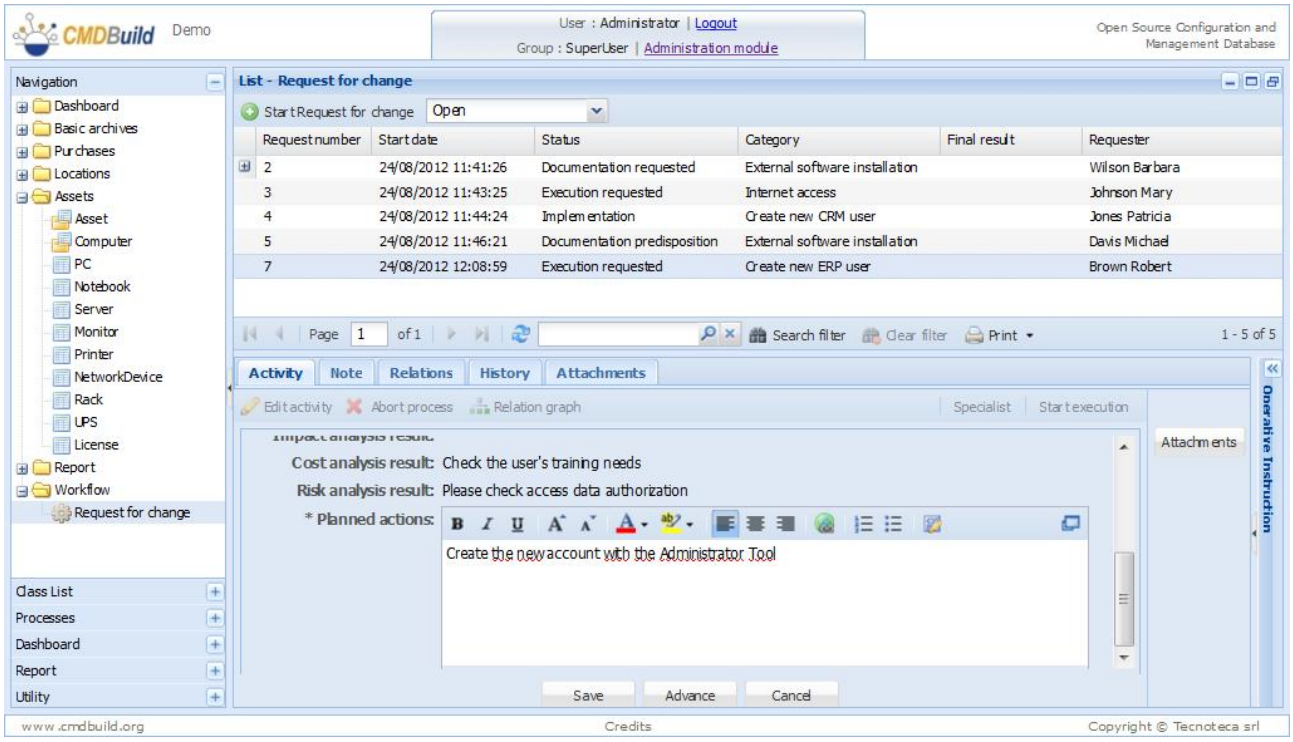


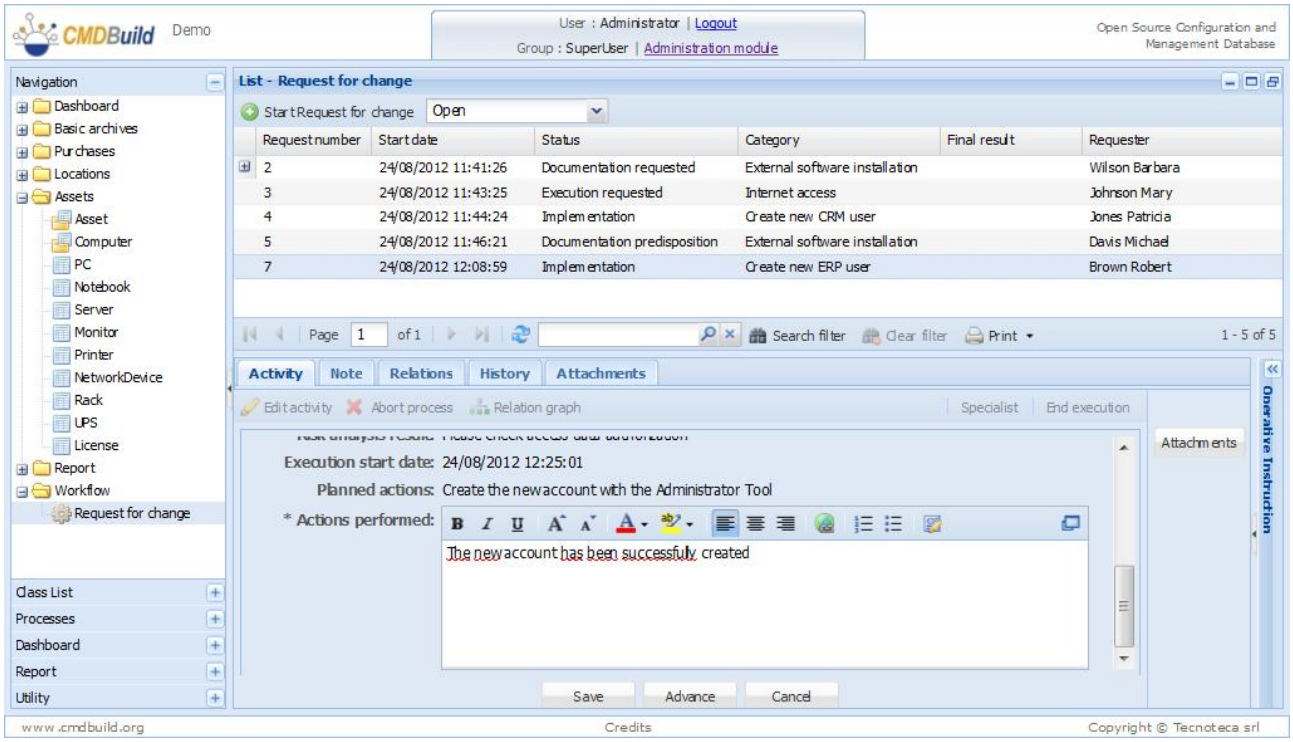


The Change Manager currently provides the results of the requested discussions and can take his/her decision.

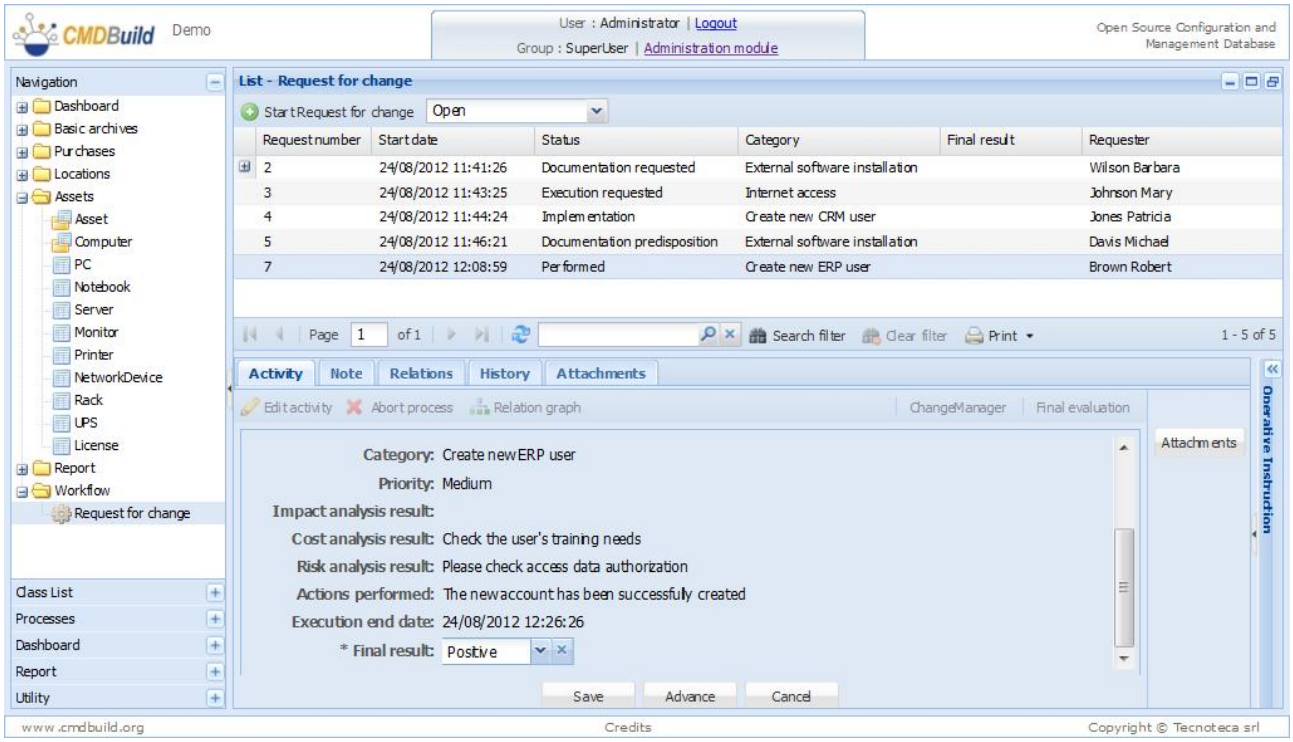


If the decision is positive, according to the flow designed with TWE, the IT experts are asked to carry out the RfC activity. At the beginning the operation makes the request with indication of the activities which must be carried out; at the end it registers the activities already carried out.

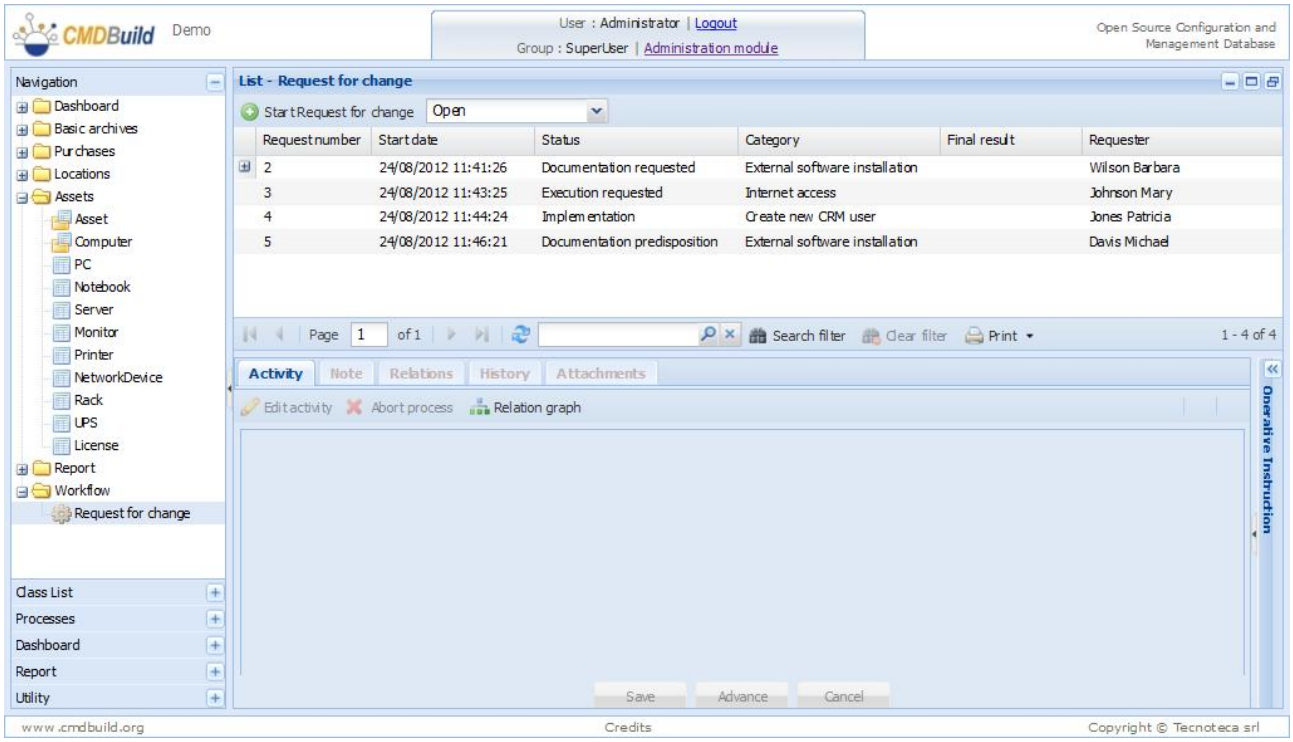




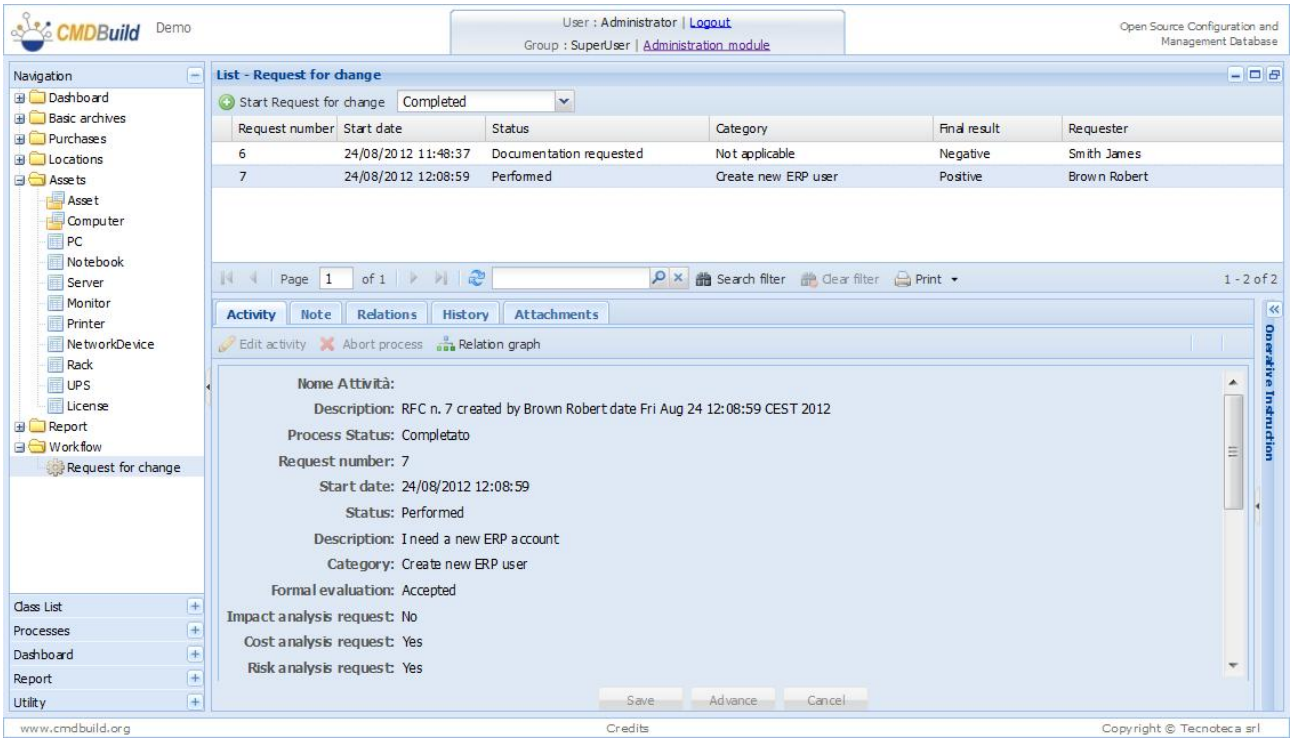
As last operation, the Change Manager closes the RfC stating a positive result.

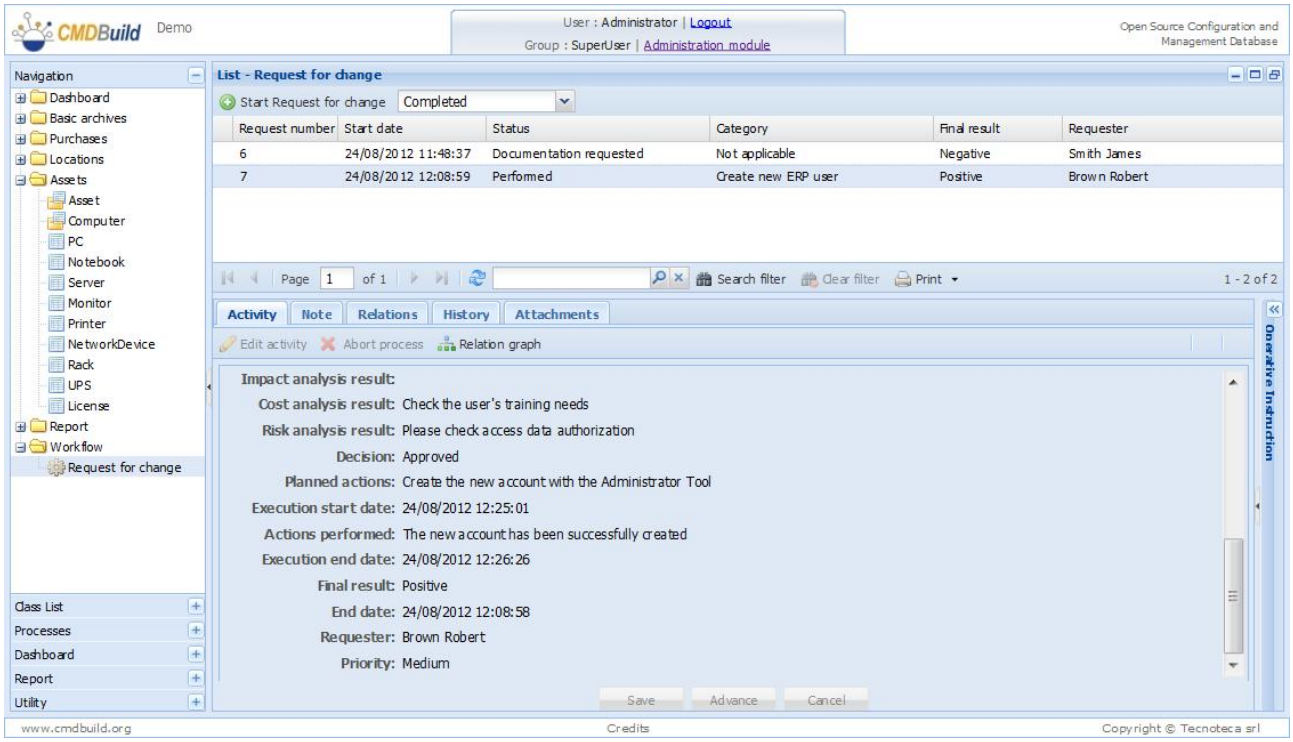


At this stage, the RfC we worked on (number 7) will not appear in the list of the open RfC.

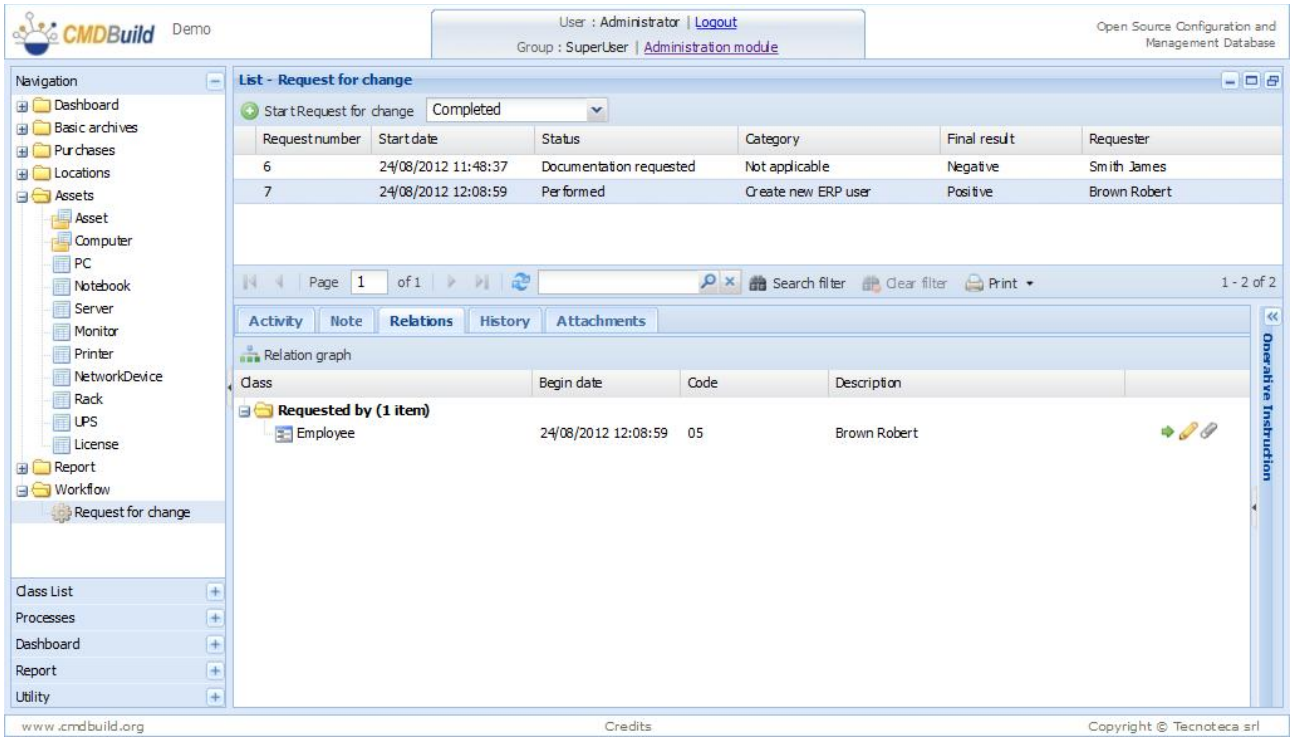


But it can be refered with all its information in the list of the completed RfC (the list can be selected in the upper part of the form)

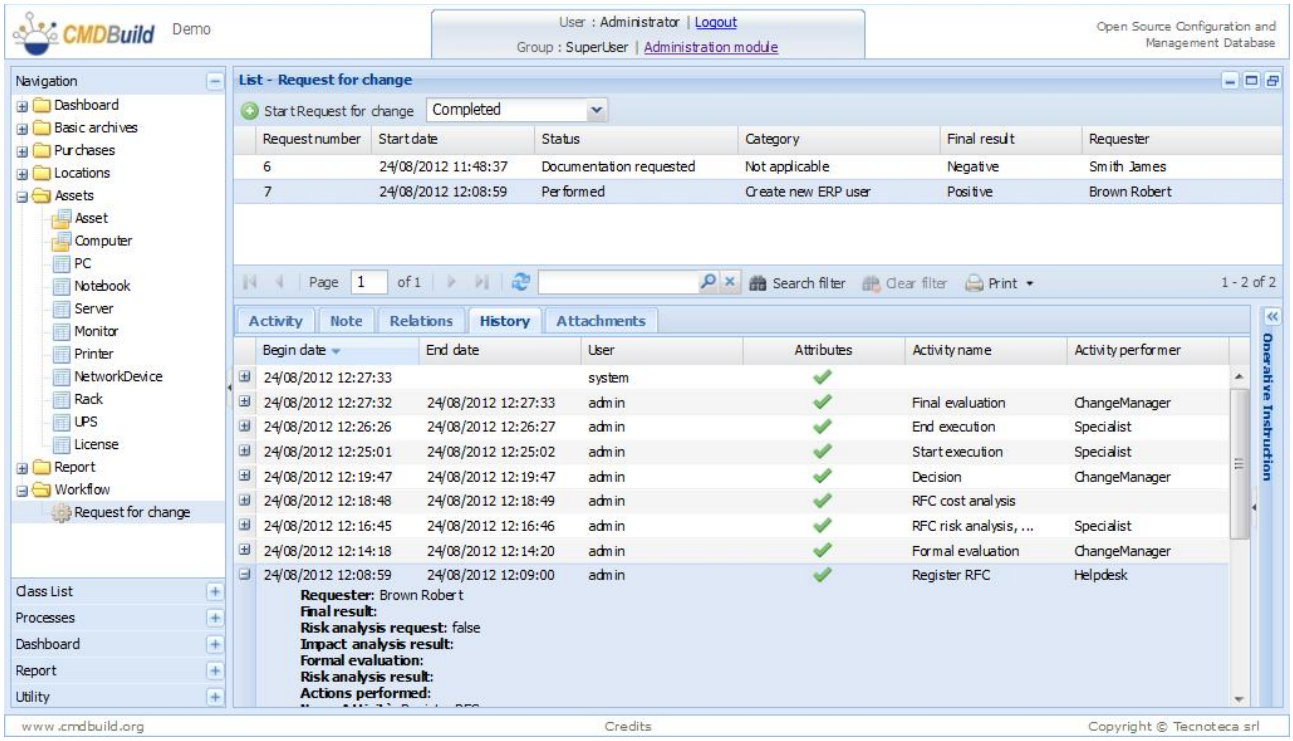




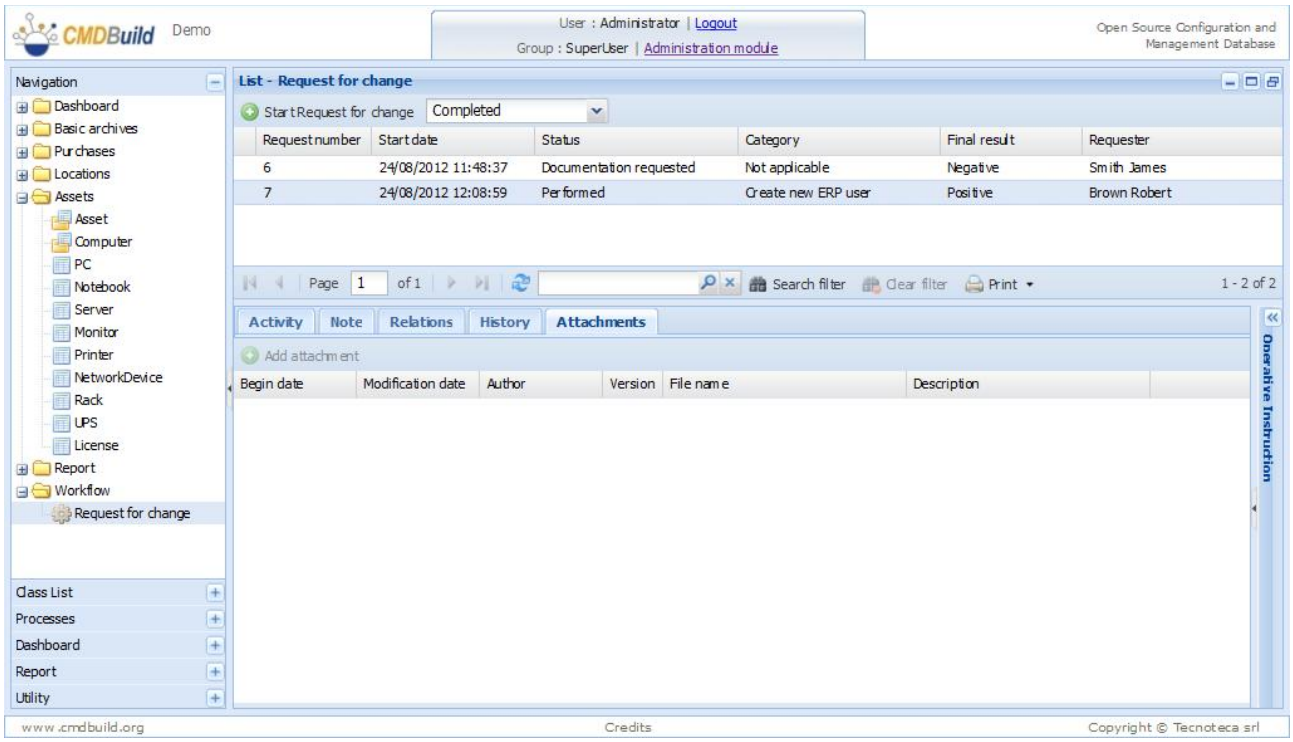
In addition to the basic information, you can refer to the relations configured with that RfC process instance (Relations TAB).



You can also refer to the sequence complete with progress activities of the process (History TAB).



Uploading the attachments during the process (using the proper widget), you can refer to the possible available documents (Attachments TAB).



Widgets prompted to use in the user activities of the workflow

Widget list

CMDBuild makes some widgets available (visual controls), placed in the right part of the form, which manage the progress of the process through the provided activity.

Graphically, such controls are designed with buttons with the specified label during the definition step.

About the configuration, they are defined as “Extended attributes” (provided in the XPDL standard) using the TWE editor.

In this document, the data types are both original (integer, string, date, float, boolean) and complex types added in the workflows of CMDBuild (lookup = id + type + description, lookups = lookup array, reference = id + idclass + description, references = reference array).

Visual control	Description	Parameters	Notes
manageRelation	It shows the card list (which can be selected) in relation to the specified card according to the specified domain	Input: DomainName *string* ClassName *string* ObjId *integer* ButtonLabel *string* EnabledFunctions *character array* Required *integer* IsDirect *string* or Input: DomainName *string* ObjRef *reference* ButtonLabel *string* EnabledFunctions *character array* Required *integer* Output: CheckArray *references*	EnabledFunctions is an array of boolean values which enables different functionalities according to the following positional method: - link element - add and link element - activate selection check - activate selection radio button - modify relation - disconnect element - modify element - delete element The parameter Required = 1 must be indicated only if the selection of at least one element is compulsory IsDirect can take the values “true” or “false”
linkCards	It shows the paginated list - which can be selected - of all cards belonging to a class, with possible display on a geographical map	Input: ClassName *string* ButtonLabel *string* SingleSelect *integer* NoSelect *integer* Required *integer* Filter *string* DefaultSelection *string*	The parameter SingleSelect = 1 must be indicatedonly if the selection of one single row is allowed (radio-button rather than checkbox) The parameter NoSelect = 1 desables the selection of rows (neither radio button nor checkbox) The parameter Required = 1 forces the selection of one row at least

		AllowCardEditing *integer* DisableGridFilterToggler *boolean* Map *string* StartMapWithLatitude *integer* StartMapWithLongitude *integer* StartMapWithZoom *integer* Metadata *string* MetadataOutput *string* <u>Output</u>: CheckArray *references [metadataOutput] text*	The Filter parameter is a CQL expression (CMDBuild query language) Example: Filter = “from Person where Id = {client:Customer.Id}” The optional parameter DefaultSelection specifies the CQL query used for the automatic selection when opening the widget The optional parameter AllowCardEditing = 1 adds an icon to edit the card The optional parameter DisableGridFilterToggler = “true” hides the button “Disable filter” The optional Map parameter enables the map visualization (if it is set = 'enabled') The parameters related to the initial presentation of the map are optional The Metadata variable accepts as unique value (waiting for future extensions) the 'point:POINT' string. The MetadataOutput variable accepts as unique value the '_metadataOutput' string that represents the name of the output variable. They both are necessary to manage the selection of a single point on an already existing polygonal. The point coordinates will be given back in the metadataOutput variable in the WGS84 format. A possible example: point:POINT(5847010.6684071 1438393.2786558)
createModifyCard	It shows the specified card in the change (if ObjId is specified), otherwise it allows the creation of a new card in the specified class	<u>Input:</u> ClassName *string* ButtonLabel *string* ReadOnly integer or <u>Input:</u> Reference *reference* ButtonLabel *string* *ReadOnly integer* or <u>Input:</u> ClassName *string* ObjId *integer* ButtonLabel *string* *ReadOnly integer*	Example: ClassName='User' ObjId=client:Requester ButtonLabel = 'Create or modify User' Requester Note: the prefix “client:” is required to access to a variable before the workflow is proceeded to the following step ReadOnly=1 shows the card read-only

		Output: Reference *reference*	
createReport		Input: ReportType *string* ReportCode *string* ButtonLabel *string* ForcePDF *integer* ForceCSV *integer* Parameter-1 Parameter-2 ... Parameter-n Output: ReportURL *string*	ReportType can currently only take the 'custom' value ReportCode coincides with the report “Code” attribute in the schedule “Report” ForcePDF forces the output in PDF format ForceCSV forces the output in CSV format Parameter-1 ... Parameter-n they represent launch parameters provided by the report
manageEmail	It allows to product through template or write free e-mails which will be sent during the development of the process.	Input: ButtonLabel *string* ToAddresses *string* CCAddresses *string* Subject *string* Content *string* *Assignments string* ReadOnly *boolean*	Visualizing e-mails, the electronic mailbox will be checked for possible new e-mails The parameters ToAddresses, CcAddresses, Subject and Content are "string template" which can include "tags" for the "substitution" of variables (for further information see the next paragraph) It is required the configuration of parameters for the e-mail sending in the file *workflow.conf*.
openNote	It visualizes the page which includes the HTML editor to insert notes	Input: ButtonLabel *string*	It can't be used in the first process activity
openAttachment	It visualizes the page provided for the uploading of the file which has to be enclosed to the current process	Input: ButtonLabel *string*	It can't be used in the first process activity
calendar	It displays the calendar with the selected dates	Input: ButtonLabel *string* ClassName *string* Filter *string* EventStartDate *date* EventEndDate *date* EventTitle *string*	From the class ClassName you can collect the dates you want to display in the calendar, with possible filter (it is optional but it takes the precedence on the ClassName). The parameter EventEndDate is optional. EventTitle indicates the attribute that draws the text and writes it on the calendar for every date
presetFromCard	It populates the current activity with those data recovered by a selected card.	Input: ButtonLabel *string* ClassName *string* Filter *string* AttributeMapping *string*	ClassName, the name of the class, as an alternative to Filter, which is on the contrary a CQL expression. AttributeMapping is a string in the form of 'a1=c1,a2=c2' that shows how to chart activity attributes with the card ones. The comma separates the assignments.

webService	It displays the result of a call to Web Service (at the moment SOAP only) as a grid. You can select some rows of this grid to obtain their XML serialization as widget output.	Input: ButtonLabel *string* EndPoint *string* Method *string* NameSpacePrefix *string* NameSpaceURI *string* NodesToUseAsRows *string* NodesToUseAsColumns *string* SingleSelect='true' Mandatory='true' ReadOnly='true' *String* parameters OutputSeparator *string* Output: Output *string* variable	EndPoint=Service URL Method=Method name NameSpacePrefix=namespace prefix' (optional) NameSpaceURI='namespace URI' (optional) NodesToUseAsRows= Names of elements (separated by commas without spaces) of the answer to display in the grid NodesToUseAsColumns=Names of the elements (separated by commas without spaces) of the answer to use as grid columns. Call parameters (optional) = possible parameters provided for in the Web Service. Output variable(optional) that will be optimized through the XML serialization related to the selected nodes If it is string type, then the separator has also to be specified. OutputSeparator (optional)= character to separate the results. If it is missing, they will be given back as string array.
startWorkflow	It allows to start a workflow according two modalities: 1) configuration read by widgets 2) configuration read by a "support" table	1) Input: ButtonLabel *string* WorkflowCode *string* or 2) Input: ButtonLabel *string* FilterType *string* Filter *string* Output: processRef *ReferenceType*	1) WorkflowCode name of the starting process 2) FilterType supports at the moment just “cql” Filter the cql filter to select a series of card from a CMDBuild table. The result of the filter should be the same as the name list of the processes that should be started from the widget itself.
grid	It allows to manage a row grid (by adding, removing and/or modifying the rows)	Input: ClassName string ButtonLabel string CardSeparator string AttributeSeparator *string* KeyValueSeparator	ClassName is the name of the class in which you want to work CardSeparator separator among the various inserted cards (default ";") AttributeSeparator separator among the attributes of the same card (default "&")

		string PresetsType="function" Presets *string* Output: Output *string* variable	KeyValueSeparator separator between an attribute and its value (default "==") The output variable will be a single string containing the serialization of the inserted data, separated by the above-mentioned characters PresetType and Preset are necessary to upload in advance some values into the grid; these values will be then edited directly by the user. If you want to use a variable as input or the output of another grid, you simply have to specify the key Preset=InputString where InputString is a formatted string like the grid output. If you want to upload in advance the grid starting from a function (having as column names the same reference class fields) you have specify PresetsType="function" and Presets=”wf_function_name” where ”wf_function_name” is the name of a stored procedure in the database defined according to criteria used to create dashboards. Any parameter has to be specified in succession in the form of: Param1="value1" (function input parameter) Param2="value2" (function input parameter) There is also the possibility to upload in advance the values into the grid through the proper widget button called “Import from CSV”. The file must follow the norms defined for the CSV file importation into CMDBuild. You will also have the possibility to specify the separator and the way to import the data (Replace or Add)
customForm	It allows to manage a form or a row grid (by adding, removing and/or modifying the rows)	Input: ButtonLabel *string* ModelType *"[form|class|function]"* Layout *"[grid|form]"* DataType *[raw_json|raw_text|function]* ReadOnly *"[true|false]"* Required *"[true|false]"* AddDisabled *"[true|false]"* DeleteDisabled *"[true|false]"* ImportDisabled *"[true|false]"*	The structure of the custom form can be defined starting from: form - JSON item array class - attributes of a class function - function input parameters The layout can be a form (as if it is a CMDBuild card) or a row series. The data of the widget can be initialized starting form: raw_json - JSON item array raw_text – well-structured strings of text function – output values of a function Data can be serialized as type of text (see

		ModifyDisabled *"[true|false]"* SerializationType *"[json|text]"* KeyValueSeparator *string* AttributesSeparator *string* RowsSeparator *string* Output: Output *string* variable	the widget grid) or as type of json.
navigationTree	It allows to select one or more data cards through an interface that is based on a preconfigured navigation tree (subset of domain graph)	Input: NavigationTreeName string ButtonLabel string Output: CheckArray *references*	NavigationTreeName represents the name of that tree you want to display
adminStart	By a process with more start activities distinct for each group, it singles out the activity for the administer user		No input nor output parameters It is an “extended attribute”, not a widget (it doesn't have a user interface), but it is described in this section, since it is configured like widgets.

Further information for the use of “string template” in the tool manageEmail

The tool *manageEmail* allows to write e-mails which will be sent during the development of the process. Visualizing e-mails, the electronic mailbox will be checked for possible new e-mails to visualize the grid.

Input parameters	• *string* ButtonLabel • one or more blocks for the e-mails definition ◦ *string template* ToAddresses: recipient’s addresses ◦ *string template* CcAddresses: carbon copy addresses ◦ *string template* Subject: e-mail subject ◦ *string template* Content: e-mail body (HTML) ◦ *string template* Condition: javascript expression whose evaluation defines if the e-mail is generated or not • other optional parameters which include queries or javascript expressions • *flag* ReadOnly: read-only email
output parameters	none

The only-read *flag* is seen as a boolean value; a boolean value (of the process), a positive integer value or a non empty string are considered *true*

In the *template strings* the variables, written in the form {namespace:localname}, are interpreted in a different way depending on the namespace (if omitted, it defaults to "server").

client:name **client**:name.Id **client**:name.Description	Form's *name* variable; for attributes such as LookUp or Reference you have to specify, with the bullet list, whether you want the *Id* or the *Description*
server:name	Process *name* variable in the previous step
xa:name	Variable *name* of the extended attribute definition, extended as template excluding the variables with namespace *js* and *cql*
user:id **user**:name	ID and name of the connected user
group:id **group**:name	ID and name of the connected group
js:name	Variable *name* of the extended attribute definition interpreted as a template and evalued as a javascript code
cql:name.field	Variable *name* of the extended attribute definition interpreted as a template and evalued carrying out a CQL query, whose field is identified by *field*

The definition blocks of the e-mails can be written in two ways:

ToAddresses="**…**"
CcAddresses="..."
Subject="..."
Content="..."

or (if you want to specify more than one e-mail):

ToAddresses1="**…**"
CcAddresses1="..."
Subject1="..."
Content1="..."
ToAddresses2="..."
CcAddresses2="..."
Subject2="..."
Content2="..."
...

Example 1

ToAddresses="foo@example.com"
Subject="**{cql:QueryRequester.Description}** - **{client:Request}**"
QueryRequester="select Description,Email,Office from Employee where Id = **{cql:SillyQuery.Id}**"
SillyQuery="select Id from Employee where Id=**{client:Requester}**"

Address: The recipient's address is statically completed with the string foo@example.com

Body: Message Body Empty

Subject:

- The variable QueryRequester selects an Employee card which includes the fields Description, Email and Office; the extracted values are available using for example the syntax {cql:QueryRequester.Description}, which will be replaced with the field Description extracted from the variable QueryRequester
- Inside QueryRequester, {cql:SillyQuery.Id} will be replaced with the Id field of the card returned from the SillyQuery (indeed nested queries are supported), replaced before with {client:Requester} with the value taken in the form
- {client:Request} of will be completed with the form value

Example 2

...
Content="The requester, **{js:JoinJS}**, belonging to the office **{cql:QueryRequester.Office_value}** requests:
>
{server:Request}"
JoinJS="**{js:FirstJS}**+"#"+**{js:SecondJS}**"
FirstJS="**{cql:QueryRequester.Description}**.slice(0,**{xa:SplitLength}**)"
SecondJS="**{cql:QueryRequester.Description}**.slice(**{xa:SplitLength}**)"
SplitLength=2
QueryRequester="select Description,Email,Office from Employee where Id = **{Requester}**"

This is an example of more complexity.

In the body there are three variables which must by replaced:

- {js:JoinJS} values the extended attribute variable like a javascript expression, splitting with # the variables FirstJS and SecondJS, always valued through javascript
- {js:FirstJS} and {js:SecondJS} include both a variable taken from a field of CQL query QueryRequester and a static variable taken from the ones of the extended attribute
- {cql:QueryRequester...} includes a reference to a server side variable called Requester
- {cql:QueryRequester.Office_value} uses the Office reference description instead of its ID (that would be just Office)
- {server:Request} takes a server side variable (as Requester), but it also states the namespace

API prompted to use in the automatic activities of the workflow

In CMDBuild there are some APIs (Application Programming Interface) which can be used in the automatic activities of the workflow for the script writing; so it is possible to implement custom behaviors (manipulation of process variables, card creation and relations in CMDB, e-mail sending, report creation, etc).

- The condition to send e-mails is always verified since {xa:SplitLength} is constant and the javascript expression is always true.

General Information

Key words

Process
ProcessId: int Id of the current process
ProcessClass: String Class name of the current process
ProcessCode: String univocal ProcessInstanceId of the current process

Performer
_CurrentUser: ReferenceType reference to the User that performed the last activity of the current process
_CurrentGroup: ReferenceType reference to the Role that performed the last activity of the current process

API
cmdb it identifies the native functions in CMDBuild

Management of CMDBuild items

They concern the CMDBuild specific data; for other data (integer, string, date, float) you can use all manipulation methods offered by the Java language.

ReferenceType

Methods
getId(): int

it returns the Reference id
getDescription(): String it returns the Reference description

LookupType

Methods
getId(): int it returns theLookup id
getType(): String it returns the type of Lookup
getDescription(): String it returns the Lookup description
getCode(): String it returns the Lookup code

CardDescriptor

Methods
getClassName(): String it returns the Class name for a CardDescriptor variable
getId(): int it returns the Id name for a CardDescriptor variable
equals(CardDescriptor cardDescriptor): boolean it compares the CardDescriptor variable with the specified one

Card

Methods
getCode(): String it returns the Code for a Card variable
getDescription(): String it returns the Description for a Card variable
has(String name): boolean it controls the presence of the specified attribute in the Card variable
hasAttribute(String name): boolean it controls the presence of the specified attribute in the Card variable
get(String name): Object it returns the specified attribute value of the Card variable
getAttributeNames(): Set<String> it returnsthe attributes list of the Card variable
getAttributes(): Map<String, Object>

it returns the attributes list and their values of the Card variable. The returned values respect the CMDBuild types (ReferenceType, LookupType, Date, Integer, ...)

Attachments

Methods
fetch(): Iterable<AttachmentDescriptor> it returns the attachments list of the Card or of the instantiated process
upload(Attachment... attachments):void it attaches the documents to the card or to the instantiated process
upload(String name, String description, String category, String url):void it creates an attachment with name, description and category specified starting from the file with the specified URL and attaches it to the card or to the instantiated process
selectByName(String... names): SelectedAttachments it returns the attachments of the card or of the instantiated process with the specified name
selectAll(): SelectedAttachments it returns all attachments of the card or of the instantiated process

AttachmentDescriptor

Methods
getName(): String it returns the name of the attachment
getDescription(): String it returns the attachment description
getCategory(): String it returns the attachment category

Attachment

Methods
getUrl(): String it returns the URL of the file

DownloadedReport

Methods
getUrl(): String it returns the local URL where the report has been saved
equals(DownloadedReport downloadedReport): boolean it compares the DownloadedReport variable with the specified one

Access methods to CMDBuild

NewCard

Builders
newCard(String className): NewCard it creates a new Card created in the specified Class of CMDBuild

Modifiers
withCode(String value): NewCard it adds the Code to the new card created in CMDBuild
withDescription(String value): NewCard it adds the Description to the new card created in CMDBuild
with(String name, Object value): NewCard it adds the value specified for the specified attribute to the new card created in CMDBuild
withAttribute(String name, Object value): NewCard it adds the value specified for the specified attribute to the new card created in CMDBuild

Actions
create(): CardDescriptor it creates the new card in CMDBuild setting the attributes previously defined

Example:

```
/*
 * Creation of a new card in the "Employee" class having
 * the following attributes:
 *  "Code"       =     "T1000"
 *  "Name"       =     "James"
 *  "Surname"    =     "Hetfield"
 */
cdNewEmployee = cmdb.newCard("Employee")
.withCode("T1000")
.with("Name", "James")
.withAttribute("Surname", "Hetfield")
.create();
```

ExistingCard

Builders
existingCard(String className, int id): ExistingCard it creates a Card existing in the specified Class having the specified Id to query CMDBuild
existingCard(CardDescriptor cardDescriptor): ExistingCard

it creates an existing Card indicated by the specified CardDescriptor to query CMDBuild

Modifiers
withCode(String value): ExistingCard it sets the Code for the Card requested to CMDBuild
withDescription(String value): ExistingCard it sets the Description for the Card requested to CMDBuild
with(String name, Object value): ExistingCard it sets the specified attribute with the specified value for the Card requested to CMDBuild
withAttribute(String name, Object value): ExistingCard it sets the specified attribute with the specified value for the Card requested to CMDBuild
withAttachment(String url, String name, String category, String description): ExistingCard it attaches a file (pointed out through a server local url) to the selected card by setting the file name, its category and its description
attachments(): ExistingCard it allows you to access the attachments of the selected card
selectAll(): ExistingCard it allows you to select all documents of the selected card
selectByName(String name1, String name2, ...):ExistingCard it allows you to select all documents of the selected card

Actions
update() it updates the Card in CMDBuild by setting the attributes previously indicated with the specified values
delete() it deletes (logic delete) the Card from CMDBuild If the "attachments" modifier has been used, it will delete only the selected files
fetch(): Card it requests the Card to CMDBuild with the attributes previously indicated. If no modifier has been used, it requests the whole Card (with all attributes) fetch(): Iterable<AttachmentDescriptor> If the "attachments" modifier has been used, the method returns the list of the card attachments
upload(Attachment attachment, Attachment attachment2,..) to be used in the presence of the "attachments" modifier: it attaches one or more files to the card upload(Attachment attachment, String description, String category, String url)

to be used in the presence of the "attachments" modifier: it attaches to the card a single file with specified description and category
download(): Iterable<Attachment> If the "attachments" modifier has been used, the method returns the selected attachments of the card
copyTo() If the "attachments" modifier has been used, the method copies a selected attachment of the card into a specified destination
moveTo() If the "attachments" modifier has been used, the method moves a selected card attachment into a specified destination

Examples:

```
/*
 * It modifies the card previously created in the class “Employee”
 * by setting the following attributes:
 *  “Phone”      =     “754-3010”
 *  “Email”      =     “j.hetfield@somemail.com”
 */
cmdb.existingCard(cdNewEmplyee)
.with(“Phone”, “754-3010”)
.withAttribute(“Email”, “j.hetfield@somemail.com”)
.update();

/*
 * (Logic) delete of the card previously created in the class
 * “Emplyoee”
 */
cmdb.existingCard(cdNewEmplyee)
.delete();

/*
 * Delete of the card attachment that was previuosly
 * created in the “Employee” class
 */

Iterable <AttachmentDescriptor> attachments =
cmdb.existingCard(cdNewEmplyee)
.attachments()
.fetch();
```

```
/*
 * Delete of the card attachment that was previuosly
 * created in the “Employee” class
 */
cmdb.existingCard(cdNewEmplyee)
.attachments()
.selectByName(String[]{"attachment-name"})
.delete();
```

NewProcessInstance

Builders
newProcessInstance(String className): NewProcessInstance it creates a new process instance created in CMDBuild for the specified process

Modifiers
withDescription(String value): NewProcessInstance it adds the Description to the new card created in CMDBuild
with(String name, Object value): NewProcessInstance it adds the value specified for the specified attribute to the new process created in CMDBuild
withAttribute(String name, Object value): NewProcessInstance it adds the value specified for the specified attribute to the new process created in CMDBuild

Actions
start(): ProcessInstanceDescriptor it creates the new process in CMDBuild setting the attributes previously defined, and does not advance
startAndAdvance(): ProcessInstanceDescriptor it creates the new process in CMDBuid setting the attributes previously defined, and advances at the following step

Example:

```
/*
 * Creation of a new card in the “RequestForChange” class
 * having the following attributes
 *  “Requester”  = “James Hetfield”
 *  “RFCExtendedDescription” = “My printer is broken”
 */
pidNewRequestForChange =
cmdb.newProcessInstance(“RequestForChange”)
```

```
.with("Requester", "James Hetfield")
.withAttribute("RFCExtendedDescription", "My printer is broken")
.startAndAdvance();
```

ExistingProcessInstance

Builders
existingProcessInstance(String processClassName, int processId): ExistingProcessInstance it creates a process instance existing in the specified process class with the specified Id

Modifiers
with(String name, Object value): ExistingProcessInstance it sets the specified attribute with the specified value for the process instance
withAttribute (String name, Object value): ExistingProcessInstance it sets the specified attribute with the specified value for the process instance
withDescription(String value): ExistingProcessInstance it sets the specified attribute with the specified value for the process instance
attachments(): Attachments it allows you to access the attachments of the process instance

Actions
abort(): void it aborts the process instance
advance(): void it advances a process instance
resume(): void it resumes the hanging process instance
suspend(): void it suspends the open process instance
update(): void it updates the process instance

Example:

```
/*
* Update of the process instance in the class "Request
* for change" with Id = pid by editing the requester and
* advancing the process at the following step
*/
```

```
cmdb.existingProcessInstance("RequestForChange",  pid)
.with("Requester", cdNewEmployee.getId())
.advance();
```

NewRelation

Builders
newRelation(String domainName): ExistingProcessInstance it creates a new relation added in the specified Domain of CMDBuild

Modifiers
withCard1(String className, int cardId): NewRelation it sets the card in the source side of the relation
withCard2(String className, int cardId): NewRelation it sets the card in the target side of the relation

Actions
create() it creates the new relation in CMDBuild among the Cards indicated in the specified Domain

Example:

```
/*
 * Creation of a new relation in the "AssetAssignee" domain
 * between a card of the selected "Asset" class,
 * through the "Item" Reference attribute, and
 * the card previously created in the "Employee" class
 */
cmdb.newRelation("AssetAssignee")
.withCard1("Employee", cdNewEmployee.getId())
.withCard2("Asset", Item.getId())
.create();
```

ExistingRelation

Builders
existingRelation(String domainName): ExistingRelation it creates an existing relation in the specified Domain of CMDBuild

Modifiers
withCard1(String className, int cardId): ExistingRelation

it sets IdClass and I'ObjId of the Card from the source side of the relation
withCard2(String className, int cardId): ExistingRelation it sets IdClass and I'ObjId of the Card from the target side of the relation

Actions
delete() it deletes (logic delete) the relation existing in CMDBuild among the Cards indicated in the specified Domain

Example:

```
/*
 * Delete the relation on the "AssetAssignee" domain
 * among the cards previously indicated
 */
cmdb.existingRelation("AssetAssignee")
.withCard1("Employee", cdNewEmployee.getId())
.withCard2("Asset", Item.getId())
.delete();
```

QueryClass

Builders
queryClass(String className): QueryClass it creates a query that queries the class specified in CMDBuild

Modifiers
withCode(String value): QueryClass it sets the Card Code for the filter used to query CMDBuild
withDescription(String value): QueryClass it sets the Card Description for the filter used to query CMDBuild
with(String name, Object value): QueryClass it sets the value for the specified attribute of the Card for the filter used to query CMDBuild
withAttribute(String name, Object value): QueryClass it sets the value for the specified attribute of the Card for the filter used to query CMDBuild

Actions
fetch(): List<Card> it performs the search query on the specified Class of CMDBuild and returns the list of those Cards that respect the filter previously set

Example:

```
/*
 * List of the cards of the “Employee” class having
 * the “State” attribute set to 'Active'
 */
Employees = cmdb.queryClass(“Employee”)
.with(“State”, “Active”)
.fetch();
```

CallFunction

Builders
callFunction(String functionName): CallFunction it creates a call to a stored procedure previously defined in PostgreSQL

Modifiers
with(String name, Object value): CallFunction it sets the value of the input parameter specified for the stored procedure

Actions
execute(): Map<String, String> it performs the stored procedure and returns the list of the output parameters with the related values

Example:

```
/*
 * Call of the stored PostgreSQL procedure
 * “cmwf_getImpact”(IN “DeliveryDate” date, IN “Cost” integer,
 * OUT “Impact” character varying)
 * that computes the impact level (attribute of
 * “Impact” process) of an activity on a scale of "High",
 * “Medium” and “Low”, given in input the expected delivery
 * date (process attribute “ExpectedDeliveryDate”) and
 * the price (attribute “ManHoursCost”) expressed in hour/employee
 */
spResultSet = cmdb.callFunction(“cmwf_getImpact”)
.with(“DeliveryDate”, ExpectedDeliveryDate.getTime())
.with(“Cost”, ManHoursCost)
.execute();
Impact = spResultSet.get(“Impact”)
```

Note: SQL functions - which should be called - must be defined according to CMDBuild standards. For their definitio,n see the Administrator Manual, section Cart TAB, paragraph “Definition of the data source (PostgreSQL function)”.

QueryRelations

Builders
queryRelations(CardDescriptor cardDescriptor): ActiveQueryRelations it creates a query to ask CMDBuild the Cards related to the specified one
queryRelations(String className, int id): ActiveQueryRelations it creates a query to ask CMDBuild the Cards related to that specified by className and id

Modifiers
withDomain(String domainName): ActiveQueryRelations it sets the Domain to perform the query

Actions
fetch(): List<CardDescriptor> it performs the query on CMDBuild using the parameters previously defined, it returns the list of the linked Cards

Example:

```
/*
 * List of “Assets” linked to the “Employee” card indicated
 * by the CardDescriptor cdNewEmployee previously created,
 * through the relation on the domain “AssetAssignee”
 */
assets = cmdb.queryRelation(cdNewEmployee)
.withDomain(“AssetAssignee”)
.fetch();
```

CreateReport

Builders
createReport(String title, String format): CreateReport it creates the Report in the specified format (pdf, csv) with the specified Title

Modifiers
with(String name, Object value): CreateReport it sets the input parameter value specified for the Report

Actions
download(): DownloadedReport it generates the indicated Report using the parameters previously defined

Example:

```
/*
 * It generated the Report "DismissedAssets" which shows the list
 * of the abandoned Assets
 */
newReport = cmdb.createReport("Assigned assets to")
.download();
```

NewMail

Builders
newMail(): NewMail it creates a new e-mail to send

Modifiers
withFrom(String from): NewMail it sets the sender of the e-mail to send
withTo(String to): NewMail it sets the recipients of the e-mail to send
withCc(String cc): NewMail it sets the carbon copy recipients of the e-mail to send
withBcc(String bcc): NewMail it sets the blind carbon copy recipients of the e-mail to send
withSubject(String subject): NewMail it sets the subject of the e-mail to send
withContent(String content): NewMail it sets the text of the e-mail to send
withContentType(String contentType): NewMail it sets the content MimeType of the e-mail to send, the allowed values are "text/html" or "text/plain". If not otherwise specified, the default value is "text/plain"
withAttachment(URL url): NewMail it sets the url of a document to enclose to the e-mail
withAsynchronousSend(bool boolean): NewMail it sends the e-mail asynchronously in spite of the script; in this way any timeout problem will be avoided, but you will not be able to intervene in case of error by sending the e-mail

Actions
send() it performs the e-mail sending using the previously defined statements

Example:

```
/*
 * Send a new email
 */
cmdb.newMail()
.withFrom("fromaddress@somemail.com")
.withTo("toaddress@somemail.com")
.withCc("ccaddress@somemail.com")
.withSubject("Mail subject")
.withContent("Mail content")
.send();
```

NewMailQueue

Builders
newMailQueue(): NewMailQueue it creates a new email queue

Methods
newMail(): QueueableNewMail it adds a new email to the queue
sendAll(): void it sends all emails from the queue

```
/*
 * Send a new email
*/
cmdb.newMailQueue()
.newMail()
.withFrom("fromaddress@somemail.com")
.withTo("toaddress@somemail.com")
.withCc("ccaddress@somemail.com")
.withSubject("Mail subject")
.withContent("Mail content")
.add()
```

```
.sendAll();
```

Methods for types conversion

ReferenceType

Methods
referenceTypeFrom(Card card): ReferenceType it returns the ReferenceType item related to the specified Card
referenceTypeFrom(CardDescriptor cardDescriptor): ReferenceType it retuns the ReferenceType item related to the specified CardDescriptor
referenceTypeFrom(int id): ReferenceType it returns the ReferenceType item related to the card with the specified Id

Example:

```
/*
 * Set the “Requester” process attribute Reference
 * type, given the “cdNewEmployee” CardDescriptor
 * previously created
 */
Requester = cmdb.referenceTypeFrom(cdNewEmployee);
```

LookupType

Methods
selectLookupById(int id): LookupType it returns the LookupType item with the specified Id
selectLookupByCode(String type, String code): LookupType it returns the LookupType item with specified Type and Code
selectLookupByDescription(String type, String description): LookupType it returns the LookupType item with specified Type and Description

Example:

```
/* Set the "State" process attribute Lookup type having:
 *  “Type” =     “Employee state”
 *  “Code” =     “ACTIVE”
 */
State = cmdb.selectLookupByCode(“Employee state”, “ACTIVE”);
```

CardDescriptor

Methods
cardDescriptorFrom(ReferenceType reference): CardDescriptor it returns the CardDescriptor of the specified card through the specified ReferenceType item

Example:

```
/*
 * Get the CardDescriptor related to the "Requester"
 * process attribute Reference type
*/
cdSelectedEmployee = cmdb.cardDescriptorFrom(Requester);
```

Card

Methods
cardFrom(ReferenceType reference): Card it returns the Card item of the specified card through the specified ReferenceType item

Example:

```
/*
 * Get the complete Card related to the "Requester"
 * process attribute Reference type
 */
selectedEmployee = cmdb.cardFrom(Requester);
```

Appendix: Documentation to use TWS 2.3

Foreword

In appendix you will find the specified technical documentation of the workflow system used until CMDBuild 1.5, whose compatibility is maintained also in CMDBuild 2.0; as soon as possible it will be discarded.

We must remember that in CMDBuild 2.0 there is the possibility to work - alternatively - both with Together Workflow Server 2.3 (the version used until CMDBuild 1.5, based on XPDL 1.0) and with the new version Together Workflow Server 4.4 (based on XPDL 2.0).

It is advisable to migrate in a short time, since that double compatibility will be maintained for a limited period.

Automatic methods used in the workflow

In order to use Together Workflow Server 2.3 (passed by the system based on Together Workflow Server 4.4), CMDBuild provides some methods (“tools”), which can be used inside the "tool activities” (automatic activities) in order to perform the various operation typologies:

- methods for the manipulation of the variables: conversion among data typologies, strings connection, etc.
- methods for the flow control: iterator, process suspension, process reboot
- access methods to CMDB: create a new card, read or change attribute, create relation, etc.
- external methods: sending e-mails, reading system time, etc.

Methods for the manipulation of the variables

Tool	Description	Input parameters	Output parameters	Notes
addDays	It adds to the specified date the indicated number of days	InputDate *date* days *integer*	OutputDate *date*	
boolToString	It converts a boolean variable to a string	InputBool *boolean*	OutputString *string*	
boolCopy	It copies the value of a boolean variable into another boolean one	From *boolean*	To *boolean*	
clearIterator	It resets the iterator	RefArray *references* HasNext *boolean* *CurrentIndex* *integer*	RefArray *references* HasNext *boolean* CurrentIndex *integer*	RefArray is set to null, CurrentIndex is set to 0 and HasNext to false
clearLookup	It resets the value	Lookup *lookup*		The value of the "Id"

	of a Lookup variable			attribute is set to -1
clearReference	It resets the value of a Reference variable	Ref *reference*		The value of the "Id" attribute is set to -1
concat concat3 / concat4 / ... / concat8	It concatenates two or more strings	InputString1 *string* InputString2 *string* ... InputStringn *string*	OutputString *string*	
createReferenceObj	It creates a reference variable and initializes it	ClassName *string* ObjId *integer* Description *string*	OutRef *reference*	The variable is initialized with the values read by the attributes “ClassName”, “ObjId” and “Description” of the specified card
dateToString	It converts a date variable into a string	InputDate *date*	OutputString *string*	
floatToString	It converts a float variable into a string	InputFloat *float*	OutputString *string*	
floatCopy	It copies the value of a float variable into another float variable	From *float*	To *float*	
getReferenceId	It extracts the “Id” attribute from a reference variable	Ref *reference*	CardId *integer*	
getReferenceClassId	It extracts the “ClassId” attribute from a reference variable	Ref *reference*	ClassId *integer*	
getLookupDescription	It extracts the “Description” attribute from a lookup variable	Lookup *lookup*	Description *string*	
getLookupId	It extracts the “Id” attribute from a lookup variable	Lookup *lookup*	Id *Integer*	
getLookupCode	It extracts the “Code” attribute from a lookup variable	Lookup *lookup*	Code *String*	
getReferenceDescription	It extracts the “Description” attribute from a reference variable	Ref *reference*	Description *string*	
getReferenceFromArray	It extracts the specified	RefArray *references*	OutRef *reference*	If the array is null or the index is higher than its

	Reference from the specified array	*Index integer*		dimension, it returns “null”
intToString	It converts an integer variable into a string	InputInt *integer*	OutputString *string*	
intCopy	It copies the value of an integer variable into another integer variable	From *integer*	To *integer*	
lookupToString	It converts the "Id" field of the lookup variable into a string	InputLookup *lookup*	OutputString *string*	
nextInt	It increases the specified integer variable	InputInt *integer*	InputInt *integer*	
referenceToString	It converts the “Id” field of the reference variable into a string	InputReference *reference*	OutputString *string*	
stringToDate	It converts a string variable into a date	InputString *string*	OutputDate *date*	It accepts as input formats YY/MM/dd or YY/mm/dd HH:mm:ss
stringCopy	It copies the value of a string variable into another string variable	From *string*	To *string*	
dateCopy	It copies the value of a date variable into another date variable	From *date*	To *date*	
stringToBool	It converts a string variable into a boolean value	From *string*	To *boolean*	It accepts as input the true or false strings
stringToInt	It converts a string variable into an integer	From *string*	To *integer*	In input it accepts the representation of an integer number in the shape of string
stringToFloat	It converts a string variable into a float	From *string*	To *float*	In input it accepts the representation of a float in the shape of string

Methods for the flow control

Tool	Description	Input parameters	Output parameters	Notes
nextRef	It increases the	RefArray	HasNext	RefArray is a reference

	iterator on a reference array	*references* CurrentIndex *integer*	*boolean* CurrentIndex *integer* CurrentValue *reference*	array, CurrentValue is the reference corresponding to the current index
resetIterator	It resets the iterators	RefArray *references*	HasNext *boolean* CurrentIndex *integer*	CurrentIndex is set to 0, HasNext is true if the array is not empty
resumeProcess	It reboots the specified process	ProcessInstanceId *string* *Complete integer*		The status of the specified process must be “Suspended” If “Complete” takes on the value 1, the process steps forward
suspendProcess	It suspends the specified process	ProcessInstanceId *string*		The constant “CURRENT” can be used to indicate the current process The process is suspended immediately before the following manual activity
voidApp	Null tool			

Access methods to CMDB

Tool	Description	Input parameters	Output parameters	Notes
createCard	It creates a new card and returns the ”Id”	ClassName *string* CardCode *string* CardDescription *string*	CardId *integer*	The method sets only the basic attributes "Code" and "Description" In order to set the other ones, you have to use the updateAttribute tool or define a createCard metatool
createCardRef	It creates a new card and returns the reference	ClassName *string* CardCode *string* CardDescription *string*	CardReference *reference*	The method sets only the basic attributes "Code" and "Description" In order to set the other ones, you have to use the updateAttribute tool or define a createCard metatool
createRelation	It creates a relation between two cards	DomainName *string* ClassName1 *string* ClassName2 *string* ObjId1 *integer* ObjId2 *integer*	Done *boolean*	

createRelation1Ref	It creates a relation between two cards, the first of them is specified by reference	DomainName *string* ObjReference1 *reference* ClassName2 *string* ObjId2 *integer*	Done *boolean*	
createRelation2Ref	It creates a relation between two cards, the second of them is indicated by reference	DomainName *string* ClassName1 *string* ObjId1 *integer* ObjReference2 *reference*	Done *boolean*	
createRelationRefs	It creates a relation between two cards, both specified by reference	DomainName *string* ObjReference1 *reference* ObjReference2 *reference*	Done *boolean*	
deleteRelation	It removes a relation between two cards	DomainName *string* ClassName1 *string* ClassName2 *string* ObjId1 *integer* ObjId2 *integer*	Done *boolean*	
deleteRelationByReference	It deletes a relation between two cards, both specified by reference	DomainName *string* ObjReference1 *reference* ObjReference2 *reference*	Done *boolean*	
selectAttribute	It reads an attribute of the specified card	ClassName *string* AttributeName *string* ObjId *integer*	AttributeValue *string*	The returned value is always represented by a string
selectAttributeFromReference	It reads an attribute of the specified card, specified by reference	ObjReference *reference* AttributeName *string*	AttributeValue *string*	The returned value is always represented by a string
selectLookup	It reads the description of a Lookup entry, specified by type and “Id”	Type *string* LookupId *integer*	LookupDescription *string*	
selectLookupById	It returns a Lookup entry, specified by “Id”	LookupId *integer*	Lookup *lookup*	
selectLookupByTypeDesc	It returns a Lookup entry, specified by type and description	Type *string* Description *string*	Lookup *lookup*	
selectLookupByTy	It returns a Lookup	Type *string*	Lookup *lookup*	

peCode	entry, specified by type and code	Code *string*		
selectReferenceByCode	It returns a reference item corresponding to the card specified by code	ClassName *string* Code *string*	OutRef *reference*	
selectReferenceByCustomAttribute	It returns a reference item corresponding to the indicated card through a generic attribute	ClassName *string* AttributeName *string* AttributeValue *string*	OutRef *reference*	
selectReferenceByReference	It returns a reference item corresponding to a reference attribute existing in the card specified by reference	ObjReference *reference* *AttributeName string*	OutRef *reference*	
selectRelations	It returns on a specific domain an array of references corresponding to the cards related to the one given by the specified id and class	ClassName *string* CardId *integer* *DomainName string*	RefArray *relations*	
selectRelationsByReference	It returns on a specific domain an array of references corresponding to the cards related to the one given by the specified reference	ClassName *string* CardId *integer* *DomainName string*	RefArray *relations*	
updateAttribute	It modifies a card	ClassName *string* AttributeName *string* ObjId *integer* AttributeValue *string*	Done *boolean*	The method edits only the specified attribute In order to edit more attributes, you have to define an updateCard metatool
updateAttributeRef	It edits a card specified by reference	ObjRef *reference* AttributeName *string* AttributeValue *string*	Done *boolean*	

External methods

Tool	Description	Input parameters	Output parameters	Notes
getCurrentTimestamp	It returns the system date and time		TheDate *date*	
getCurrentGroupReference	It returns a reference variable corresponding to the current user group		GroupRef *reference*	The returned item corresponds to the current group card in the CMDB "Role" table
getCurrentUserReference	It returns a reference variable corresponding to the current user		UserRef *reference*	The returned item corresponds to the current user card in the CMDB "Role" table
getReportFullUrl	It returns the link to the report created with the extended attribute createReport	ReportUrl *string*	ReportUrl *string*	
sendMail	It sends an e-mail	FromAddresses *string* ToAddresses *string* CCAddresses *string* BCCAddresses *string* Subject *string* Content *string* UrlAttachments *string* MimeType *string*		The tool provides that Shark parameters related to the e-mail sending are correctly configured Parameters From, To and Attach can include more values concatenated with “,” Parameters CCAddresses, BCCAddresses and UrlAttachments can be set by an empty string MimeType can take the values “text/html” or “text/plain”

Template automatic methods usable in the workflow

In order to use Together Workflow Server 2.3 (passed by the system based on Together Workflow Server 4.4), CMDBuild provides some templates of automatic methods (meta-tools), used for the definition of tools.

For the creation of new “tools”, custom CMDBuild provides the following steps:

- creation of a new “Application” with TWE Together Workflow Editor 4.4 (you can access the list from the process features), with the proper button “Create new element”
- the completion of the “Application” definition by clicking on the new row added to the list and setting the following parameters:
  - Id = name for the new “tool”
  - Name = you can set the same value chosen in the previous field
  - Formal parameters = adding as many input and output parameters as provided in the tool (as you can see in the following table)
  - Extended attribute “ToolAgentClass”
  - further specific extended attributes in the meta-tool (as you can see in the following table)

Template type	**Description**	**Input parameters**	**Output parameters**	**Notes**
createCard	Card creation in the CMDB	Attributes list set in the new card or ClassName *string* List of input parameters provided by the function	CardReference *reference*	It returns the id of the created card The second specification of the input parameters can be used if you exclude ClassName from the external attribute list (see the following table)
createReport	Running a report	List of input parameters provided by the report	ReportURL *string*	The returned URL can be used to enclose the report to an e-mail with the tool sendMail
executeFunction	Execute PostgreSQL functions	List of input parameters provided by the function	List of output parameters provided by the function	There must be at least one input parameter and one output parameter, even if they are fake
startProcess	Instance initiation of another process	Attributes list set during the process initiation	ProcessInstanceId *string*	It returns the process instance name (string type)
updateCard	Card update in the CMDB	ClassName *string* ObjId *integer* Attributes list updated in the card or	Done *boolean*	

		ObjRef *reference* List of input parameters provided by the function		
updateProcess	Save or progress of another process instance	ProcessInstanceId *string* Attributes list to set	Done *boolean*	

For a better readability, the following table shows separately the ToolAgent indication and other possible attributes that must be specified as TWE in the metatool definition.

All values of the attributes are string type.

Template type	**Metatool attribute**	**Metatool value**
createCard	ToolAgentClass ClassName	org.cmdbuild.shark.toolagent.CreateCardToolAgent [Class Name]
createReport	ToolAgentClass Type Code Format	org.cmdbuild.shark.toolagent.CreateReportToolAgent custom [Report code] pdf or csv
executeFunction	ToolAgentClass Procedure or CursorProcedure	org.cmdbuild.shark.toolagent.ExecuteStoredProcedureToolAgent [PostgreSQL function name with return single value] [PostgreSQL function name with return multiple value]
startProcess	ToolAgentClass ProcessClass Complete	org.cmdbuild.shark.toolagent.ProcessStartToolAgent [Class Name] 1 (to advance the process to the following activity) or 0 (to stop the process on the first activity)
updateCard	ToolAgentClass	org.cmdbuild.shark.toolagent.UpdateAttributeToolAgent
updateProcess	ToolAgentClass ProcessClass Complete	org.cmdbuild.shark.toolagent.ProcessUpdateToolAgent [Class Name] 1 (to advance the process to the following activity) or 0 (to stop the process on the first activity) If the process is "Suspended", the resumeProcess method must be carried out in advance.

APPENDIX: Glossary

ATTACHMENT

An attachment is a file associated to a card.

In order to manage the attachments, CMDBuild uses in embedded mode any document system which is compatible with the standard protocol CMIS (or the DMS Alfresco until the version 3 through its native webservice).

The management of the attachments supports the versioning of those files that have been uploaded a few times, with automatic numbering.

WORKFLOW STEP

"Activity" means one of the steps of which the process consists.

An activity has a name, an executor, a type, possible attributes and methods with statements (CMDBuild API) to be executed.

A process instance is a single process that has been activated automatically by the application or manually by an operator.

See also: Process

ATTRIBUTE

The term refers to an attribute of a CMDBuild class.

CMDBuild allows you to create new attributes (in classes and domains) or edit existing ones.

For example, in "supplier" class the attributes are: name, address, phone number, etc..

Each attribute corresponds, in the Management Module, to a form field and to a column in the database.

See also: Class, Domain, Report, Superclass, Attribute Type

BIM

Method with the aim to support the whole life cycle of a building: from its construction, use and maintenance, to its demolition, if any.

The BIM method (Building Information Modeling) is supported by several IT programs that can interact through an open format for data exchange, called IFC (Industry Foundation Classes).

See also: GIS

CI

We define CI (Configuration Item) each item that provides IT service to the user and has a sufficient detail level for its technical management.

CI examples include: server, workstation, software, operating system, printer, etc.

See also: Configuration

CLASS

A Class is a complex data type having a set of attributes that describe that kind of data.

A Class models an object that has to be managed in the CMDB, such as a computer, a software, a service provider, etc.

CMDBuild allows the administrator - with the Administration Module - to define new classes or delete / edit existing ones.

Classes are represented by cards and, in the database, by tables automatically created at the definition time.

See also: Card, Attribute

CONFIGURATION

The configuration management process is designed to keep updated and available to other processes the items (CI) information, their relations and their history.

It is one of the major ITIL processes managed by the application.

See also: CI, ITIL

DASHBOARD

In CMDBuild, a dashboard corresponds to a collection of different charts, in this way you can immediately hold in evidence some key parameters (KPI) related to a particular management aspect of the IT service.

See also: Report

DATABASE

The term refers to a structured collection of information, hosted on a server, as well as utility software that handle this information for tasks such as initialization, allocation, optimization, backup, etc..

CMDBuild relies on PostgreSQL, the most powerful, reliable, professional and open source database , and uses its advanced features and object-oriented structure.

DOMAIN

A domain is a relation between two classes.

A domain has a name, two descriptions (direct and inverse), classes codes, cardinality and attributes.

The system administrator, using the Administration Module, is able to define new domains or delete / edit existing ones.

It is possible to define custom attributes for each domain.

See also: Class, Relation

DATA FILTER

A data filter is a restriction of the list of those elements contained in a class, obtained by specifying boolean conditions (equal, not equal, contains, begins with, etc.) on those possible values that can be accepted by every class attribute.

Data filters can be defined and used exceptionally, otherwise they can be stored by the operator and then recalled (by the same operator or by operators of other user groups, which get the permission to use them by the system Administrator)

See also: Class, View

GIS

A GIS is a system able to produce, manage and analyse spatial data by associating geographic elements to one or more alphanumeric descriptions.

GIS functionalities in CMDBuild allow you to create geometric attributes (in addition to standard attributes) that represent, on plans / maps, markers position (assets), polylines (cable lines) and polygons (floors, rooms, etc.).

See also: BIM

GUI FRAMEWORK

It is a user interface you can completely customise. It is advised to supply a simplified access to the application. It can be issued onto any webportals and can be used with CMDBuild through the standard REST webservice.

See also: Mobile, Webservice

ITIL

"Best practices" system that established a "standard de facto"; it is a nonproprietary system for the management of IT services, following a process-oriented schema (Information Technology Infrastructure Library).

ITIL processes include: Service Support, Incident Management, Problem Management, Change Management, Configuration Management and Release Management.

For each process, ITIL handles description, basic components, criteria and tools for quality management, roles and responsibilities of the resources involved, integration points with other processes (to avoid duplications and inefficiencies).

See also: Configuration

LOOKUP

The term "Lookup" refers to a pair of values (Code, Description) set by the administrator in the Administration Module.

These values are used to bind the user's choice (at the form filling time) to one of the preset values.

With the Administration Module it is possible to define new "LookUp" tables according to organization needs.

MOBILE

It is a user interface for mobile tools (smartphones and tablets). It is implemented as multi-platform app (iOS, Android) and can be used with the CMDB through the REST webservice.

See also: GUI Framework, Webservice

PROCESS

The term "process" (or workflow) refers to a sequence of steps that realize an action.

Each process will take place on specific assets and will be performed by specific users.

A process is activated by starting a new process (filling related form) and ends when the last workflow step is executed.

See also: Workflow step

RELATION

A relation is a link between two CMDBuild cards or, in other words, an instance of a given domain.

A relation is defined by a pair of unique card identifiers, a domain and attributes (if any).

CMDBuild allows users, through the Management Module, to define new relations among the

cards stored in the database.

See also: Class, Domain

REPORT

The term refers to a document (PDF or CSV) containing information extracted from one or more classes and related domains.

CMDBuild users run reports by using the Management Module; reports definitions are stored in the database.

See also: Class, Domain, Database

CARD

The term "card" refers to an element stored in a class.

A card is defined by a set of values, i.e. the attributes defined for its class.

CMDBuild users, through the Management Module, are able to store new cards and update / delete existing ones.

Card information is stored in the database and, more exactly, in the table/columns created for that class (Administration Module).

See also: Class, Attribute

SUPERCLASS

A superclass is an abstract class used to define attributes shared between classes. From the abstract class you can derive real classes that contain data and include both shared attributes (specified in the superclass) and specific subclass attributes.

For example, you can define the superclass "Computer" with some basic attributes (RAM, HD, etc.) and then define derived subclasses "Desktop", "Notebook", "Server", each one with some specific attributes.

See also: Class, Attribute

ATTRIBUTE TYPE

Each attribute has a data type that represents attribute information and management.

The attribute type is defined using the Administration Module and can be modified within some limitations, depending on the data already stored in the system.

CMDBuild manages the following attribute types: "Boolean", "Date", "Decimal", "Double", "Inet" (IP address), "Integer", "Lookup" (lists set in "Settings" / "LookUp"), "Reference" (foreign key), "String", "Text", "Timestamp".

See also: Attribute

VIEW

A view not only includes the whole content of a CMDB class, it is a group of cards defined in a logical way.

In particular, a view can be defined in CMDBuild by applying a filter to a class (so it will contain a reduced set of the same rows) or specifying an SQL function which extracts attributes from one or more related classes.

The first view type maintains all functionalities available for a class, the second one allows the sole display and search with fast filter.

See also: Class, Filter

WEBSERVICE

A webservice is an interface that describes a collection of methods, available over a network and working using XML messages.

With webservices, an application allows other applications to interact with its methods.

CMDBuild includes a SOAP and a REST webservice.

WIDGET

A widget is a component of a GUI that improves user interaction with the application.

CMDBuild uses widgets (presented as "buttons") that can be placed on cards or processes. The buttons open popup windows that allow you to insert additional information, and then display the output of the selected function.