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We are thankful for the great contributions that led to the creation of these products.

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• cannot be removed from the application, and in particular from the header at the top of each page

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

1.1. The application

CMDBuild is an open source web environment for the configuration of custom applications for the Asset Management.

On the one hand, it provides native mechanisms for the administrator, implemented in a "core" code which has been kept separated from the business logic, so that the system can be configured with all its features.

On the other hand, it generates dynamically a web interface for the operators, so that they can keep the asset situation under control and always know their composition, detachment, functional relations and how they update, in order to manage their life-cycle in a comprehensive way.

The system administrator can build and extend his/her own CMDB (hence the name of the project), modeling the CMDB according to the company needs; a proper interface 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.

Using external visual editors, the administrator can design workflows, import them into CMDBuild and put them at operators' disposal, so that they can execute them according to the configured automatisms.

In a similar way, using external visual editors, the administrator can design various reports on CMDB data (printouts, graphs, barcode labels, etc.), import them into the system and put them at operators' disposal.

The administrator can also configure some dashboards made up of charts which immediately show the situation of some indicators in the current system (KPI).

A task manager included in the user interface of the Administration Module allows you to schedule various operations (process starts, e-mail receiving and sending, connector executions) and to control CMDB data (synchronous and asynchronous events). Based on their findings, it sends notifications, starts workflows and executes scripts.

Thanks to document management systems that support the CMIS standard (Content Management Interoperability Services) - among which there is also the open source solution Alfresco - you will be able to attach documents, pictures, videos and other files.

There is also a Scheduling, which can be supplied both automatically when filling in a data card and manually. This Scheduling will manage single or recurring deadlines related, for example, to certifications, warranties, contracts with customers and suppliers, administrative procedures, etc.

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

The system also includes a REST webservice, so that CMDBuild users can implement custom interoperability solutions with external systems.

Furthermore, CMDBuild includes two external frameworks:

- the Advanced Connector CMDBuild, which is written in Java and can be configured in Groovy: it helps the implementation of connectors with external data sources, i.e automatic inventory systems, virtualization or monitoring ones (supplied with non-open source license to the users that subscribe the annual Subscription with Tecnoteca)
- the GUI Framework CMDBuild, which helps the implementation of additional graphical interfaces, i.e. web pages (simplified for non technicians) that have to be published on external portals and that are able to interact with the CMDB through the REST webservice
CMDBuild includes a mobile interface (for smartphone and tablet). It is implemented as multi-platform app (iOS, Android) and is able to interact with the CMDB through the REST webservice (supplied with non-open source license to the users that subscribe the annual Subscription with Tecnoteca).

CMDBuild is an enterprise system: server-side Java, web Ajax GUI, SOA architecture (Service Oriented Architecture), based on webservice and implemented by using the best open source technologies and following the sector standards.

CMDBuild is an ever-evolving system, which has been released for the first time in 2006 and updated several times a year in order to offer more features and to support new technologies.

1.2. Official website
CMDBuild has a dedicated website: http://www.cmdbuild.org
The website gathers a lot of documents on technical and functional features of the project: brochures, slides, manuals (see next paragraph), testimonials, case histories, newsletters, forums.

1.3. 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.

1.4. Available manuals
This manual is for those who need certain first introductory information on CMDBuild and who are interested in knowing the general philosophy of the project.

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

• system overview ("Overview Manual")
• system usage for operators ("User Manual")
• system administration ("Administrator Manual")
• installation and system management ("Technical Manual")
• webservice details and configuration ("Webservice Manual")

1.5. Applications based on CMDBuild
Tecnoteca has used the CMDBuild environment in order to implement two different pre-configured solutions:

• CMDBuild READY2USE, for the management of assets and IT services, oriented to internal IT infrastructures or services for external clients (www.cmdbuildready2use.org) according to the ITIL best practice (Information Technology Infrastructure Library)
• openMAINT, for the inventory management of assets, properties and related maintenance activities (www.openmaint.org)

Both applications are released with open source license, except for certain external components.
(data sync connectors, Self-Service portal, mobile APP, etc.), that are reserved to the users that subscribe the annual Subscription with Tecnoteca.
2. Description of the workflow system

2.1. General Information

One important added value of CMDBuild is the possibility of defining processes for operators to execute the management activities.

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, organizational procedures and 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 will find general concepts and basic mechanisms implemented in the system.

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

2.2. Purposes

The workflow management system 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

In the IT environment, these basic mechanisms allow the configuration of all processes provided by ITIL "best practices", included Incident Management, Change Management, Request Fulfillment, Service Catalog, etc. In the Facility Management environment, all maintenance processes can be configured.

2.3. Used tools

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

- XPDL 2.0 ([http://www.wfmc.org/xpdl.html](http://www.wfmc.org/xpdl.html)) as definition language (standardized from the WfMC, WorkFlow Management Coalition)
- the graphical editor TWE Together Workflow Editor 5.5 or older ([http://www.together.at/prod/workflow/twe](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.
2.4. Terminology

The workflow "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 (at the 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.

The process status can be:

- "active", i.e. it is still in an intermediate activity
- "complete", i.e. it ended its activities
- "aborted", i.e. it has been terminated before reaching its completion
- "suspended", i.e. it has been temporarily suspended and can be resumed

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

- a list of attributes coming from CMDBuild or from inside the workflow, which will be set during its implementation
- a list of widgets (visual controls of some predefined typologies) that will be set during its creation
- 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
3. Implementation method

3.1. Workflows as special classes

The mechanism for workflow management is implemented in CMDBuild through concepts and procedures similar to the management of classes and cards.

The workflow management includes:

- "special" Process classes, each corresponding to a type of workflow
- attributes, corresponding to the information presented (for read or write) in the forms which manage the advancement of each single step of the process
- relations with other process instances or standard cards involved in the process
- user groups, that will be able to perform every activity, coinciding with CMDBuild user 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

3.2. 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 widgets (visual controls) which can be placed on each form corresponding to a user activity (viewing, 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
3.3. Defining a new process

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

- analysis of the new process which has to be implemented, in order to single out:
  - a list of the user groups involved in the process
  - a list of user activities, automatic activities, transition conditions, etc
  - a list of descriptive attributes of the process in its user activities, the related typologies (string, integer, etc) and their presentation mode (read-only, reading and writing, possible compulsoriness)
  - a list of values required for the creation of “Lookup” attributes
  - a list of 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)
  - a list of widgets to be configure in every user activity
  - a list of widgets to be 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 user 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 upload “XPDL” button, available under the corresponding process under the "Processes" tab in the Administration Module

Once the operations described above are completed, 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.
3.4. 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 coherence with the CMDBuild functionalities, dedicated to the management of the item 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, named "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 they are involved (since they attended that activity or previous activities of that process) with:
  - filters by status (started, completed,...)
  - 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
3. Implementation method

- 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)
- in the "Email" TAB you can visualize the details of any email related to the instance of that processes
- in the “Attachments” TAB (if the DMS Service is enabled), you can visualize the attachments related to the process instance

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.
4. Widgets prompted to use in the user activities of the workflow

4.1. Widget list

CMDBuild makes some default widgets (visual controls) available, placed in the top-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, widgets are defined as “Extended attributes” (provided in the XPDL standard) using the TWE editor.

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

<table>
<thead>
<tr>
<th>Visual control</th>
<th>Description</th>
<th>Parameters</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Widget_linkCards</td>
<td>It shows the paginated list of all cards belonging to a class, with possible display on a geographical map</td>
<td>Input: ClassName string ButtonLabel string SingleSelect integer NoSelect integer Required integer Filter string DefaultSelection string AllowCardEditing integer DisableGridFilterToggler boolean</td>
<td>The parameter SingleSelect = 1 must be set only if the selection of one single row is allowed (radio-button rather than checkbox) The parameter NoSelect = 1 disables the selection of rows The parameter Required = 1 forces the selection of at least one row The Filter parameter accepts 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”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Output: CheckArray references</td>
<td></td>
</tr>
</tbody>
</table>
| Widget_createModifyCard | It shows the specified card (if ObjId is specified), otherwise it allows the creation of a new card in the specified class | Input: ClassName string ButtonLabel string ReadOnly integer or Reference reference ButtonLabel string ReadOnly integer | Example: ClassName=’User’ ObjId=client:Requester ButtonLabel = ‘Create or modify User’ Requester  
Note: the prefix “client:” is required to access a variable before the workflow is advanced to the following step  
ReadOnly=1 shows the card in read-only |
4. Widgets prompted to use in the user activities of the workflow

<table>
<thead>
<tr>
<th>Widget</th>
<th>Input</th>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
</table>
| Widget_createReport  | ReportType string  
|                      | ReportCode string  
|                      | ButtonLabel string  
|                      | ForcePDF integer  
|                      | ForceCSV integer  
|                      | Parameter-1  
|                      | Parameter-2  
|                      | ...  
|                      | Parameter-n  
|                      | ReportURL string  
|                      | ReportType can only take the ‘custom’ value  
|                      | ForcePDF forces the output in PDF format  
|                      | ForceCSV forces the output in CSV format  
|                      | Parameter-1 ... Parameter-n represent the parameters provided by the report  
|                      | Visualizing e-mails, the electronic mailbox will be checked for possible new e-mails  
|                      | Template1 ... Templaten is the “Name” of the Email template to use to generate the email.  
|                      | Condition1 ... Conditionn is the cql condition used to enable the email creation with Template1.  
|                      | NotifyWith1 ... NotifyWithn is the name of the template to use to send a notification email.  
|                      | It can't be used in the first process activity  
|                      | From the class ClassName you can collect the dates you want to display in the calendar, with a possible filter.  
|                      | EventStartDate is the attribute to use as event start date.  
|                      | EventEndDate is the attribute to use as event end date. It is optional.  
|                      | EventTitle indicates the attribute that draws the text and writes it on the calendar for  

4. Widgets prompted to use in the user activities of the workflow

<table>
<thead>
<tr>
<th>Widget</th>
<th>Description</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>string</strong></td>
<td>DefaultDate string</td>
<td>every event. EventType is the attribute to use as event type. EventTypeLookup is the Lookup to use event types. Usually is the LookupType of the attribute EventType. DefaultDate is the attribute to use as opening date in calendar.</td>
<td></td>
</tr>
<tr>
<td><strong>Widget_presetFromCard</strong></td>
<td>It populates the current activity with the data recovered from a selected card.</td>
<td><strong>Input:</strong> ButtonLabel string ClassName string Filter string AttributeMapping string</td>
<td>ClassName, the name of the class, as an alternative to a Filter AttributeMapping is a string with the structure ‘a1=c1,a2=c2’ that shows how to chart activity attributes with the card ones. The comma separates the assignments.</td>
</tr>
<tr>
<td><strong>Widget_startWorkflow</strong> (or just Widget_workflow)</td>
<td>It allows to start a new workflow</td>
<td><strong>Input:</strong> ButtonLabel string WorkflowCode string or 2) ButtonLabel string FilterType string Filter string</td>
<td>WorkflowCode name of the starting process 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.</td>
</tr>
<tr>
<td><strong>Widget_customForm</strong></td>
<td>Allows to manage a form or a row grid (by adding, removing and/or modifying the rows)</td>
<td><strong>Input:</strong> ButtonLabel string ModelType &quot;[form</td>
<td>class</td>
</tr>
</tbody>
</table>
4. Widgets prompted to use in the user activities of the workflow

### 4.1.1. 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.

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

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                | 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` |
| client: name.Id             | PROCESS NAME variable in the previous step |
| client: name.Description    | Variable `name` of the extended attribute definition, extended as template excluding the variables with namespace `js` and `cql` |
| server: name                | ID and name of the connected user |
| xa: name                    | ID and name of the connected group |
| js: name                    | Variable `name` of the extended attribute definition interpreted as a template and evaluated as a javascript code |
| cql: name.field             | Variable `name` of the extended attribute definition interpreted as a template and evaluated 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="..."
```
4. Widgets prompted to use in the user activities of the workflow

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

```
ToAddresses1="..."
CcAddresses1="...
Subject1="...
Content1="...
ToAddresses2="...
CcAddresses2="...
Subject2="...
Content2="...
```

4.1.2. 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

4.1.3. Example 2

```
Content="The requester, \{js:JoinJS\}, belonging to the office \{cql:QueryRequester.Office_value\} requests:<br /><br />
\{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 higher complexity.

In the body there are three variables which must be 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
5. API prompted to use in the automatic activities of the workflow

CMDBuild offers various APIs (Application Programming Interface) which can be used in the automatic activities of the workflow so that it is possible to implement custom behaviors (manipulation of process variables, card creation and relations in CMDB, e-mail sending, report creation, etc).

5.1. Key words

<table>
<thead>
<tr>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProcessId: long</td>
</tr>
<tr>
<td>ProcessClass: String</td>
</tr>
<tr>
<td>ProcessCode: String</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performer</th>
</tr>
</thead>
<tbody>
<tr>
<td>_CurrentUser: ReferenceType</td>
</tr>
<tr>
<td>_CurrentGroup: ReferenceType</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>API</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmdb</td>
</tr>
</tbody>
</table>

5.2. Management of CMDBuild items

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

<table>
<thead>
<tr>
<th>ReferenceType</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
</tr>
<tr>
<td>getld: long</td>
</tr>
<tr>
<td>getDescription: String</td>
</tr>
</tbody>
</table>
Overview Manual

5. API prompted to use in the automatic activities of the workflow

**LookupType**

<table>
<thead>
<tr>
<th>Methods</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getId(): long</td>
<td>returns the Lookup id</td>
</tr>
<tr>
<td>getType(): String</td>
<td>returns the type of Lookup</td>
</tr>
<tr>
<td>getDescription(): String</td>
<td>returns the Lookup description</td>
</tr>
<tr>
<td>getCode(): String</td>
<td>returns the Lookup code</td>
</tr>
</tbody>
</table>

**CardDescriptor**

<table>
<thead>
<tr>
<th>Methods</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getClassName(): String</td>
<td>returns the Class name for a CardDescriptor variable</td>
</tr>
<tr>
<td>getId(): long</td>
<td>returns the Id name for a CardDescriptor variable</td>
</tr>
<tr>
<td>equals(CardDescriptor cardDescriptor): boolean</td>
<td>compares the CardDescriptor variable with the specified one</td>
</tr>
</tbody>
</table>

**Card**

<table>
<thead>
<tr>
<th>Methods</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getCode(): String</td>
<td>returns the Code for a Card variable</td>
</tr>
<tr>
<td>getDescription(): String</td>
<td>returns the Description for a Card variable</td>
</tr>
<tr>
<td>has(String name): boolean</td>
<td>controls the presence of the specified attribute in the Card variable</td>
</tr>
<tr>
<td>hasAttribute(String name): boolean</td>
<td>controls the presence of the specified attribute in the Card variable</td>
</tr>
<tr>
<td>get(String name): Object</td>
<td>returns the specified attribute value of the Card variable</td>
</tr>
<tr>
<td>getAttributeNames(): Set&lt;String&gt;</td>
<td>returns the attributes list of the Card variable</td>
</tr>
<tr>
<td>getAttributes(): Map&lt;String, Object&gt;</td>
<td>returns the attributes list and their values of the Card variable. The returned values respect the CMDBuild types (ReferenceType, LookupType, Date, Integer, …)</td>
</tr>
</tbody>
</table>
### Attachments

**Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>fetch()</code>: Iterable&lt;AttachmentDescriptor&gt;</td>
<td>returns the attachments list of the Card or of the instantiated process</td>
</tr>
<tr>
<td><code>upload(Attachment... attachments): void</code></td>
<td>attaches the documents to the card or to the instantiated process</td>
</tr>
<tr>
<td><code>upload(String name, String description, String category, String url): void</code></td>
<td>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</td>
</tr>
<tr>
<td><code>selectByName(String... names): SelectedAttachments</code></td>
<td>returns the attachments of the card or of the instantiated process with the specified name</td>
</tr>
<tr>
<td><code>selectAll(): SelectedAttachments</code></td>
<td>returns all attachments of the card or of the instantiated process</td>
</tr>
</tbody>
</table>

### AttachmentDescriptor

**Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>getName(): String</code></td>
<td>returns the name of the attachment</td>
</tr>
<tr>
<td><code>getDescription(): String</code></td>
<td>returns the attachment description</td>
</tr>
<tr>
<td><code>getCategory(): String</code></td>
<td>returns the attachment category</td>
</tr>
</tbody>
</table>

### Attachment

**Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>getUrl(): String</code></td>
<td>returns the URL of the file</td>
</tr>
</tbody>
</table>

### DownloadedReport

**Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>getUrl(): String</code></td>
<td>returns the local URL where the report has been saved</td>
</tr>
<tr>
<td><code>equals(DownloadedReport downloadedReport): boolean</code></td>
<td>compares the DownloadedReport variable with the specified one</td>
</tr>
</tbody>
</table>
5.3. Access methods to CMDBuild

5.3.1. NewCard

**Builders**

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

**Modifiers**

```java
withCode(String value): NewCard
adds the Code to the new card created in CMDBuild
```

```java
withDescription(String value): NewCard
adds the Description to the new card created in CMDBuild
```

```java
with(String name, Object value): NewCard
adds the value specified for the specified attribute to the new card created in CMDBuild
```

```java
withAttribute(String name, Object value): NewCard
adds the value specified for the specified attribute to the new card created in CMDBuild
```

**Actions**

```java
create(): CardDescriptor
creates the new card in CMDBuild setting the attributes previously defined
```

**Example:**

```java
/*
 * Creation of a new card in the “Employee” class having
 * the following attributes:
 * “Code” = “T1000”
 * “Name” = “James”
 * “Surname” = “Hetfield”
 */

```

5.3.2. ExistingCard

**Builders**

```java
existingCard(String className, long id): ExistingCard
creates a Card existing in the specified Class having the specified Id to query CMDBuild
```
5. API prompted to use in the automatic activities of the workflow

existingCard(CardDescriptor cardDescriptor): ExistingCard
creates an existing Card indicated by the specified CardDescriptor to query CMDBuild

<table>
<thead>
<tr>
<th>Modifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>withCode(String value): ExistingCard</td>
</tr>
<tr>
<td>sets the Code for the Card requested to CMDBuild</td>
</tr>
<tr>
<td>withDescription(String value): ExistingCard</td>
</tr>
<tr>
<td>sets the Description for the Card requested to CMDBuild</td>
</tr>
<tr>
<td>with(String name, Object value): ExistingCard</td>
</tr>
<tr>
<td>it sets the specified attribute with the specified value for the Card requested to CMDBuild</td>
</tr>
<tr>
<td>withAttribute(String name, Object value): ExistingCard</td>
</tr>
<tr>
<td>it sets the specified attribute with the specified value for the Card requested to CMDBuild</td>
</tr>
<tr>
<td>withAttachment(String url, String name, String category, String description): ExistingCard</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>attachments(): ExistingCard</td>
</tr>
<tr>
<td>it allows you to access the attachments of the selected card</td>
</tr>
<tr>
<td>selectAll(): ExistingCard</td>
</tr>
<tr>
<td>it allows you to select all documents of the selected card</td>
</tr>
<tr>
<td>selectByName(String name1, String name2, ...): ExistingCard</td>
</tr>
<tr>
<td>it allows you to select all documents of the selected card</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>update()</td>
</tr>
<tr>
<td>updates the Card in CMDBuild by setting the attributes previously indicated with the specified values</td>
</tr>
<tr>
<td>delete()</td>
</tr>
<tr>
<td>deletes the Card from CMDBuild</td>
</tr>
<tr>
<td>If the &quot;attachments&quot; modifier has been used, it will delete only the selected files</td>
</tr>
<tr>
<td>fetch(): Card</td>
</tr>
<tr>
<td>requests the Card to CMDBuild with the attributes previously indicated. If no modifier has been used, it requests the whole Card (with all attributes)</td>
</tr>
<tr>
<td>fetch(): Iterable&lt;AttachmentDescriptor&gt;</td>
</tr>
<tr>
<td>If the “attachments” modifier has been used, the method returns the list of the card attachments</td>
</tr>
<tr>
<td>upload(Attachment attachment, Attachment attachment2, ...)</td>
</tr>
<tr>
<td>to be used in the presence of the ”attachments” modifier: it attaches one or more files to the card</td>
</tr>
<tr>
<td>upload(Attachment attachment, String description, String category, String url)</td>
</tr>
<tr>
<td>to be used in the presence of the ”attachments” modifier: it attaches to the card a single file with specified description and category</td>
</tr>
</tbody>
</table>
### 5. API prompted to use in the automatic activities of the workflow

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>download()</code></td>
<td>If the &quot;attachments&quot; modifier has been used, the method returns the selected attachments of the card</td>
</tr>
<tr>
<td><code>copyTo()</code></td>
<td>If the &quot;attachments&quot; modifier has been used, the method copies a selected attachment of the card into a specified destination</td>
</tr>
<tr>
<td><code>copyToAndMerge()</code></td>
<td>If the &quot;attachments&quot; modifier has been used, the method copies a selected attachment of the card into a specified destination or skip this action if the attachment already exists</td>
</tr>
<tr>
<td><code>moveTo()</code></td>
<td>If the &quot;attachments&quot; modifier has been used, the method moves a selected card attachment into a specified destination</td>
</tr>
</tbody>
</table>

### Examples:

```java
/*
 * 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(cdNewEmployee)
    .with("Phone", "754-3010")
    .withAttribute("Email", "j.hetfield@somemail.com")
    .update();

/*
 * (Logic) delete of the card previously created in the class "Employee"
 */
cmdb.existingCard(cdNewEmployee)
    .delete();

/*
 * Delete of the card attachment that was previously created in the "Employee" class
 */
Iterable <AttachmentDescriptor> attachments =
    cmdb.existingCard(cdNewEmployee)
    .attachments()
    .fetch();
```
* Delete of the card attachment that was previously created in the “Employee” class
* /
   
cmdb.existingCard(cdNewEmployee)
   .attachments()
   .selectByName(String[]{"attachment-name"})
   .delete();

5.3.3. NewProcessInstance

<table>
<thead>
<tr>
<th>Builders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>newProcessInstance(String processClassName): NewProcessInstance</td>
<td>creates a new process instance created in CMDBuild for the specified process</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Modifiers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>withDescription(String value): NewProcessInstance</td>
<td>adds the Description to the new card created in CMDBuild</td>
</tr>
<tr>
<td>with(String name, Object value): NewProcessInstance</td>
<td>adds the value specified for the specified attribute to the new process created in CMDBuild</td>
</tr>
<tr>
<td>withAttribute(String name, Object value): NewProcessInstance</td>
<td>adds the value specified for the specified attribute to the new process created</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>start(): ProcessInstanceDescriptor</td>
<td>creates the new process in CMDBuild setting the attributes previously defined, and does not advance</td>
</tr>
<tr>
<td>startAndAdvance(): ProcessInstanceDescriptor</td>
<td>creates the new process in CMDBuild setting the attributes previously defined, and advances at the following step</td>
</tr>
</tbody>
</table>

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();
5.3.4. **ExistingProcessInstance**

<table>
<thead>
<tr>
<th>Builders</th>
</tr>
</thead>
<tbody>
<tr>
<td>existingProcessInstance(String processClassName, int processId): ExistingProcessInstance</td>
</tr>
<tr>
<td>creates a process instance existing in the specified process class with the specified Id</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Modifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>withProcessInstanceId(String value): ExistingProcessInstance</td>
</tr>
<tr>
<td>sets the process instance Id</td>
</tr>
<tr>
<td>with(String name, Object value): ExistingProcessInstance</td>
</tr>
<tr>
<td>sets the specified attribute with the specified value for the process instance</td>
</tr>
<tr>
<td>withAttribute(String name, Object value): ExistingProcessInstance</td>
</tr>
<tr>
<td>sets the specified attribute with the specified value for the process instance</td>
</tr>
<tr>
<td>withDescription(String value): ExistingProcessInstance</td>
</tr>
<tr>
<td>sets the specified attribute with the specified value for the process instance</td>
</tr>
<tr>
<td>attachments(): Attachments</td>
</tr>
<tr>
<td>allows you to access the attachments of the process instance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>abort(): void</td>
</tr>
<tr>
<td>aborts the process instance</td>
</tr>
<tr>
<td>advance(): void</td>
</tr>
<tr>
<td>advances a process instance</td>
</tr>
<tr>
<td>resume(): void</td>
</tr>
<tr>
<td>resumes the hanging process instance</td>
</tr>
<tr>
<td>suspend(): void</td>
</tr>
<tr>
<td>suspends the open process instance</td>
</tr>
<tr>
<td>update(): void</td>
</tr>
<tr>
<td>updates the process instance</td>
</tr>
</tbody>
</table>

**Example:**

```java
/*
* 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();
```
5.3.5. NewRelation

**Builders**

<table>
<thead>
<tr>
<th>newRelation(String domainName): ExistingProcessInstance</th>
</tr>
</thead>
<tbody>
<tr>
<td>creates a new relation added in the specified Domain of CMDBuild</td>
</tr>
</tbody>
</table>

**Modifiers**

<table>
<thead>
<tr>
<th>withCard1(String className, int cardId): NewRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sets the card in the source side of the relation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>withCard2(String className, int cardId): NewRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sets the card in the target side of the relation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>withAttribute(String attributeName, Object attributeValue): NewRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sets the value of a relation attribute</td>
</tr>
</tbody>
</table>

**Actions**

<table>
<thead>
<tr>
<th>create()</th>
</tr>
</thead>
<tbody>
<tr>
<td>creates the new relation in CMDBuild among the Cards indicated in the specified Domain</td>
</tr>
</tbody>
</table>

Example:

```java
/*
 * 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();
```

5.3.6. ExistingRelation

**Builders**

<table>
<thead>
<tr>
<th>existingRelation(String domainName): ExistingRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>creates an existing relation in the specified Domain of CMDBuild</td>
</tr>
</tbody>
</table>

**Modifiers**

<table>
<thead>
<tr>
<th>withCard1(String className, int cardId): ExistingRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sets IdClass and l'ObjId of the Card from the source side of the relation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>withCard2(String className, int cardId): ExistingRelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sets IdClass and l'ObjId of the Card from the target side of the relation</td>
</tr>
</tbody>
</table>
5. API prompted to use in the automatic activities of the workflow

### Actions

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delete()</td>
<td>deletes the relation existing among the Cards indicated in the specified Domain</td>
</tr>
</tbody>
</table>

**Example:**

```java
/*
 * 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`
  - creates a query that queries the class specified in CMDBuild

**Modifiers**

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

**Actions**

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

**Example:**

```java
/*
 * List of the cards of the “Employee” class having
```
5. API prompted to use in the automatic activities of the workflow

```java
* the “State” attribute set to 'Active'
*/
Employees = cmdb.queryClass("Employee")
  .with("State", "Active")
  .fetch();

5.3.8. QueryLookup

<table>
<thead>
<tr>
<th>Builders</th>
</tr>
</thead>
<tbody>
<tr>
<td>queryLookup(String type): QueryAllLookup</td>
</tr>
<tr>
<td>creates a query that queries the lookup type specified in CMDBuild</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>fetch(): Iterable&lt;Lookup&gt;</td>
</tr>
<tr>
<td>performs the search query on the specified lookup type of CMDBuild and returns the list of those Lookups</td>
</tr>
</tbody>
</table>

5.3.9. CallFunction

<table>
<thead>
<tr>
<th>Builders</th>
</tr>
</thead>
<tbody>
<tr>
<td>callFunction(String functionName): CallFunction</td>
</tr>
<tr>
<td>creates a call to a stored procedure previously defined in PostgreSQL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Modifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>with(String name, Object value): CallFunction</td>
</tr>
<tr>
<td>sets the value of the input parameter specified for the stored procedure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>execute(): Map&lt;String, Object&gt;</td>
</tr>
<tr>
<td>performs the stored procedure and returns the list of the output parameters with the related values</td>
</tr>
</tbody>
</table>

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
 */
5. API prompted to use in the automatic activities of the workflow

```java
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 definition, see the Administrator Manual, section Cart TAB, paragraph “Definition of the data source (PostgreSQL function)”.

### 5.3.10. QueryRelations

**Builders**

```java
queryRelations(CardDescriptor cardDescriptor): ActiveQueryRelations
    creates a query to ask CMDBuild the Cards related to the specified one

queryRelations(String className, long id): ActiveQueryRelations
    creates a query to ask CMDBuild the Cards related to that specified by className and id
```

**Modifiers**

```java
withDomain(String domainName): ActiveQueryRelations
    sets the Domain to perform the query
```

**Actions**

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

**Example:**

```java
/*
 * 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();
```

### 5.3.11. CreateReport

**Builders**

```java
createReport(String title, String format): CreateReport
    creates the Report in the specified format (pdf, csv) with the specified Title
```
5. API prompted to use in the automatic activities of the workflow

### Modifiers

**with(String name, Object value): CreateReport**

- sets the input parameter value specified for the Report

### Actions

**download(): DownloadedReport**

- generates the indicated Report using the parameters previously defined

#### Example:

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

### Builders

**newMail(): NewMail**

- creates a new e-mail to send

#### Modifiers

- **withFrom(String from): NewMail**
  - sets the sender of the e-mail to send
- **withTo(String to): NewMail**
  - sets the recipient of the e-mail to send
- **withTo(String... tos): NewMail**
  - sets the recipients of the e-mail to send
- **withTo(Iterable<String> tos): NewMail**
  - sets the recipients of the e-mail to send
- **withCc(String cc): NewMail**
  - sets the carbon copy recipient of the e-mail to send
- **withCc(String... ccs): NewMail**
  - sets the carbon copy recipients of the e-mail to send
- **withCc(Iterable<String> ccs): NewMail**
  - sets the carbon copy recipients of the e-mail to send
- **withBcc(String bcc): NewMail**
  - sets the blind carbon copy recipient of the e-mail to send
sets the blind carbon copy recipient of the e-mail to send

```java
withBcc(String... bccs): NewMail
```
sets the blind carbon copy recipients of the e-mail to send

```java
withBcc(Iterable<String> bccs): NewMail
```
sets the blind carbon copy recipients of the e-mail to send

```java
withSubject(String subject): NewMail
```
sets the subject of the e-mail to send

```java
withContent(String content): NewMail
```
sets the text of the e-mail to send

```java
withContentType(String contentType): NewMail
```
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"

```java
withAttachment(URL url): NewMail
```
sets the url of a document to enclose to the e-mail

```java
withAttachment(String url): NewMail
```
sets the url (as a string) of a document to enclose to the e-mail

```java
withAttachment(URL url, String name): NewMail
```
sets the url of a document with the specified name to enclose to the e-mail

```java
withAttachment(String url, String name): NewMail
```
sets the url (as a string) of a document to enclose to the e-mail with a specified name

```java
withAttachment(DataHandler dataHandler): NewMail
```
sets the dataHandler as an attachment of the e-mail

```java
withAttachment(DataHandler dataHandler, String name): NewMail
```
sets the dataHandler as an attachment with the specified name

```java
withCard(@Nullable String className, @Nullable Long cardId): NewMail
```
sets the card related to the email

```java
withCard(@Nullable CardDescriptor card): NewMail
```
sets the card related to the email

```java
withCard(@Nullable ReferenceType card): NewMail
```
sets the card related to the email

```java
withAsynchronousSend(bool boolean): NewMail
```
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

```java
send()
```
performs the e-mail sending using the previously defined statements

### Example:

```java
/*
 * Send a new email
 */
```
5. API prompted to use in the automatic activities of the workflow

```java
cmdb.newMail()
  .withFrom("fromaddress@somemail.com")
  .withTo("toaddress@somemail.com")
  .withCc("ccaddress@somemail.com")
  .withSubject("Mail subject")
  .withContent("Mail content")
  .send();
```

5.4. Methods for types conversion

5.4.1. ReferenceType

<table>
<thead>
<tr>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>referenceTypeFrom(Card card): ReferenceType</td>
</tr>
<tr>
<td>returns the ReferenceType item related to the specified Card</td>
</tr>
<tr>
<td>referenceTypeFrom(CardDescriptor cardDescriptor): ReferenceType</td>
</tr>
<tr>
<td>returns the ReferenceType item related to the specified CardDescriptor</td>
</tr>
<tr>
<td>referenceTypeFrom(long id): ReferenceType</td>
</tr>
<tr>
<td>returns the ReferenceType item related to the card with the specified Id</td>
</tr>
</tbody>
</table>

Example:

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

5.4.2. LookupType

<table>
<thead>
<tr>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>selectLookupById(long id): LookupType</td>
</tr>
<tr>
<td>returns the LookupType item with the specified Id</td>
</tr>
<tr>
<td>selectlookupByCode(String type, String code): LookupType</td>
</tr>
<tr>
<td>returns the LookupType item with specified Type and Code</td>
</tr>
<tr>
<td>selectLookupByDescription(String type, String description): LookupType</td>
</tr>
<tr>
<td>returns the LookupType item with specified Type and Description</td>
</tr>
</tbody>
</table>

Example:

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

### 5.4.3. CardDescriptor

<table>
<thead>
<tr>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>cardDescriptorFrom(ReferenceType reference): CardDescriptor</td>
</tr>
<tr>
<td>returns the CardDescriptor of the specified card through the specified ReferenceType item</td>
</tr>
</tbody>
</table>

**Example:**

```java
/*
 * Get the CardDescriptor related to the "Requester"
 * process attribute Reference type
 */

cdSelectedEmployee = cmdb.cardDescriptorFrom(Requester);
```

### 5.4.4. Card

<table>
<thead>
<tr>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>cardFrom(ReferenceType reference): Card</td>
</tr>
<tr>
<td>returns the Card item of the specified card through the specified ReferenceType item</td>
</tr>
</tbody>
</table>

**Example:**

```java
/*
 * Get the complete Card related to the "Requester"
 * process attribute Reference type
 */

selectedEmployee = cmdb.cardFrom(Requester);
```
6. 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.
The management of the attachments supports the versioning of those files that have been uploaded a few times, with automatic numbering.
See also: Card

ACTIVITY
Activity: workflow step.
An activity can be an interaction with the operator (interactive) or a script that processes operations via API (automatic).
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 (for example in "supplier" class the attributes can be: name, address, phone number, etc.).
CMDBuild allows you to create new attributes (in classes and domains) or edit existing ones.
In the database, every attribute is related to a column in the table which implements the associated class and corresponds, in the Data Management Module, to a data entry field of the specific card for the class management.
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).
CMDBuild includes a connector to sync some CI information (technical or maintenance records) and an interactive viewer for the 3D model of the building represented by the IFC file.
See also: CI, GIS

CI
We define CI (Configuration Item) each item that provides a service to a user and has a sufficient detail level for its technical management.
In CMDBuild, the term is applied to a generic context of Asset Management extending the concept usually used in the management of IT infrastructure.
CI examples include: server, workstation, software, plant, electric panel, fire extinguisher, furniture, etc.
See also: Configuration, ITIL
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 company, a building, an asset, a service, etc.
CMDBuild allows the administrator - with the Schema Module - to define new classes or delete/edit existing ones.
A class is represented in the database with a table automatically generated when defining the class and corresponds - in the Data Management Module - to a card for the consultation and update of the cards expected in the model.
See also: Card, Attribute

CMDB
ITIL best practice (Information Technology Infrastructure Library), which has become a "standard de facto" and a non-proprietary system for services management, has introduced the term CMDB referred to the Configuration Item database.
CMDBuild extends the concept of CMDB applying it to a generic Asset Management context.
See also: Database, ITIL

CONFIGURATION
The configuration management process is designed to keep updated and available to other processes the items (Configuration Item) information, their relations and their history.
Even if it known as one of the main processes within the ITIL Best Practice, the same concept is used in CMDBuild for generic contexts of Asset Management.
See also: CI, ITIL

DASHBOARD
In CMDBuild, a dashboard corresponds to an application page including one or more different graphic representations, in this way you can immediately hold in evidence some key parameters (KPI) related to management aspects of the Asset Management 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.
The Asset Management database, implemented on the basis of the CMDBuild logics and philosophy, is also indicated as CMDB (Configuration Management Data Base).

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, or configured by the Administrator and made available by operators.
See also: Class, View

**GIS**
A GIS is a system able to produce, manage and analyze 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 (transmission lines) and polygons (floors, rooms, etc.).
See also: BIM

**GUI FRAMEWORK**
It is a framework provided by CMDBuild to simplify the implementation of external custom user interfaces and to grant a simplified access to non-technical users. They can be issued onto any webportals and can be used with CMDBuild through the standard REST webservice.
The CMDBuild GUI Framework is based on javascript JQuery libraries.
See also: Mobile, Webservice

**ITIL**
It is a "best practices" system that established a "standard de facto"; it is a non-proprietary system for the management of IT services, following a process-oriented schema (Information Technology Infrastructure Library).
ITIL processes include: Service Support, Change Management and the Configuration 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).
CMDBuild uses some ITIL concepts and applies them to a generic context of Asset Management.
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 (also called multiple choice or picklist).
With the Administration Module it is possible to define new "LookUp" tables according to organization needs.
See also: Attribute type

**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: Webservice

**PROCESS**

The term process (or workflow) refers to a sequence of steps that realize an action.
For each process (type of process) a new process instance will be started when users have to carry out an action on assets according to a procedure implemented as workflow.
A process is activated by starting a new process (filling related form) and ends when the last workflow step is executed.
The workflows managed in CMDBuild are described in the standard markup language XPDL (XML Process Definition Language), ruled by the WFMC (WorkFlow Management Coalition).
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 CMDB.
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.
The reports can be configured in the Administration Module importing in XML format the description of the layout designed with the visual editor JasperReports. They can be provided to operators in the application menu.
CMDBuild users can print reports using the Management Module, which will result as printouts, charts, documents, labels, etc.
See also: Class, Domain, Database

**CARDS**

The term "card" refers to an element stored in a class (corresponding to the record of a table in the database).
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 as template to define attributes shared between subclasses. From the abstract class, or from abstract class hierarchies, you can derive real classes that contain data and include both shared attributes (specified in the superclass) and specific subclass attributes, besides the relations on the superclass domains and on specific domains.
For example, you can define the superclass "Company" with some basic attributes (VAT number, Business name, Phone number, etc.) and the derived subclasses "Customers" and "Suppliers", each one with both generic attributes of the superclass and its own attributes and relations.
See also: Class, Attribute

TENANT
A "tenant", in CMDBuild, is a part of the CMDB reserved to users belonging to a suborganization of the CMDBuild instance (a Group Society, a Seat, a Division, etc.). Working in "multitenant" mode, every user works only on data of his/her suborganization and, in case, on common data: "tenants".
The list of usable Tenants can be defined from an applicable class of CMDBuild (seats, companies, customers, etc.) or from a database custom function, where you can implement complex visibility rules.

ATTRIBUTE TYPE
Each attribute has a data type that represents attribute information and management. The type of attribute and its management modes are defined in the Administration Module.
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 includes cards defined with logic criteria of filters applied to one or more CMDB classes. 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 information and applications to interact with its methods.
CMDBuild includes a SOAP and a REST webservice, which are provided to external applications to read or write data on CMDB or process operations.

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 consult or insert data or process other operations.
CMDBuild includes some standards widgets to process the most common operations, but it also supplies the specifications to implement other custom widgets.