CICERO

A DILIGENT Argumentation Tool
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1 About the Argumentation Tool

Cicero is a web-based tool which supports asynchronous discussions between several participants. This social software application is based on the idea of Issue Based Information Systems (IBIS) and the DILIGENT argumentation framework. The DILIGENT argumentation framework was adapted for Cicero in order to make it easier applicable on discussions and in order to reduce the learning effort by users.

The discussions in Cicero are organized in projects. It is possible to have different property values and access rights for the different projects. Thus, projects are really independent of each other. More details about how to create a project and define its properties and access rights is available in Section 4.

In Cicero, a discussion starts with the issue that should be discussed. For this issue, several solutions can be proposed. The solutions proposals can then be discussed with the help of supporting or objecting arguments. Furthermore, Cicero also defines a workflow for coming to a decision. For this purpose, it offers different decision procedures like preferential voting or that a responsible person is allowed for making decisions. More details about the discussion and decision process is available in Section 5.

2 Installation and Configuration

2.1 Installing Cicero

To install Cicero you need to execute the following steps:

1. Install\(^1\) or upgrade\(^2\) to MediaWiki 1.11 (or higher).
   
   Note that Cicero 1.00 has been tested with MediaWiki 1.11 and doesn’t work with versions of MediaWiki prior to 1.11; it is also NOT guaranteed that Cicero 1.00 will work with versions of MediaWiki higher than 1.11.

2. Install\(^3\) the MediaWiki extension Semantic MediaWiki 1.0 RC2 (or higher).
   
   Note that Cicero 1.00 has been tested with Semantic MediaWiki 1.0 RC2 and doesn’t work with versions of Semantic MediaWiki prior to 1.0 RC2; it is also NOT guaranteed that Cicero 1.00 will work with versions of Semantic MediaWiki higher than 1.0 RC2.

3. Extract the downloaded archive into the folder \(<\text{MediaWikiPath}>/\text{extensions/}\).
   
   Note that after extracting the archive, you will have a new folder called DILIGENTArgumentationTool which you should NOT rename.

\(^1\)See http://www.mediawiki.org/wiki/Installation
\(^2\)See http://www.mediawiki.org/wiki/Manual:Upgrading
\(^3\)See http://ontoworld.org/wiki/Semantic_MediaWiki
4. Add the following line at the end of LocalSettings.php of your MediaWiki-installation:

```
include_once("extensions/DILIGENTArgumentationTool/DAT_DILIGENTArgumentationTool.php");
```

5. By calling the page

```
http://<servername>/<MediawikiFolder>/index.php?title=Special:DAT_InstallForm
```

Note that you need a Sysops-account within MediaWiki to be able to access the installation form. Here you just have to click on the Install Cicero 1.00-button and the installation is executed automatically (see area 1 in Fig. 1). Make sure that in the LocalSettings.php of MediaWiki a database user account is listed which has the right to create and alter tables.

![Figure 1: The Cicero installation form.](image)

Note that - if for some reason - the installation becomes incomplete or defective you can execute the installation procedure at any time. The installation procedure will add the missing parts of the installation and will repair the broken parts.

The user who installed the Cicero extension gets automatically assigned the role of a Cicero administrator. In Subsection 2.2.1, more details are available about the Cicero administrator-role and how to assign it to further users.

### 2.2 Configuration

#### 2.2.1 User groups

**Predefined rights settings**

The definition of the user groups used in Cicero are stored in the file UserManagement/DAT_UserRights.php. Usually, it will not be necessary to manually change this file. It is used for changing the predefined public and private rights-configurations described in Subsection 4.2.2. They can be changed by adapting the values in lines 25-88. The following lines
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```php
$datGroupPermissions["project member"]['changeprojectproperties']['public'] = false;
$datGroupPermissions["project member"]['changeprojectproperties']['private'] = false;
$datGroupPermissions["project member"]['createissue']['public'] = true;
$datGroupPermissions["project member"]['createissue']['private'] = false;
...
```

Show an excerpt. For example if you prefer that in the predefined configuration `public` a project member should not be able to create an issue, you need to change line 3 to

```php
$datGroupPermissions["project member"]['createissue']['public'] = false;
```

$datGroupPermissions has the following structure

```php
$datGroupPermissions[<roleName>][<rightName>][<predefinedConfigurationName>] = {true or false}
```

`true` stands for `allowed` while `false` means `forbidden`. Be sure to keep the hierarchical structure of the user groups and the inheritance rule (for more details see Subsection 4.2.2). Changes to this file will not have an effect on the user rights of already created projects.

Add new Cicero administrator

For registering a plain user as a Cicero administrator, the `User rights management` page of the MediaWiki can be used. The page can be accessed under the URL

```
```

Note that you need to be (at least) member of the `Bureaucrats`-group to access this page. There you can type the loginname of the respective user. After clicking on the `Edit User Groups`-button (area 1 in Fig. 2) an interface appears below. It shows on the left the current memberships of the user (area 2). If the entry Cicero admin already exists, the user already is a cicero administrator. But if the entry Cicero admin appears on the right side (area 3), the user needs to be added to this group. You achieve this by selecting the entry Cicero admin on the right side and clicking on the `Save User Groups`-button (area 4).

2.2.2 Settings

The settings of the Cicero extension are mainly stored in the file `DAT_Settings.php`. You should normally NOT change any of the values. If you have other MediaWiki extensions installed besides of Cicero and SemanticMediaWiki which uses own namespaces, you probably need to change the following lines (34-37):

```php
### NAMESPACES ###
// namespace numbers for this extension
$namespaceNr = 102;
$namespaceDiscussionNr = 103;
```
2 Installation and Configuration

Figure 2: Adding a new cicero administrator

If another extension already uses the namespace numbers 102 and 103, change the values in `DAT_Settings.php` into values unequal to these and bigger than 110.

If you want to deactivate the creation of accounts by users, you just need to out-comment the following line (64) by adding `//` at the beginning:

```php
$datGroupPermissions['*']['createaccount'] = true;
```

With this you restore the default behavior of your MediaWiki-installation.

If you want to change the default issue and voting timer within a project, you can change the following lines (193-194):

```php
$defaultIssueTimer = 0;
$defaultVotingTimer = 7;
```

The predefined values are 0 for the default issue timer and 7 for the default voting timer. These values are shown in the interface for creating new projects (see Subsection 4.1).

If you want to change the colors used on the project and issue article page, you can change the following lines (196-199):

```php
### COLOR SETTINGS ###
$boxHeadlineBackground = "#C3C3FF";
$buttonAreaBackground = "#FFFF66";
$buttonAreaText = "#000000";
```

Note that you have to use the hexadecimal notation of the colors\(^4\).

\(^4\)See http://tomheller.de/theholycymbal/html-farben.html
2.2.3 Activation of the email-notifications in MediaWiki

For activating email-notifications on your MediaWiki-installation you need to add the following lines to the *LocalSettings.php*:

```php
#including external SMTP server
$wgSMTP = array(
    "host" => 'examplehost.example.org',
    "IDHost" => 'example.org',
    "port" => "25",
    "auth" => true,
    "debug" => false,
    "username" => ,
    "password" => ,
);
```

Usually you only have to indicate the host-address and the port (normally 25) of your delivery SMTP server. Note that the lines with `#` are commented out and don’t have an effect. Remove the leading `#` if the corresponding property needs to be set for configuring the access to your mail server.

3 Getting Access and Log In

After successfully installing MediaWiki, Semantic MediaWiki and the Cicero extension on your server, you can now start using the features of Cicero. The *Main page* of MediaWiki is the place where you get the first time in touch with the Cicero extension. Here, Cicero provides a dynamically updated list of all existing projects in its installation. This way it is easy to access the different projects.

To log into the Wiki press the link on the upper right corner of the main page. It will show you an interface to put in your user name and password. If you don’t have an account yet, create one (click on the appropriate link). While creating a new account you have to specify an email address. An email will be send to you containing a link for the verification of the new account. This address will also be used for notifications later on.

Note that in the default settings of MediaWiki users are not allowed to create their own user accounts. Normally a MediaWiki-user with the rights of a *Bureaucrat* needs to create them. In Cicero, this default setting of MediaWiki is overwritten, so that any user can create its own account. See Subsection 2.2.2 if you want to restore the default behavior.

After you have successfully logged into the system you will be redirected to the main page. To log out use the corresponding link of the personal menu on the top of the page.
The overview page of a project can be reached from the main page of Cicero by using the links in the list of projects at the bottom of the main page (see Fig. 3). The project overview page has three main areas that are shown in Fig. 4:

1. A short introductory text that should summarize the project objectives. From here, also further pages with more detailed information may be linked. It should enable new users to get familiar with the project. The text may be changed in the settings of the project (see Subsection 4.2).

2. An overview box with the most important properties of the project, e.g. who created the project, how many issues are currently attached to the project etc. At the bottom of the overview box, all functions that are available to the current user are shown. Functions for which the user does not have the necessary access rights are not shown (see Subsection 4.2 for a summary of the access rights model of Cicero).

3. At the bottom of the page, two lists are available that contain the most recently modified issues and users participating in the project. For getting a list of all issues or users, the links in the yellow area have to be used.

The project overview page is automatically generated and updated by Cicero and need not be changed by the user. The introductory text of the project can be changed in the project properties (see Subsection 4.2).
4 The Project Page

Figure 4: Overview page of a project in Cicero.

4.1 Creating a Project

In Cicero, all issues and their discussions are related to a project. Thus, at least one project has to be created before one can start with creating and discussing issues. There are two possibilities to create a new project (see Fig. 3):

- Using the Create Project link in the sidebar of Cicero. This link is accessible on each page of Cicero.
- Using the Create Project link next to the title of the project list on the start page of Cicero.

Only logged in users that have the Cicero administrator role can create projects (see Section 2.1 for instructions how to assign users the Cicero administrator role). If a user has the sufficient rights for creating a project, he will see a form where the project can be configured. For more details on the configuration options of a project see Subsection 4.2.

4.2 Managing the Project Properties

The properties of a project can be divided into two different blocks: (1) The description of the project, the advanced project settings, the default issue settings and (2) the management of the access rights of different user roles and the assignment of specific roles to the different users. The page for managing the project properties can be accessed from overview box on the overview page of the project (area 2 in Fig. 4). The link is only visible to users with sufficient access rights (either an Cicero administrator or, in most cases, a Project Moderator).
4.2.1 Project Description, Advanced Project Settings and Default Issue Settings

In Fig. 5, one can see the part of the project properties dialog in which the description of the project, the advanced project settings, and the default issue settings can be edited. The description of the project will be shown on the overview page of the project. It should give new participants in the project a short introduction to the project objectives, etc. The text may contain Wiki markup for formatting, including links to subpages on which more details may be explained.

The advanced project settings contain the **Self-registration** option. If it is set to the value **allowed**, users that are currently not participating in the project may register themselves for participation. Self-registered users are automatically assigned to the role **Project Member** (see below). This function is deactivated if the option is set to the value **forbidden**.

In the default issue settings, one may change the default values that are used if a new issue is created, i.e., which decision mode should be used, how many solution proposals may be selected during a decision, and the values of the issue and the voting timer. The details about these settings are available in Subsection 5.5 about managing the issue properties.

4.2.2 Managing Access Rights and User Roles

In Fig. 6, one can see the part of the project properties dialog in which the user roles in the project can be edited and assigned to the different participating users. The access rights in the different projects hosted on a single Cicero installation are independent of each other. Besides the **Cicero administrators** of the Wiki, in each
project exist four predefined roles, to which different access rights can be assigned: The *Project Moderator*, the *Issue Moderator*, the *Project Member* and the *Anonymous User*. User roles are ordered hierarchically. This means, a project moderator always has equivalent or more rights than an issue moderator and the issue moderator always has equivalent or more rights than a project member and so on. A Cicero administrator automatically has all access rights to a project and its related issues. If a user can register himself for participating in a project, he is always assigned to the role of a project member (see Subsection 4.2.1 for instructions how to activate the self-registration of users). Alternatively, one can explicitly assign the roles to different users (see area 2 in Fig. 6).

Depending on the access and participation policies that should be implemented in a project, one can assign different access rights to the four roles. The following access rights exist in Cicero:

- **Read Discussion**: Allows access to the subpages of a project as well as to the overview pages of an issue and its discussions. Without this access right, a user can only see the start page of a project with the general information. Note that the title of issues are also shown to users which don’t have the Read Discussion-right within a project.

- **Participate in Discussion**: Allows for actively participating in discussions of an issue, i.e. to provide solution proposals and arguments.

- **Vote**: Allows for participating in the decision taking process of an issue, i.e. to either participate in a voting or to select a solution proposal for implementation (see Subsection 5.5 for more details on the decision taking process).
• **Change Project Properties**: Allows for managing the project properties as they are described in this section, including the access rights and user roles. Thus, this right should usually only be given to a very small and trusted group of users.

• **Create Issue**: Allows for raising new issues, i.e. creating a new issue overview page (see Subsection 5.1).

• **Change Issue Properties**: Allows for accessing the issue properties as they are described in Subsection 5.5).

Note that for the *Anonymous User* only the *Read Discussion*-right can be activated or deactivated. All other rights are not selectable in the interface and are automatically set to *deactivated*.

There exists two predefined configurations of the access rights that can be selected with the drop-down list in the upper-left corner of the role configuration panel (area 1 in Fig. 6):

• **Public**: In a public project, all registered users are allowed for actively participating in discussions and the decision taking procedure as well as in raising new issues. Managing the project and issue properties are restricted to users that have assigned the role *project moderator* or *issue moderator*, respectively.

• **Private**: In a private project, the plain *project members* only have read access to the whole project and the related issues. Only *issue moderators* are allowed for participating in discussions and decision taking procedures as well as in raising new issues.

It is possible to use one of the pre-configured role configurations as the basis for a customized role configuration. Just select one of the pre-configurations and adapt it by adding or removing the marks in the checkboxes. Note that during checking or unchecking a box also the inherited access rights are automatically set for the more and less capable user groups (see above for details about the hierarchy of user groups). So if a right for a user group is activated, it will automatically be activated for all more capable user groups. Analogously, if a right for a user group is deactivated, it will automatically be deactivated for the less capable user groups.

In area 2 in Fig. 6, the panel for assigning roles to the users of a project is shown. To assign a role to a user, one has to first search for his account in the database of the Wiki. A user can be searched by either his Wiki account name, his real name or his e-mail address. The latter two are only optional information that need not to be given by all users during their registration.

The search results are then shown in the *user search list* where one or more users can be selected and then assigned to one of the three predefined roles by clicking on e.g. the *Add as Project Member* button. Users can also be removed from the different lists by clicking on the *Remove User* button under the respective list.
Note that the interface in the current version doesn’t avoid that a user is added to more than one user group. You could for example add a user McSuarez to the project moderator- and the issue moderator-group at the same time. But the Cicero will only store the highest group membership, which means that for the user McSuarez only the project moderator-membership is considered, because a project moderator always has the same or more rights than an issue moderator.

In order to avoid the administrative overhead of manually adding all users that are plain Project Members, it is possible to enable the self-registration of users in a project (see Subsection 4.2.1). They are then automatically added as project members. By default, the self-registration is deactivated.

### 5 The Issue Page

For each issue, an overview page and a discussion page exists. The overview page of an issue can be reached from the project overview page: Either the list of the 10 most recently added issues can be used for accessing an issue (see area 3 in Fig. 4) or the options Search for Issues and List all Issues can be used (see area 2 and 3 in Fig. 4).

The issue overview page has three main areas that are shown in Fig. 7:

1. A description of the issue as it was entered during the creation.

2. A list of all solutions for the issue that were proposed up to now. If the description of a solution proposal is too long only the first 30 words are initially shown. One can expand the description to its full length by using the lens at the end of the corresponding description. This area also shows which solution is selected for implementation once a decision is taken (see Subsection 5.4).

3. An overview box with the most important properties of the issue, e.g. who created the issue, how many solutions are proposed and how many arguments are given. Furthermore, one can access from here the full discussion associated with the issue or change the properties of the issue. In order to see the Change Issue Properties option, one needs to have the corresponding access right (see Subsection 4.2.2).

The issue overview page is automatically generated and updated by Cicero and need not be changed by the user. The description and the settings of the issue can be changed in the issue properties (see Subsection 5.5).

### 5.1 Creating an Issue

New issues can be added by using the corresponding option on the project overview page (see area 2 and 3 in Fig. 4). In order to see the Add New Issue option, one needs to have the corresponding access right (see Subsection 4.2.2).
Creating a new issue is a simple task in Cicero and can be done very fast. In the form for creating a new issue (see Fig. 8) one only needs to enter a unique title for the issue and an initial description. The description may contain Wiki markup for formatting, including links to related issues or web pages. The issue is then create by clicking on the Save Issue button. The settings with regard to the decision taking procedure and the issue and voting timer are set to the default values as they are specified in the project settings (see Subsection 4.2.1). The settings and the text describing an issue can later be changed on the page for managing the issue properties (see Subsection 5.5).

5.2 Issue States

During its lifetime, an issue passes through four different states. Depending on the state, different changes to the issue are allowed. The states are summarized below and in Fig. 9:

Figure 7: Overview page of an issue in Cicero.

Figure 8: Form for creating a new issue in Cicero.
• **Running**: During the *running* state, all users with the corresponding access rights are allowed for making changes to the issues like adding further solution proposals or arguments.

• **Locked**: An issue can reach the *locked* state only if the dictator mode is chosen for decision taking (see Subsection 5.4). During the *locked* state, no changes to the issue are allowed. Only a user with the corresponding access rights is allowed for deciding which solution proposal should be implemented as a response to the issue. As soon as the decision is taken, the state automatically changes to the *decided* mode.

• **Voting**: An issue can reach the *voting* state only if a preferential voting is chosen for decision taking (see Subsection 5.4). During the *voting* state, no changes to the issue are allowed. All users with the corresponding access rights are allowed for casting their ballot. The voting is finished either after the time span set in the voting timer or it is manually finished by a user with the corresponding access rights. As soon as the decision is taken, the state automatically changes to the *decided* mode.

• **Decided**: As soon as a decision is taken which solution proposal should be implemented in response to the issue, the issue changes into the *decided* state. In this state, no changes to the issue are possible. If it should be further discussed, the issue has to be set back to the *running* state by a user with the corresponding access rights.

### 5.3 The Discussion Page

The discussion page is – as the name says – the place where the discussion of a certain issue is stored. It can be reached from the issue page either through the tab-bar at the top or through the *View Discussion* link in area 3 of the issue overview page (see Fig. 7). At the top of the page a table of content of the whole discussion is shown for quickly accessing specific solution proposals or arguments (see area 1 in Fig. 10). Directly below the table of contents, the subject of discussion, i.e. the description of the issue, is repeated from the overview page. Below the subject of discussion, the different solution proposals and their supporting or objecting arguments are listed. To make a contribution to the discussion, one has to use *Reply* link next to the corresponding heading to which it should refer. Two different kinds of contributions can be distinguished:

• **Solution Proposal**: As the name says, it proposes a possible solution of the current issue. During taking a decision, one can select one or more solution proposals for being implemented as a response to the issue (see Subsection 5.4).
Figure 9: Issue States in Cicero
• Argument: In principle, an argument can either support or object a specific solution proposal. Three different types of arguments exist:
  
  – Example: An example corresponds to a pattern that should or should not be imitated (depending on whether it is a supporting or objecting example). They are used for illustrating similar cases that may serve as a model for the solution proposal to which they reply.
  
  – Evaluation: An evaluation gives criteria which help to assess the strengths and weaknesses of a solution proposal.
  
  – Justification: A justification describes the relevant circumstances that help to understand why a certain solution is supported or objected by the author of the argument.

In Fig. 11, the form for adding an argument to a solution proposal is shown. In the top left drop down list, one can select the argument type and whether it supports or objects the solution proposal to which it replies. In the box below, the argument text can be entered. The text may contain Wiki markup for formatting, including links to external resources or files uploaded to the Wiki.

The different kind of contributions and how they are related to each other can also be seen in Fig. 12. One can see that solution proposals can only directly reply to the issue while the arguments can only directly reply to a solution proposal. This results in a very flat hierarchy, showing the arguments with a small indent to their solution proposals.
Figure 11: Form for replying to a solution proposal.

Figure 12: Relations between issues, solution proposals and arguments.
5.4 Taking a Decision

If the decision taking procedure for an issue should be started, the state of the issue has to be changed from *running* to *voting* first. Under the precondition that there exists at least one solution proposal on the discussion page of an issue, two different ways exist how this state transition may take place:

1. In the issue settings, an automatic issue timer can be set that triggers that transition of the issue state from *running* to *voting*. By default, the issue timer is deactivated but in the project or issue settings a specific number of days may be given after which this transition takes place (see Subsection 4.2.1 and 5.5).

2. A user with the necessary access rights (see Subsection 4.2.2) edits the issue properties and manually starts the voting phase for an issue.

Furthermore, two basic modes for taking a decision can be distinguished:

- **Preferential Mode**: In the voting phase of the preferential decision mode, all users with the corresponding access right can cast their ballot. Either automatically, by means of the voting timer determined in the issue settings (see Subsection 5.5), or manually by an authorized user, the voting phase is closed after some time and the solution proposal with the most votes is marked as the decided solution. In case of a draw between two or more solution proposals a run-off ballot will start automatically. As soon as a final decision is available, the results are shown on the issue overview page and the state of the issue automatically changes to decided.

- **Dictator Mode**: In this mode, a user with the corresponding access rights locks the issue (see Subsection 5.5). After that, he may go back to the issue overview page where a link to the page for taking a decision is shown. Once, the user made his decision he returns to the overview page where the result is shown and the issue state automatically changes to *decided*. Thus, the decision is only made by a single user.

Depending on the *selection mode* of the issue (see Subsection 5.5), the users can either select only a single solution proposal during the decision taking phase or multiple solution proposals. In Fig. 13 shows how the look of the issue overview page during a running preferential voting. By clicking on the button in the upper-left box, the user can change to the page shown in Fig. 14 and cast his ballot. For the dictator mode both pages look very similar.
5 The Issue Page

Figure 13: Issue overview page during a running preferential voting.

Figure 14: Form in Cicero for casting the ballot during a voting.
5.5 Managing the Issue Properties

The properties of an issue can be changed by choosing the corresponding option on the issue overview page (area 3 in Fig. 7). This option is only available for users with the corresponding access rights. In the issue properties (see Fig. 15), one can change the description of the issue (area 1) as well as its advanced settings (area 2). The description may contain Wiki markup for formatting, including links to related issues or web pages. The values of the advanced issue settings are inherited from the project settings during the creation of the issue (see Subsection 4.2.1). More details on the meaning of the different settings are available in the sections about the different state of an issue and the available decision taking procedures (see Subsection 5.2 and 5.4).

The issue timer and the voting timer can be used for automatically triggering issue state transitions. The issue timer gives the number of days after which an issue should automatically change from the running state into either the voting or locked state, depending on the chosen decision mode. The voting timer gives is only activated if preferential voting is chosen as the decision taking procedure. In this case, it gives the number of days after which the voting is automatically closed. Setting either of both time spans to a value of 0 corresponds to deactivating the automatic state transition, i.e. a user with the corresponding access rights has to manually change the state with the help of the issue state drop-down list.

Figure 15: Editing the issue properties in Cicero.