OP 3.3.5

Database

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PRIORITY 1: Facilitating innovation across Central Europe

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Summary	Development of a smart database to match innovative ideas with specialised SMEs and R&D-institutions in order to start the idea-to-market product developments.

The InTraMed-C2C database

Introduction

Development and implementation of an innovation database is one of the goals of the InTraMed-C2C project. The InTraMed-C2C database in the Project Handbook (Work Packages 3 & 4) states: "…the overall concept as an IntraMED-C2C framework will be described which also includes a database for matching innovative ideas with institutions for the realisation of these ideas which are mainly SMEs and R&D institutions…"

The major steps to create a web based innovation database have been:

- elaborate a concept
- planning (structure and functions)
- design
- implementation
- testing
- presentation of the alpha version at the Fourth project meeting, Debrecen, Hungary[1]

This report is based on the above mentioned presentation, with few additions.

Database structure

Drupal terminology

The innovation database is implemented in a Drupal[2] environment. The Drupal is a widely used open source content management system for web sites, based on MySQL (or PostgreSQL) and PHP on server side, and uses Javascript and jQuery on client side. Drupal provides a slim database abstraction layer to provide developers with the ability to support multiple database servers easily. The intent of this layer is to preserve the syntax and power of SQL as much as possible, while letting Drupal control the pieces of queries that need to be written differently for different servers and provide basic security checks.[3] However, working in a Drupal environment means that we use the Drupal's API and user interface, therefore the description of the innovation database uses the Drupal terms instead of the general terms of databases and terms of the database design. Consequently, we use terms, like content type, taxonomy vocabulary, node reference, filters, views, etc., instead of the conventional terms of computerized databases, like table, key, index, relationship, etc.

In the terminology of Drupal 6, the pages or contents are called *nodes*. These terms are used in this report alternatively.

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[1] http://intramed-c2c.eu/content/fourth-prject-meeting
[2] http://drupal.org/
[3] http://api.drupal.org/api/drupal/includes--database.inc/group/database/6

Content types

In Drupal, each item of content is called a node, and each node belongs to a single content type, which defines various default settings for nodes of that type, such as whether the node is published automatically and whether comments are permitted.[4] In addition to the default fields of a content type (title, body, comments and attachments), we use several other fields constructed by the Content Construction Kit (CCK) module[5].

Innovation

This is the "core" content type of the innovation database, which, similarly to the other content types, consists a number of CCK fields to describe and characterize an innovation. The table below shows all CCK fields in this content type (this table inserted here just as an example: see other content type structures with CCK fields in the Appendix). The CCK fields are grouped, the first group (*Name, state and description*) consists all mandatory fields, which can not be left empty; the user should fill them or select an option.

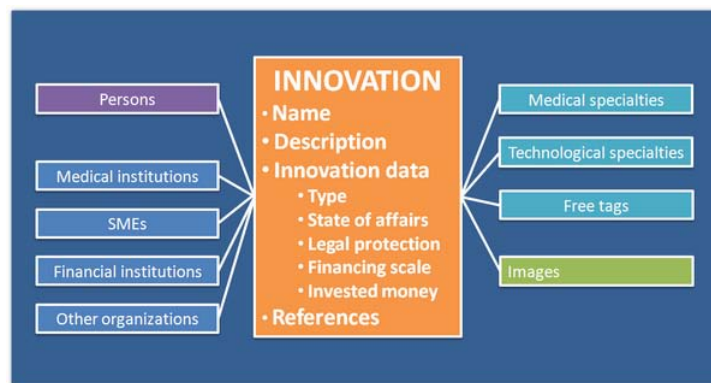| Label	Name	Type
Name of the innovation	Node module form.	
I'am interested	field_button1	Button
Name, state and description	group_description	Standard group
Name of the innovation	field_name_innovation	Text
Innovation type	field_inno_type	Text
Legal protection	field_protection	Text
State of affairs	field_state	Text
Abstract	field_short_description	Text
Description	field_description	Text
Images	group_images	Standard group
Image gallery	field_ref_gallery	Node reference
Innovation specialties	group_type	Standard group
Medical specialty	field_medspec	Content Taxonomy Fields
Technological specialty	field_techspec	Content Taxonomy Fields
Free tags	field_free_tags	Content Taxonomy Fields
Involved organizations	group_organizations	Standard group
Medical institutions	field_ref_medinst	Node reference
Small or medium enterprises	field_ref_sme	Node reference
Financial institutions	field_ref_fininst	Node reference
Other organizations	field_ref_other	Node reference
Involved persons	group_persons	Standard group
Person(s)	field_ref_person	Node reference
Financing	group_financing	Standard group
Order of magnitude	field_magnitude	Integer
Already invested	field_invested	Money

1. CCK fields in the Innovation content type

The Innovation content type consists a number of *Node reference* type CCK fields. These serves to link other content type nodes (pages) to an Innovation. This solution makes the use of the database easier. For example if a person is involved in more than one innovation, her/his data (name, contact information etc.) should be typed only in the first case when the person's page is created, and this page (node) can be referenced in any innovation page selected from the list of all persons.

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[4] http://drupal.org/node/21947
[5] http://drupal.org/project/cck

In the innovation content type, the default *Title* field's label was renamed to *Name of the innovation*, and the default *Body* field is omitted, and it's function (publish text) is served by the *Description* field, because a CCK text field can be more easily customized than the default *Body* field.

The figure 2. shows all other content types referenced by the innovation content type. In the future, this structure can be easily extended by references to additional content types.

2. Referenced content type in the innovation content type

3. Display content of a referenced node: thumbnail of images from a referenced gallery on the referrer's page

Any content of referenced node can be displayed in the referrer content, for example images of a referenced gallery (Figure 3.) can be displayed on the innovation page. The images here is displayed as a cropped thumbnail, with link to show the full image, as a Lightbox[6] slideshow.
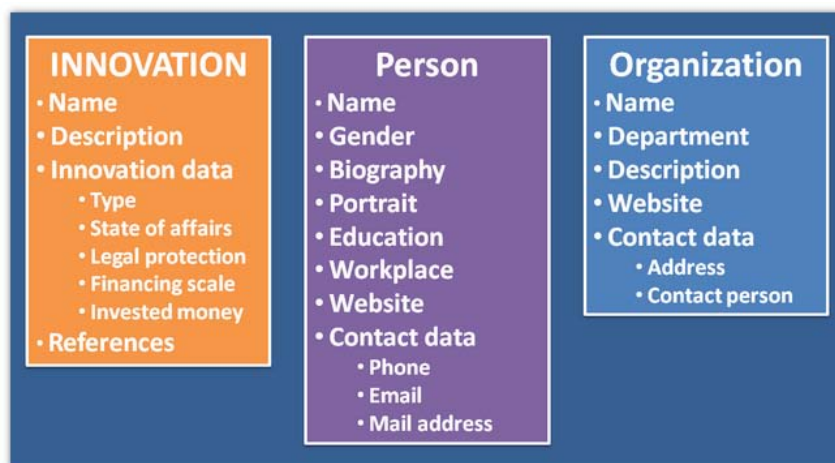
Other content types

Other content types implemented at present in the innovation database are:

- Persons
- Organizations
    - Medical institution
    - SME (Small or medium enterprise)
    - Financial institution

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[6] http://lokeshdhakar.com/projects/lightbox2/
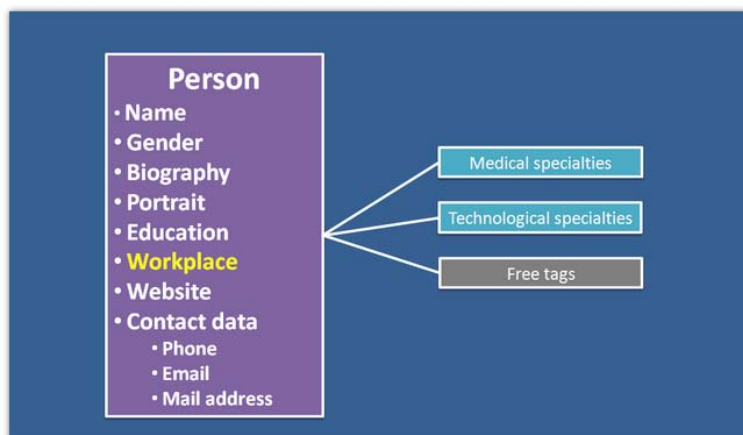
♦ Other organization
- Gallery (of images)

Similarly to the innovation content type, other content types consists a number of CCK fields.

4. CCK fields in other content types

See the structure of all content types with their CCK fields in the Appendix.

Vocabularies

5. Database structure: vocabularies linked to a content type

Three vocabularies (lists of keywords or tags) are used in the innovation database to categorize the innovations, organizations and persons:

- Medical specialties
- Technological specialties
- Free tags

The vocabularies of *Medical specialties* and *Technological specialties* use predetermined lists of keywords.
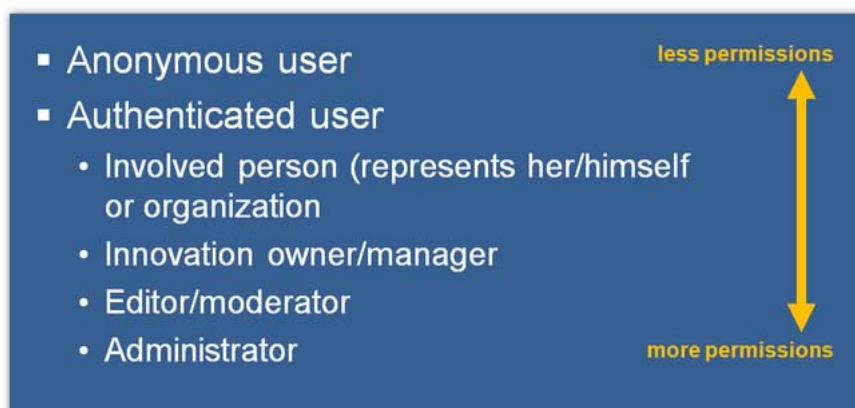
This two vocabularies is are excerpts of the extended Ortelis Thesaurus[7], originally developed in the Certif Project, and in use by the Hungarian Current Research Information System (HunCRIS)[8].

The third vocabulary of *Free tags* doesn't have a predetermined list of keywords; users with appropriate permission are allowed to add any keywords to it.

If a vocabulary is linked to a content type, in the edit form of a page one or more keywords from the list of terms can be selected – in the case of Free tags, can be selected or added – to categorize the content.

How to use the database

Users

6. User groups arranged by permission levels

Users belong to user groups, in the Drupal they are called *roles*, like editor, administrator, etc. (In the Drupal, te administrator, has access all functions to the web site, including the innovation database.) Any other roles can be created, and its permissions can be set by the administrator (or another user permitted by the administrator to manage users' permissions).

In the Drupal, there are three default roles:

- anonymous users (any visitor of the web site not logged in),
- authenticated users (by default, they have the same permissions as anonymous users, but they are registered, having user name and password and they can log in)
- administrator

Anonymous users are permitted to browse and filter the lists of contents, and browse list of vocabulary lists. Also they have permission to read the contents (pages), and send message to the database manager(s) to express their intention to be involved in an innovation.

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[7] http://nkr.info.omikk.bme.hu/cerif/orteliustop.htm
[8] http://nkr.info.omikk.bme.hu/HunCRIS_eng.htm

For the test period a tester role was defined with permissions to create any content (innovations, persons, organizations, galleries), edit them, and post comments.

In the future, the innovation database content can be divided to different parts according the access permission of different user groups. For example it can be divided into two parts; one part can be accessed by anybody, and another confidential part (certain content types or certain fields of a content type), which can be accessed only by users having appropriate permissions.

Browse the database

The content of the innovation database (innovations, organizations, persons, images etc.) can be browsed via different lists of contents showing the title (name) of the pages, and some selected data and text, and link to the full contents. These lists (database queries) are created by the Views module[9]. For example, the list of innovations is a list of contents filtered to show only the list of innovation content type pages:

7. Views of innovations. Light blue boxes are list istems.
Any of them represents one innovation, and have link to the full content

[9] http://drupal.org/project/views

Filtering lists

The content type filter (set to select innovation content type pages) is hidden, and cannot be changed by the user. However, several additional filters are exposed, and therefore can be set by the user. An arrangement of exposed filters for the list of innovations (highlighted with red colour) is sown on the figure 8.

8. Exposed filters (in the red box)

Selection a value in the dropdown box of an exposed filter will results a (narrowed) list of innovations displaying only those innovations, which have that value.

9. Narrowing the list of innovations by selecting a value of an exposed filter

Innovation page

If the user finds an innovation in the list which arouses her/his interest, the link leads to the innovation's page with full content – abstract, description, images, and tables of other information.

RADIOTHERAPY PROTOCOL WITH SPECIAL IMPLANT

Abstract

The clinical research team is studying the adjuvant therapy possibilities in advanced colorectal malignant diseases. Their target activity is based on intra-abdominal colorectal inoperable or locally recurrent tumors (unsuitable for oncological safe surgical procedure).

If you would like to be involved in this innovation, please send us a detailed message.

Description

The clinical research team is studying the adjuvant therapy possibilities in advanced colorectal malignant diseases. Their target activity is based on intra-abdominal colorectal inoperable or locally recurrent tumors (unsuitable for oncological safe surgical procedure). They are trying to obtain down-sizing and down-staging of tumors with the object of a safe surgical treatment. For this object they are trying to develop a targeted, very effective in low dose neo-adjuvant chemo-radiotherapy protocol. For this therapy they need a special shaped, double action intra-abdominal silicone implant with complementary devices. They are looking for a company specialised in silicone implant manufacturing that is ready to work with and helps them in developing this special silicone implant and its accessories and is interested in following studies improving its utility in neo-adjuvant chemo-irradiation therapy of locally advanced intra-abdominal colonic tumors. They are looking for a developer as well (for complementary devices and equipments).

Images

Innovation data

Innovation type	new equipment
State of affairs	seed - prototype
Legal protection	protected
Financing scale	1,000 - 10,000 €
Already invested money	500 EUR
Medical specialty	radiotherapy
Technological specialty	plastics technology
Free tags	silicon implant irradiation therapy

Involved organizations and persons

Medical institutions	Kaposi Mór Teaching Hospital
SMEs	—
Financial institutions	—
Other organizations	—
Persons	—

10. An innovation page with full content

Innovation pages have printable html and pdf versions, which can be opened by clicking on the icons at the upper right corner.

Below these icons, there is another link in a green box to send a detailed message to the innovation's manager. Clicking on the link, a form will be opened to send a message. In this way, the user can initiate a contact with the innovation's manager or owner.

I WOULD LIKE TO PARTICIPATE IN THIS INNOVATION

You are kindly requested to give us your detailed contact information (address, phone number, etc).

Your name: *

Your phone number:

Your mobile phone number:

Your address:

Your e-mail address: *

Message: *

Send

11. Message form

Browse other lists

There are other ways to find interesting innovation, namely browsing the lists of keywords or terms of the vocabularies. The vocabularies with predermined lists of keywords are displayed as hierarchical lists (similar to common directory lists).

12. Hierarchical list of the Medical specialties vocabulary terms, displaying the number of content pages havong a given term

Clicking on a parent keyword makes visible its children. If a keyword has not any children (it is a leaf on a branch), clicking on it, a list of contents having that keyword will be open:

ANDROLOGY

Showing **2** results

Image upload test 01
"We had a problem of uploading pictures; the error message said "not enough disk space". This seems to be an internal error. We tried it several times and always this error occurred." more »
State of affairs: seed - prototype
Medical specialty: Andrology, Audiologopaedia, Medicine
Technological specialty: Environmental design, Naval engineering
Free tags: android, catheter, happy birthday, invasive vascular surgery, levespor, personal mobility, rénszarvas

Best Innovation of the Galaxy
Nam quis libero vitae diam pellentesque venenatis sit amet non nibh. Nam eros elit, rhoncus in rhoncus sit amet, semper eget odio. Quisque libero metus, dignissim id vestibulum at, convallis id diam. more »
State of affairs: seed - prototype
Medical specialty: Andrology, Herbal medicine studies
Technological specialty:
Free tags: android

13. List of innovations having the the same keyword

The list of free tags are displayed in alphabetical order (because this list is not hierarchical):

Keywords or terms assigned to a web page

A | C | D | E | É | F | H | I | J | L | M | O | P | R | S | T | W

android (2)
animal breeding (1)
animal science (1)

A | C | D | E | É | F | H | I | J | L | M | O | P | R | S | T | W

Add/edit database items

Users having the appropriate permissions can add and edit contents. The form to add/edit an innovation page is divided into collapsible blocks. The first block is expanded, and it consists all mandatory fields, labelled with red asterisk (*):

14. Add/edit form of an innovation

Other blocks are collapsed, and can be expanded by clicking on their title. Innovation specialties block consists vocabularies:

15. Add/edit form block of vocabularies

Two blocks, *Involved organizations* and *Involved persons* have reference fields to refer other contents. In these fields the user can select already existing contents of appropriate types (Medical or other organizations in the Block 4, and persons in the Block 5). If an organisation or person is not added to the database yet, there is an opportunity to add it, without leaving the add/edit form of the innovation, just clicking on the Create new... link to open another form (in a *modal window*):

16. Open a modal window to add a person to the database without leaving the add/edit innovation form

17. The add person form in a modal window opened without leaving the add/edit innovation form

Further development options

The alpha version of the InTraMed-C2C innovation database is completed. The tasks of the next period are the thorough testing of the alpha version with participation of project partners; and further development to produce a public beta version.

Some possible options and directions of this work are:

- Refine structure (e.g. link persons to organizations and vice versa)
- Add video content type
- Attach document files to innovations
- Modify/add filters (e.g. add to lists of persons and organizations)
- Modify/add items' fields
- Migrate from Drupal 6 to Drupal 7

Appendix I: Structure of content types

Database content type structure (CCK fields)

Label	Name	Type
Name of the innovation	Node module form.	
I'am interested	field_button1	Button
Name, state and description	group_description	Standard group
Name of the innovation	field_name_innovation	Text
Innovation type	field_inno_type	Text
Legal protection	field_protection	Text
State of affairs	field_state	Text
Abstract	field_short_description	Text
Description	field_description	Text
Images	group_images	Standard group
Image gallery	field_ref_gallery	Node reference
Innovation specialties	group_type	Standard group
Medical specialty	field_medspec	Content Taxonomy Fields
Technological specialty	field_techspec	Content Taxonomy Fields
Free tags	field_free_tags	Content Taxonomy Fields
Involved organizations	group_organizations	Standard group
Medical institutions	field_ref_medinst	Node reference
Small or medium enterprises	field_ref_sme	Node reference
Financial institutions	field_ref_fininst	Node reference
Other organizations	field_ref_other	Node reference
Involved persons	group_persons	Standard group
Person(s)	field_ref_person	Node reference
Financing	group_financing	Standard group
Order of magnitude	field_magnitude	Integer
Already invested	field_invested	Money

18. Innovation

Label	Name	Type
Title	Node module form.	
Personal data	group_personal_data	Standard group
Prefix	field_name_prefix	Text
First name	field_name_first	Text
Middle name	field_name_middle	Text
Last name	field_name_last	Text
Gender	field_gender	Text
Contact	group_contact	Standard group
Phone	field_phone	Phone number
Skype ID and status	field_show_skype Controlling *field_skype_id* Controlling *field_skype_call*	Text
Skype ID	field_skype_id Controlled by *field_show_skype*	Text
Skype status	field_skype_call Controlled by *field_show_skype*	Computed
Email	field_email	Email
Website	field_homepage	Link
Work	group_work	Standard group
Education	field_education	Text
Position	field_position	Text
Medical specialty	field_medspec	Content Taxonomy Fields
Technological specialty	field_techspec	Content Taxonomy Fields
Biography & portrait	group_short_biography	Standard group
Short biography	field_short_biography	Text
Portrait	field_portrait	File

19. Person

Label	Name	Type
Name of institution	Node module form.	
Department	field_department	Text
Medical specialty	field_medspec	Content Taxonomy Fields
Free tags	field_tags	Content Taxonomy Fields
Contact person	group_contact_person	Standard group
Contact Name	field_contact_name	Text
Email	field_email	Email
Phone	field_phone	Phone number
Website	field_homepage	Link
Address	group_address	Standard group
Zip	field_zip	Text
Country	field_country	Text
Region ID	field_regionid	Text
City	field_city	Text
Street	field_street	Text

20. Medical institution

Label	Name	Type
Company name	Node module form.	
Department	field_department	Text
Technological specialty	field_techspec	Content Taxonomy Fields
Free tags	field_tags	Content Taxonomy Fields
Contact person	group_contact_person	Standard group
Contact Name	field_contact_name	Text
Email	field_email	Email
Phone	field_phone	Phone number
Organization's homepage	field_homepage	Link
Address	group_address	Standard group
Zip	field_zip	Text
Country	field_country	Text
Region ID	field_regionid	Text
City	field_city	Text
Street	field_street	Text

21. SME (Small or medium enterprise)

Label	Name	Type
Title	Node module form.	
Department	field_department	Text
Free tags	field_tags	Content Taxonomy Fields
Contact person	group_contact_person	Standard group
Contact Name	field_contact_name	Text
Email	field_email	Email
Phone	field_phone	Phone number
Address	group_address	Standard group
Zip	field_zip	Text
Country	field_country	Text
Region ID	field_regionid	Text
City	field_city	Text
Street	field_street	Text
Website	field_homepage	Link

22. Financial institution

Label	Name	Type
Title	Node module form.	
Department	field_department	Text
Free tags	field_tags	Content Taxonomy Fields
Contact person	group_contact_person	Standard group
Contact Name	field_contact_name	Text
Email	field_email	Email
Phone	field_phone	Phone number
Organization's homepage	field_homepage	Link
Address	group_address	Standard group
Zip	field_zip	Text
Country	field_country	Text
Region ID	field_regionid	Text
City	field_city	Text
Street	field_street	Text

23. Other organization

Label	Name	Type
Title	Node module form.	
Image	field_gallery_image	File
Gallery description	Node module form.	

24. Image gallery

Appendix II: Tables to edit innovation database

Add (or edit) Innovation – fields

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
1	Name & description	
	Name of the innovation*(type or paste text - max. 250 characters)	
	Innovation type (select option) *	procedure improvement new procedure equipment improvement new equipment
	Legal protection (select option) *	not protected protected
	State of affairs (select option) *	**opened** - an idea **mature** - implementation plan **seed** - prototype **investigated** - impact assesment has been **started**, seeking investment partners can be used in the **medical practice** **marketable**- it can be used in a medical practice, seeking investors **implemented**
	Abstract* (type or paste text - max. 300 characters)	

	Description (type or paste text)	
2	Images	
	Images (select or add Gallery of images)	
3	Innovation specialties	
	Medical specialty (select from list)	
	Technological specialty (select from list)	
	Free tags (select or type)	
4	Involved organizations	
	Medical institutions (select or add)	
	Small or medium enterprises (select or add)	
	Financial institutions (select or add)	
	Other organizations (select or add)	
5	Involved persons	
	Person (select or add)	
6	Financing	
	Order of magnitude (select options)	
	Already invested (add value and select currency)	

Add (or edit) medical institution

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
	Name of institution* (type or paste)	
	Department (type or paste)	
	Medical specialty (select from list)	
	Free tags (select of type)	
	Contact person	
	Contact Name (type or paste)	
	Email (type or paste)	
	Phone (type or paste)	
	Website (type URL)	
	Address	
	Zip (type or paste)	
	Country (select from list)	
	Region ID (select from list)	
	City (type or paste)	
	Street (type or paste)	
	Description	
	Description (type or paste)	

Add (or edit) SME

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
	Name of institution* (type or paste)	

	Department (type or paste)	
	Technological specialty (select from list)	
	Free tags (select of type)	
	Contact person	
	Contact Name (type or paste)	
	Email (type or paste)	
	Phone (type or paste)	
	Website (type URL)	
	Address	
	Zip (type or paste)	
	Country (select from list)	
	Region ID (select from list)	
	City (type or paste)	
	Street (type or paste)	
	Description	
	Description (type or paste)	

Add (or edit) financial institution

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
	Name of institution* (type or paste)	
	Department (type or paste)	
	Free tags (select of type)	
Contact person		
	Contact Name (type or paste)	
	Email (type or paste)	
	Phone (type or paste)	
	Website (type URL)	
Address		
	Zip (type or paste)	
	Country (select from list)	
	Region ID (select from list)	
	City (type or paste)	
	Street (type or paste)	
Description		
	Description (type or paste)	

Add (or edit) other institution

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
	Name of institution* (type or paste)	
	Department (type or paste)	
	Free tags (select of type)	
Contact person		
	Contact Name (type or paste)	
	Email (type or paste)	
	Phone (type or paste)	
	Website (type URL)	
Address		
	Zip (type or paste)	
	Country (select from list)	
	Region ID (select from list)	
	City (type or paste)	
	Street (type or paste)	
Description		
	Description (type or paste)	

Add (or edit) person

Mandatory fields are marked with red asterisk (*).

Block	Field name	Field value
	Prefix (type or paste)	
	First name* (type or paste)	
	Middle name (type or paste)	
	Last name* (select of type)	
	Gender (select option)	
Contact		
	Phone (type or paste)	
	Skype ID and status* (select option)	
	Skype ID (type or paste)	
	Email (type or paste)	
	Website (type URL)	
Work		
	Education (select option)	
	Position (type or paste)	
	Medical specialty (select from list)	
	Technological specialty (select from list)	
Biography & portrait		
	Short biography (type or paste)	
	Portrait (upload image file)	
Vocabularies		
	Free tags (select or type)	