ActiveMap Web admin manual 3.39.0

Activemap Computer Systems Design

Mar 27, 2023

CONTENTS

ANNOTATION

This document is intended to provide an overview of the general information, structure and configuration of the ActiveMap Web system for individual conditions, requirements and application areas of the software.

CHAPTER

ONE

GENERAL INFORMATION ABOUT THE PROGRAM

1.1 About Program

ActiveMap Web (administrator) is the administrative part of the ActiveMap Web program that allows to add and structure a variety of geographic information, as well as configure access rights to user information and user interface settings.

ActiveMap Web is part of a multi-component web-based ActiveMap system for remote employee management.

ActiveMap is an online system for organizing the interaction between field workers and the dispatcher (task coordinator). The system provide the ability to plan and manage the production work, as well as operational quality control of the field service.

Capabilities of ActiveMap:

- Flexible customization to meet the needs of the company.

ActiveMap can be adapted to any business process. A list of work types, stages and deadlines can be set up for each organization.

- Adding tasks and controlling their execution.

The system allows to add operational and planned tasks, including scheduled tasks on a given template.

- Object inventory.

ActiveMap helps carry out an inventory of objects: updating information on the status of existing objects, identifying nonexistent and creating new objects.

- Control of field employees.

The system helps to control employees with real-time tracking of the location, viewing the history of their movement and recording the execution of requests.

- Convenient and quick interaction between field employees and work coordinators.

ActiveMap speeds up the process of exchanging results between the field employee and the work coordinator. The coordinator can promptly update task information, which is immediately displayed to the field employee. The coordinator also can quickly return the job to the fieldworker for execution based on the results of the fieldwork.

- Using photo and video fixation materials and GLONASS/GPS data.

The system makes it possible to fix the fact of work fulfillment by means of photos, video recordings, location data. This gives the opportunity to avoid field inspection of executed orders.

- User rights configuration.

The system gives the possibility to configure user rights. Each user is assigned a certain role. The role of the system user affects access to the list of tasks, editing and management of these tasks. The roles are from simple users to the administrator of the entire system.

- Displaying service objects on a map.

ActiveMap allows to create tasks on the basis of service objects with automatic filling of coordinates and task fields.

- Creating electronic documents.

The system allows to create reports on the work with tasks and user activity based on the document form of the organization, as well as invoices issued by field employees.

More information about the comprehensive capabilities of the ActiveMap system can be found on the website of the Activemap Computer Systems Design company https://activemap.me/.

1.2 System requirements

The program is created using web technologies, that allows to run it from any personal computer with Internet access. To organize the dispatcher's workplace, a personal computer with technical specifications that meet the following requirements at a minimum is required:

- Processor: Intel Core i3,
- Operating system: Windows 7,
- Internet access speed of at least 1 Mbps.

The program does not require additional installation of third-party software on the workstation. The program opens using internet browsers such as Internet Explorer, Mozilla Firefox, Opera, Google Chrome, or Microsoft Edge.

CHAPTER

TWO

WORKING IN THE PROGRAM

2.1 Running the program

To run the Program, open an Internet browser (Internet Explorer, Mozilla Firefox, Opera, Google Chrome, Microsoft Edge), enter the address of the web page of the Program in the address bar. The start window (Fig. 2.1) appears.

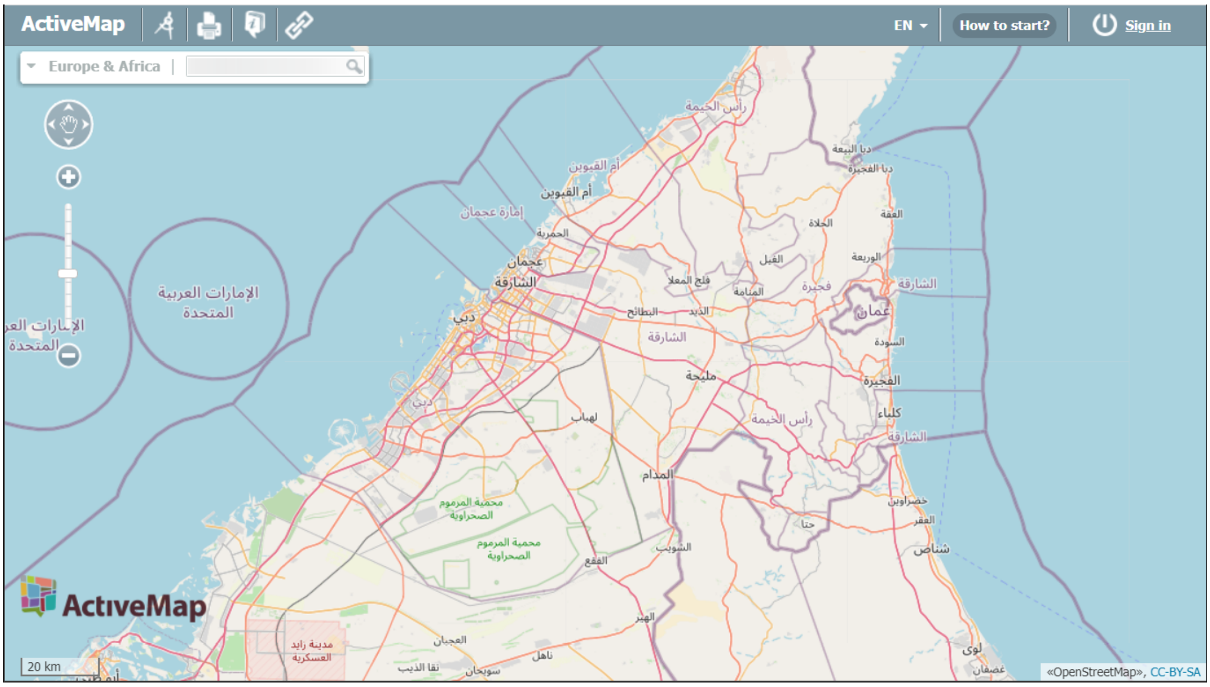


Fig. 2.1: Start window

To log in you need to enter your credentials: login and password. Then the start web page will load (Fig. 2.2).

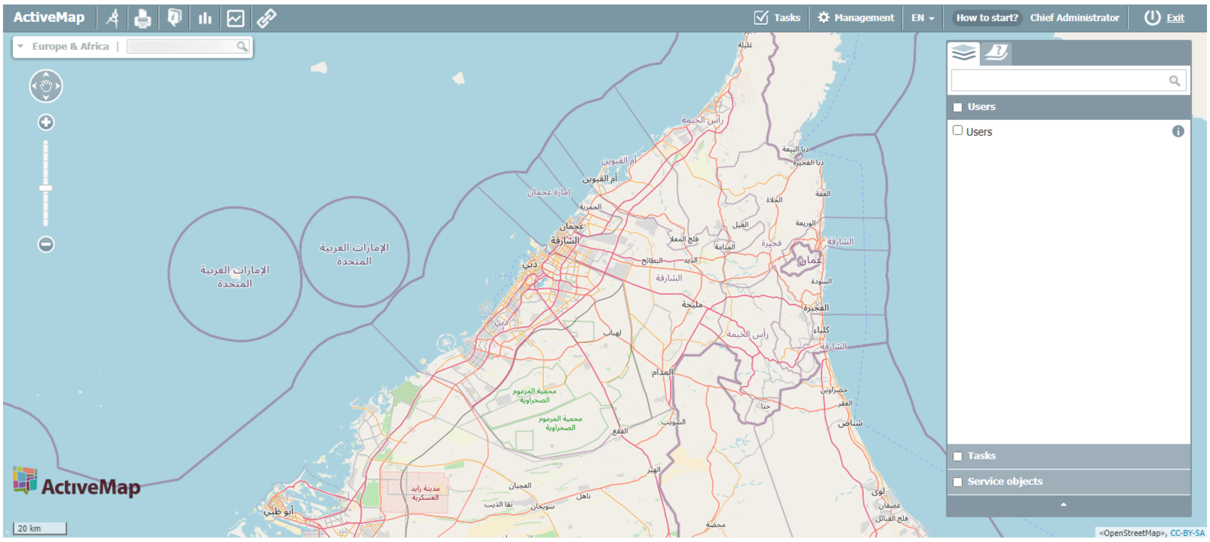


Fig. 2.2: Start page of the program

The main window of the Program contains (Fig. 2.3):

1. Map displaying area.
2. Toolbar.
3. Basemap controls with a search bar.
4. Control panel for thematic layers.
5. User panel.
6. Scale bar.
7. Scale bar.
8. Map navigation bar.

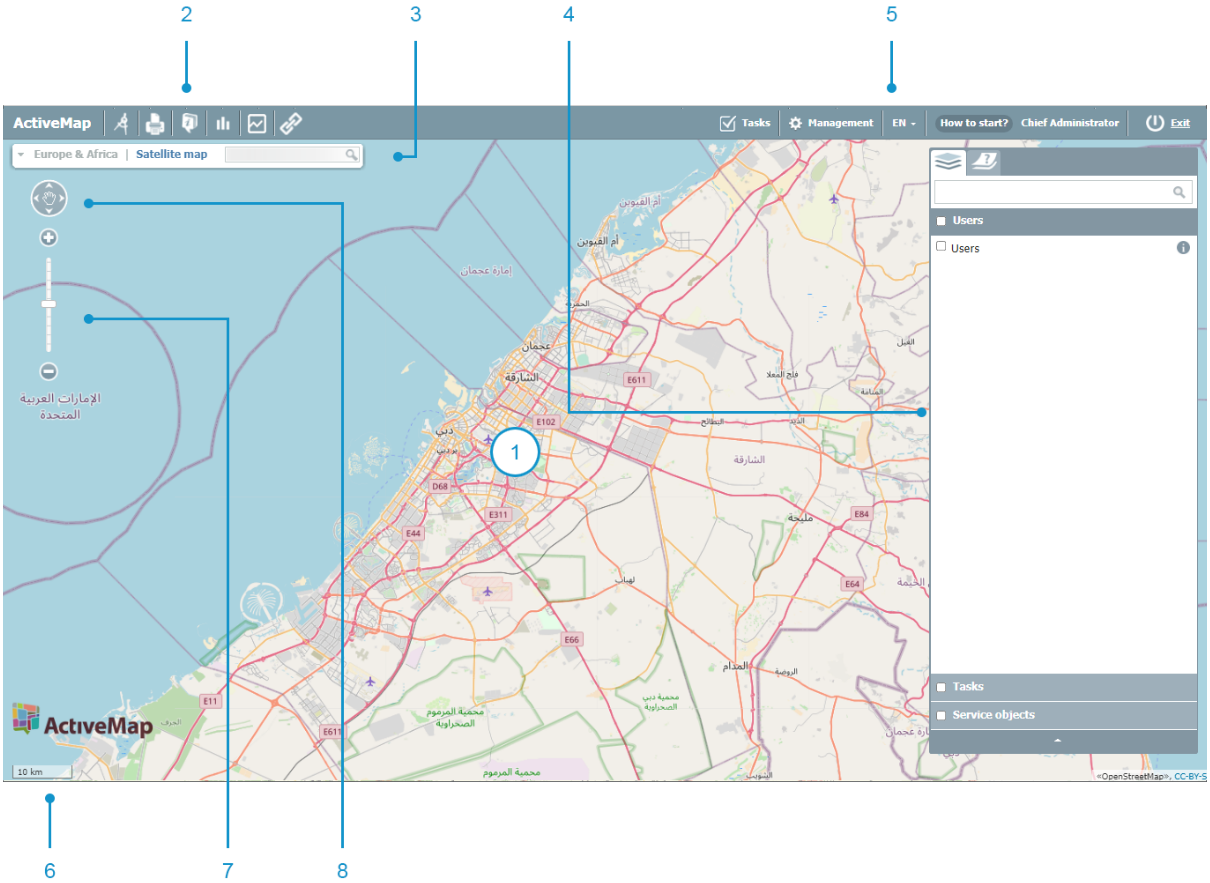


Fig. 2.3: Elements of the main window

Working with administration tools is available in the "Tasks" and "Management" modules, which can be accessed through the user panel at the top of the main program window (Fig. 2.4).

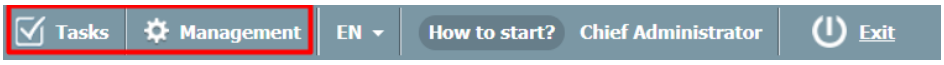


Fig. 2.4: Switching to the "Tasks" and "Management" modules

2.2 Tasks module

The task module allows to work with contracts, create operational and planned tasks in the system.

Operational tasks are created to solve current issues. Planned (scheduled) tasks are created on a date and time specified in the schedule according to a given template.

Tasks can be created within the contracts, concluded with an organization, as well as independently of them. The ability to view, create and edit contracts and tasks depends on the user's role in the system. User roles are defined by the Organization Administrator or Cluster Administrator.

To go to the tasks module, click on "Tasks" (Fig. 2.5) on the user panel on the main page of the geoportal:

Fig. 2.5: Accessing the task module

2.2.1 Contracts

2.2.1.1 Contracts in ActiveMap

Contract – an agreement for the provision of services concluded with an organization, under which work on a task is performed. Contracts can be created, edited, and deleted by users with Administrator or Cluster Administrator roles. Contracts operate within the cluster. The cluster is selected automatically. When creating, the cluster of the customer organization is used. In another cluster, this contract will not be available to users. The Chief Inspector, Cluster Inspector, Administrator, and Assigned Organization Inspector have rights to view the contract. Users who see the task created under the contract will also receive minimal information (id, title).

A contract may include a list of service objects and types of work. After the start date of the contract, it is impossible to change this date, customer and performer organizations, and also the end date after the expiration of the contract.

Operational and scheduled tasks can be created within a contract. Operational and scheduled tasks can only be created within one contract, you cannot add two contracts. But multiple tasks and schedules can be attached to one contract. If necessary, you can delete a previously selected contract from the task and add a new one. If you delete a contract from the system, the operational tasks created under it and the tasks created under the schedule are preserved (the contract name is displayed in the task), the schedule itself is deleted.

2.2.1.2 List of contracts

To access the window with contracts in the "Tasks" module, click on "Contracts" on the top panel of the page. In the opened window (Fig. 2.6), the entire list of contracts entered into the system (for the Chief Administrator and Chief Inspector) or the cluster contract list (for the Cluster Administrator and Cluster Inspector), the organization contract list (for the Organization Administrator and Organization Inspector), the contract list for available tasks for all other users is presented.

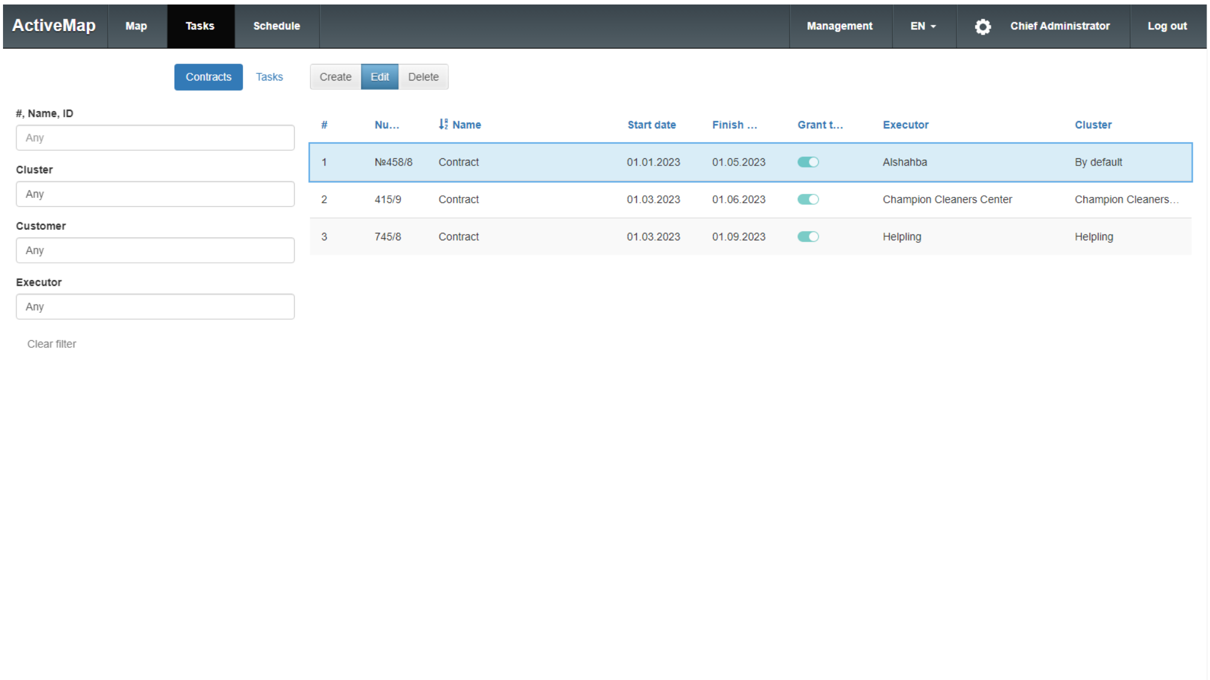


Fig. 2.6: List of contracts

The contracts window has a search by contract number, name and ID. You can also set up filters by attributes:

- Cluster,
- Customer,
- Executor.

The list of contracts is presented in the form of a table, which includes all the basic information on the contract. For convenience, there is sorting in two directions, which works by clicking on the attribute name.

2.2.1.3 Creating a contract

Contracts can only be created, edited, and deleted by users with the Administrator or Cluster Administrator roles. To add a new contract, click "Create", after which a window will open (Fig. 2.7) , where you have to fill in the following fields in the "Main" tab:

- "Name" (mandatory field) — name of the contract;
- "Number" — contract number;
- "Start date" and "Finish date" — the period of the contract, during which the work will be performed and tasks will be created (if these fields are not filled, an operational task or a task on a schedule cannot be created);
- "Customer" (mandatory field) — the cluster of this organization will be assigned to the contract;
- "Executor" (mandatory field) — the organization that is the executor of the contract and to which tasks will be automatically assigned when this contract is selected;

- "Grant task creation to executor" toggle (disabled by default) - if it is disabled, users will not be able to select this contract when creating a task;
- "Description" — a comment to the contract.

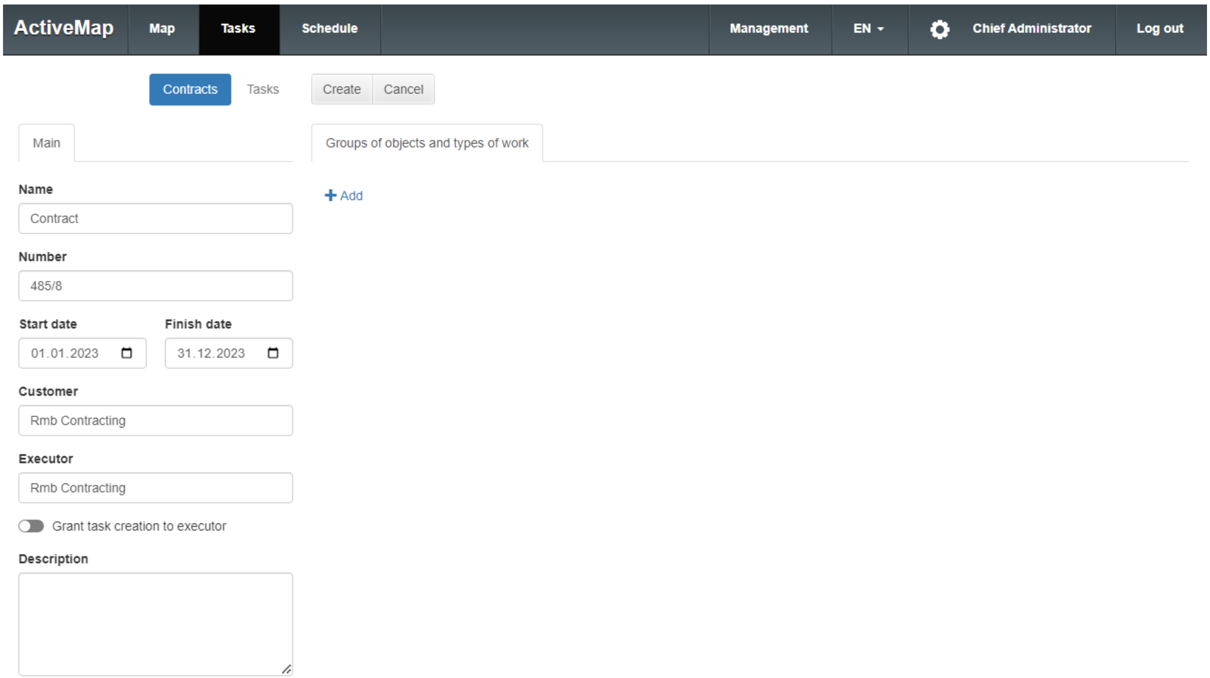


Fig. 2.7: Creating a contract

If necessary, you can add types of work to the contract and specify the list of service objects for which work should be performed. To do this click "Add" in the "Groups of objects and types of work" tab. The block of selecting service objects and types of work will be added. Click "Change" to add a value. When changing a service object, a window will open where you have to select the layer and objects. For convenience, the window has a search line and the ability to select all or individual objects (Fig. 2.8).

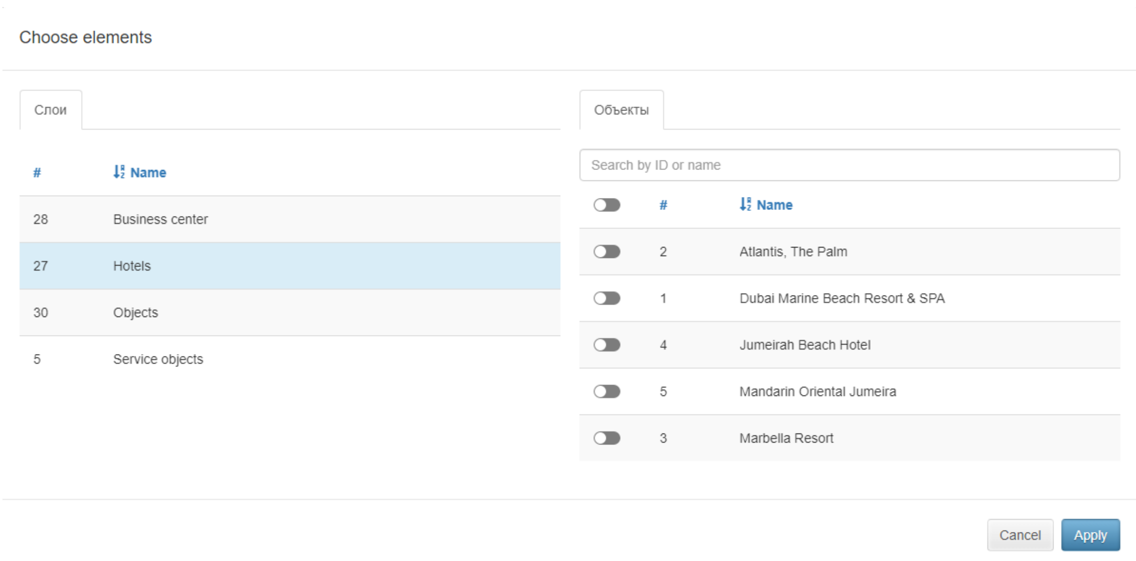


Fig. 2.8: Linking a contract to service objects

When you change the type of work, a window will open in which you have to select the necessary types of work. For convenience, there is a search line, the ability to select all or selected types of work, as well as a filter to display all types of work or only selected ones (Fig. 2.9).

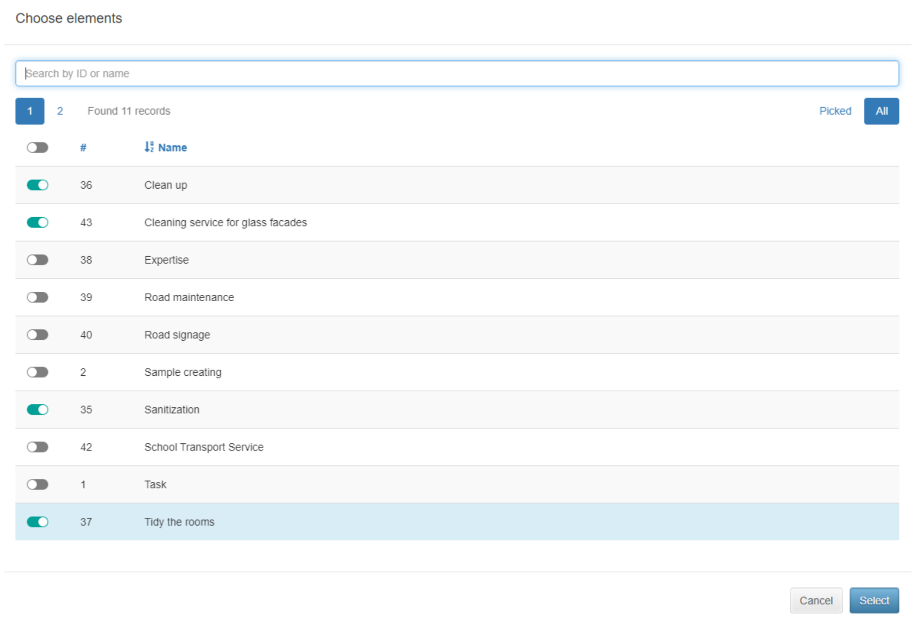


Fig. 2.9: Linking a contract to work types

After saving the contract data, tasks can be created only for the selected types of work and service objects during the specified contract period. You can create several such groups of objects and types of work within one contract. The program also checks whether the selected types of work are available to the assigned organization. If the organization has no rights, the contract will not be saved, as this can cause errors in the creation of tasks in the future. When selecting an object that has a connection to an organization/cluster, the task must be created in the specified organization. If this organization has no rights to the selected type of work, the contract will not be saved.

After entering all the data for the contract, click “Create”. The contract will become available for attaching to tasks in the ActiveMap system software products: ActiveMap Web, ActiveMap Desktop, ActiveMap Mobile.

2.2.1.4 Contract management

To edit a contract, select it and click “Edit”. A window similar to the creation window will open, where you can make and save edits. To delete a contract, select it and click “Delete”. When a contract is deleted, the operational tasks created under it and the tasks created according to the schedule are preserved (the name of the contract is displayed in the task), the schedule itself is deleted.

2.2.2 Tasks

To access the task list, click on “Tasks” on the top panel of the page. In the window that opens, you can see all the tasks created so far (Fig. 2.10).

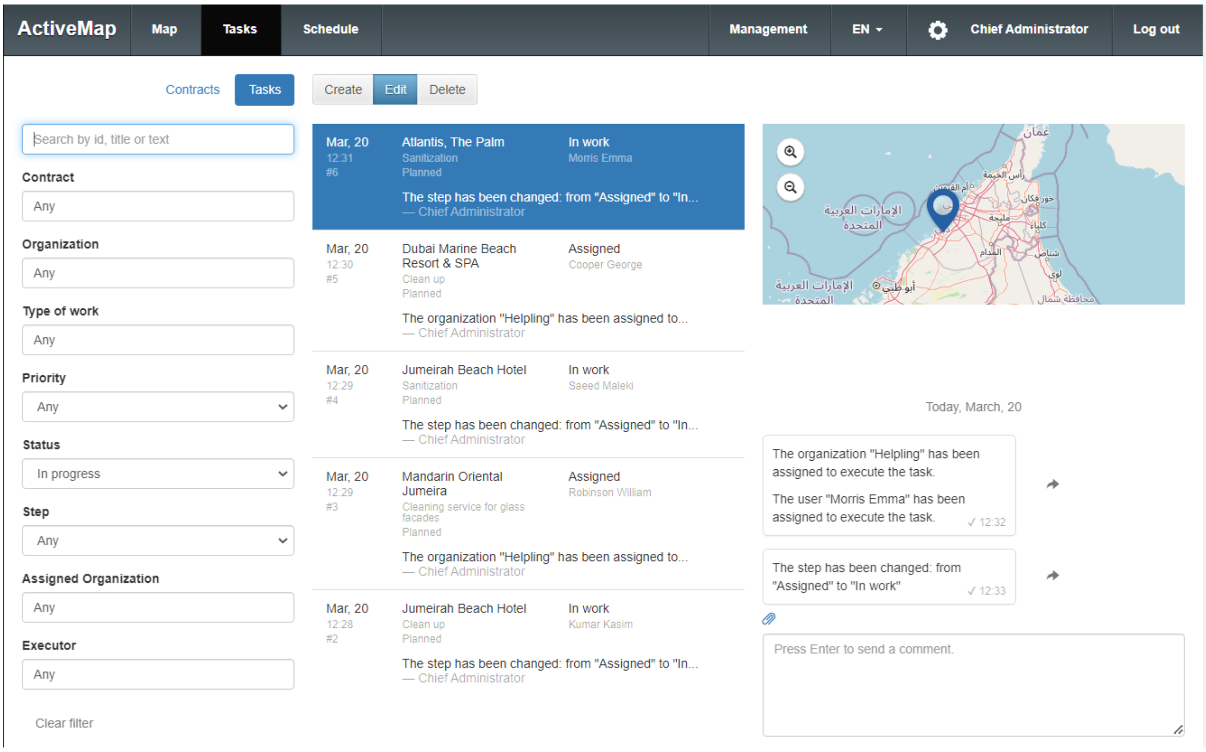


Fig. 2.10: List of tasks available to the user

The filter area located to the left of the task list is intended for searching in the general list using various parameters.

The following filtering parameters are used:

- “Search by Id, title or text”,
- “Contract” (if you have access),
- “Organization”,

- “Type of work”,
- “Priority”,
- “Status”,
- “Step”,
- “Assigned organization”,
- “Executor”.

The context search field allows to find a task by number, title, or description. To search for a task, simply enter part of the number, name, or description. To filter tasks by stage, type of work, step, priority, organization, performing organization, or performer, you need to select values from the dropdown list. The values of these parameters are customized for the individual characteristics of the organization’s activities. After entering and selecting all filtering parameters, the list will display tasks that meet the specified criteria.

2.2.2.1 Creating an operational task

To create a new operational task, click “Create” and fill in the form (Fig. 2.11).

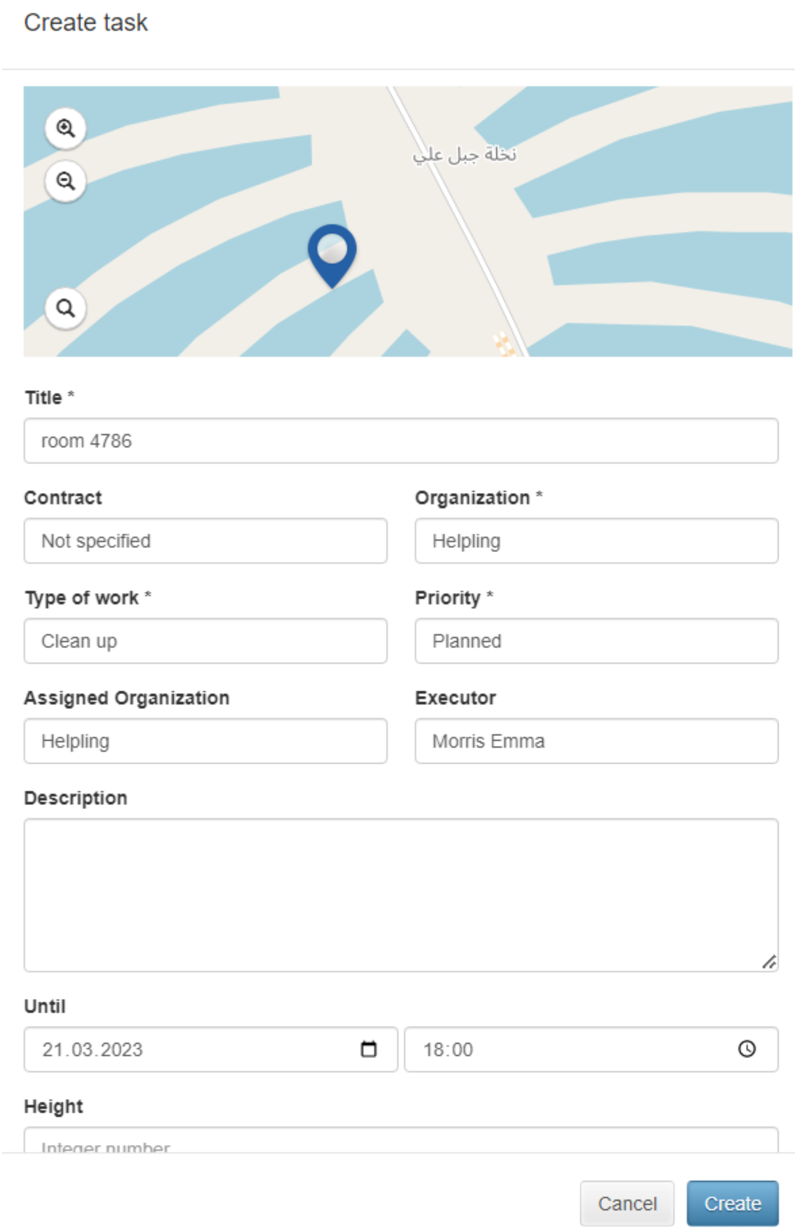


Fig. 2.11: New task creating window

The “Main” tab contains the following fields:

- “Map” - marking the location of the task object on the map (you can select from service objects, find an address in the search field or mark a point on the map);
- “Title” - a brief description of the problem/goal of the task;
- “Contract” - the contract under which the work is carried out for the task;
- “Organization” - the organization on whose behalf the task will be created (this field is available to Chief Administrator and Chief Inspector);
- “Type of work” - type of work for the task;
- “Priority” - type of work (you can choose from the list: planned, unplanned, additional, etc.);

- "Assigned organization" - the organization to which the task will be assigned for execution (when selecting a contract, the value specified in the contract will be automatically filled in);
- "Executor" - the user responsible for performing the task;
- "Description" - a detailed description of the task;
- "Until" - the date and time by which the task must be completed;
- Custom fields - additional fields with different formats that were previously created and linked to a specific type of work.

In the "Files" tab you can attach files of different formats (Fig. 2.12). These can be photos, videos, audio recordings, text files.

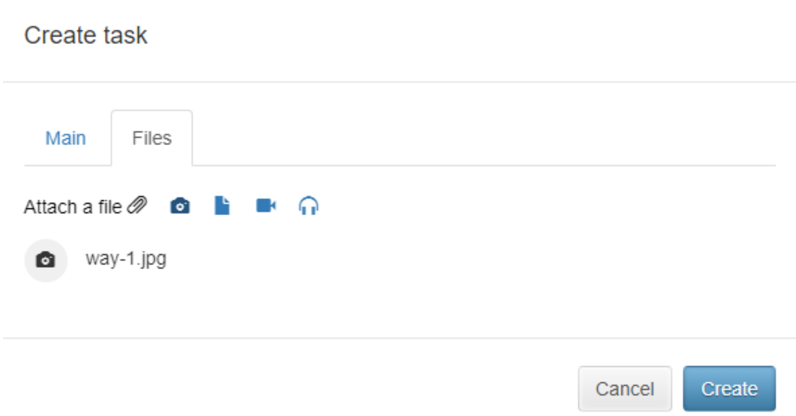


Fig. 2.12: Adding files to a new task

2.2.2.2 Editing a task

The ability to edit task fields depends on the role of the user. To edit a task, select the desired task and click "Edit" in the upper part of the window or double-click on the task. After that the task opens in the edit mode, where the user can fill in/modify the available fields (Fig. 2.13).

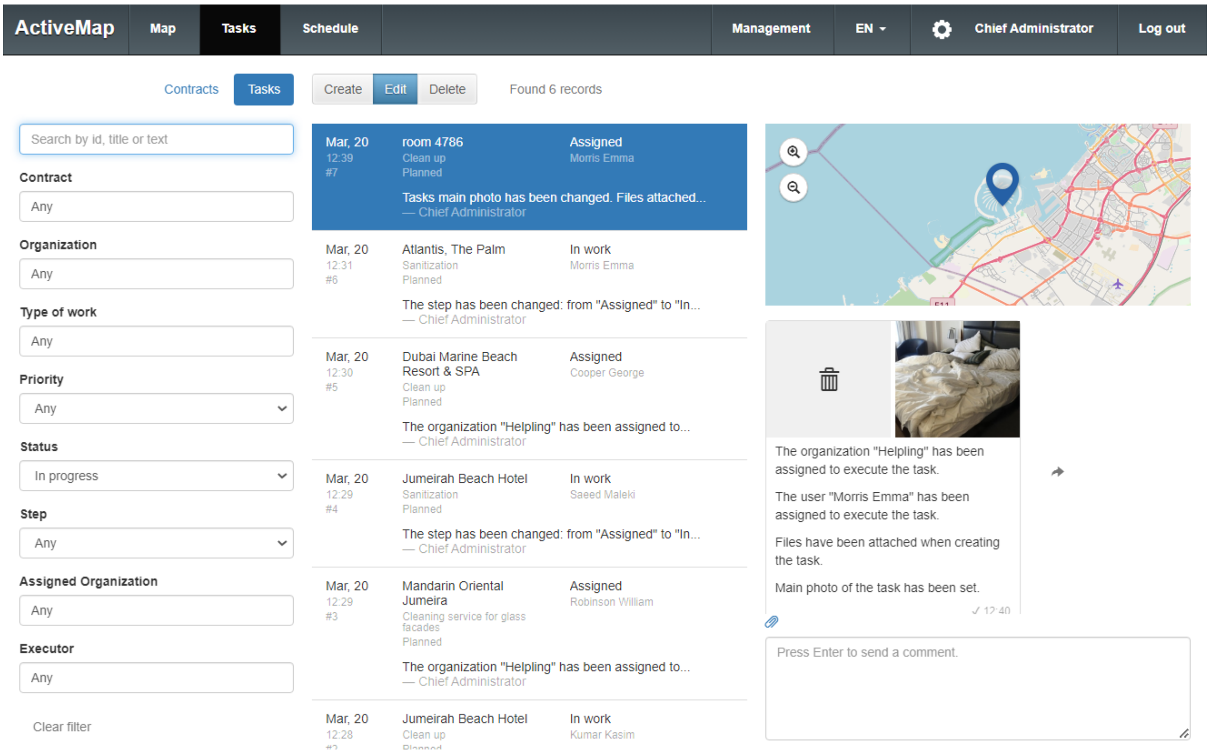


Fig. 2.13: Task editing window

After making all the changes, click one of the buttons located at the top of the editing window:

- “OK” - save changes and go to the list of tasks;
- “Apply” - save changes without closing the editing window;
- “Cancel” - cancel all changes made before saving;
- “Close” - close the editing window (changes will not be saved if they are not saved before closing).

If the task is not editable, only the “Close” button will be active.

2.2.2.3 Deleting a task

To delete an existing task, select it and click on “Delete” at the top of the window. Confirm the action in the pop-up information window (Fig. 2.14).

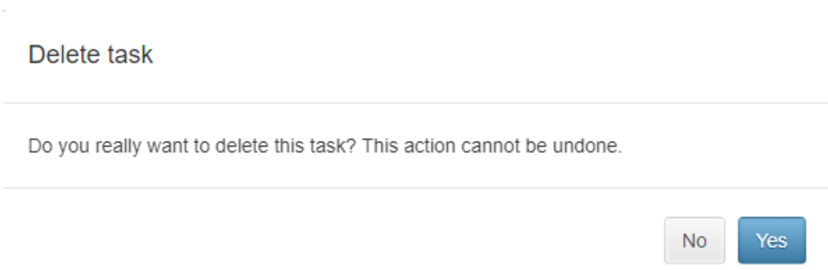


Fig. 2.14: Deleting a task

If the user does not have access to deleting tasks, the message "No access rights" will appear.

2.2.3 Schedules

Schedules allow you to automatically generate tasks based on templates (typical tasks) at a certain time with the required frequency. To go to the section with schedules and task templates, click on "Schedule" on the top panel of the page. The schedule window with a calendar will open (Fig. 2.15).

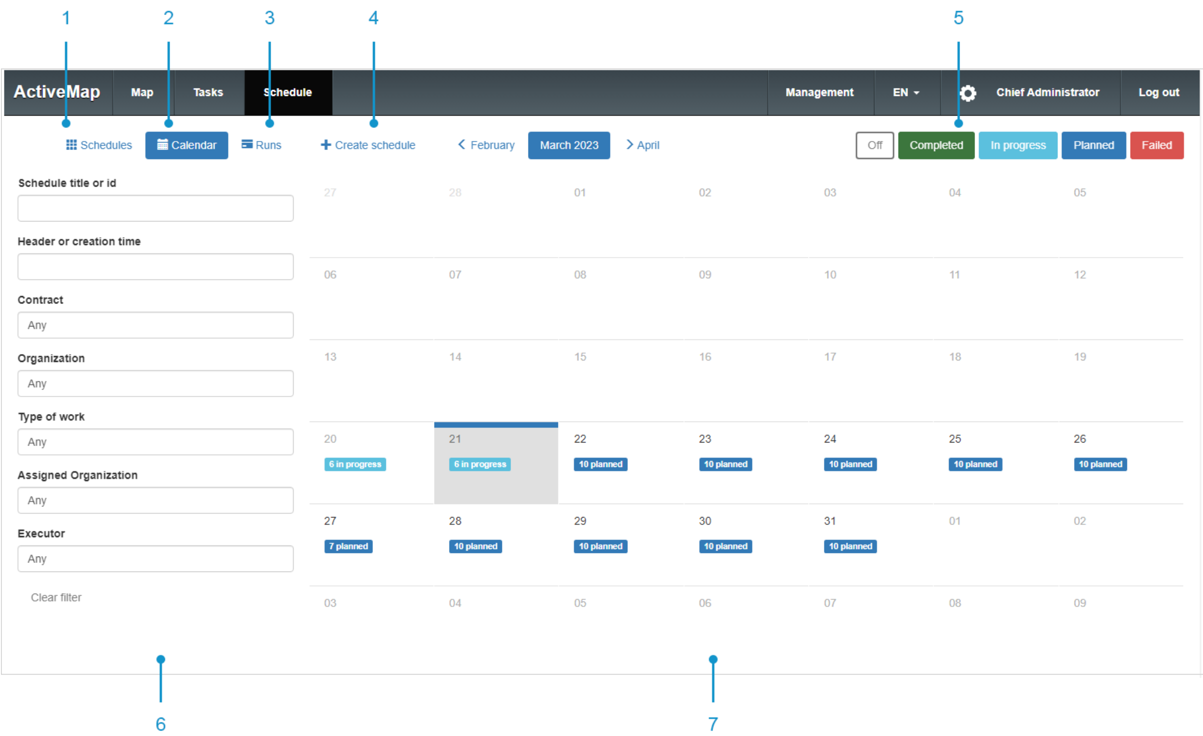


Fig. 2.15: Schedule window with calendar

The window contains the following elements:

1. "Schedules" button - switching to the cards of all available schedules.
2. "Calendar" button - switching to the calendar with schedule launches (the calendar is open by default when you go to the schedules section).
3. "Launches" button - switching to the cards of schedules with launches for the selected date.
4. "New schedule" button - switching to the schedule creation window.
5. Legend of the status of creating tasks with the ability to turn on/off.
6. Filter panel.
7. Calendar with marked task status.

When you click on the "Schedules" button, you switch to the cards of all available schedules. The schedule card displays its name, organization, cluster, contract, launch (task creation) time, a button to go to the list of templates attached to the schedule (Fig. 2.16).

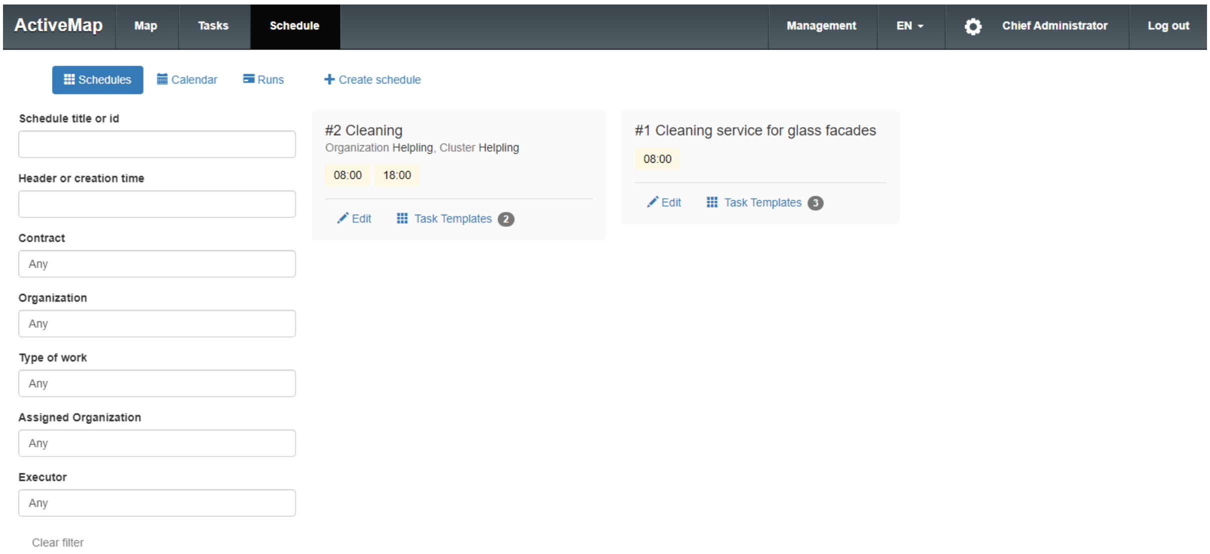


Fig. 2.16: Schedule cards

Clicking on the "Calendar" button takes you to the calendar with schedule launches. The calendar with the current month is opened by default when switching to the schedules section (Fig. 2.15). The calendar cells display the number of tasks created by the schedule for the day. Tasks are grouped and color coded by statuses. The colors of the statuses are displayed in the legend in the upper right part of the window (enabled, completed, in progress, planned, not created). Click on a status name to enable/disable displaying of the corresponding tasks in the calendar. Double-clicking on a date in the calendar opens the launches window for that day.

You can go to the same window by clicking on the "Launches" button. In the right part of the window there is a smaller version of the calendar with task status marks (Fig. 2.17).

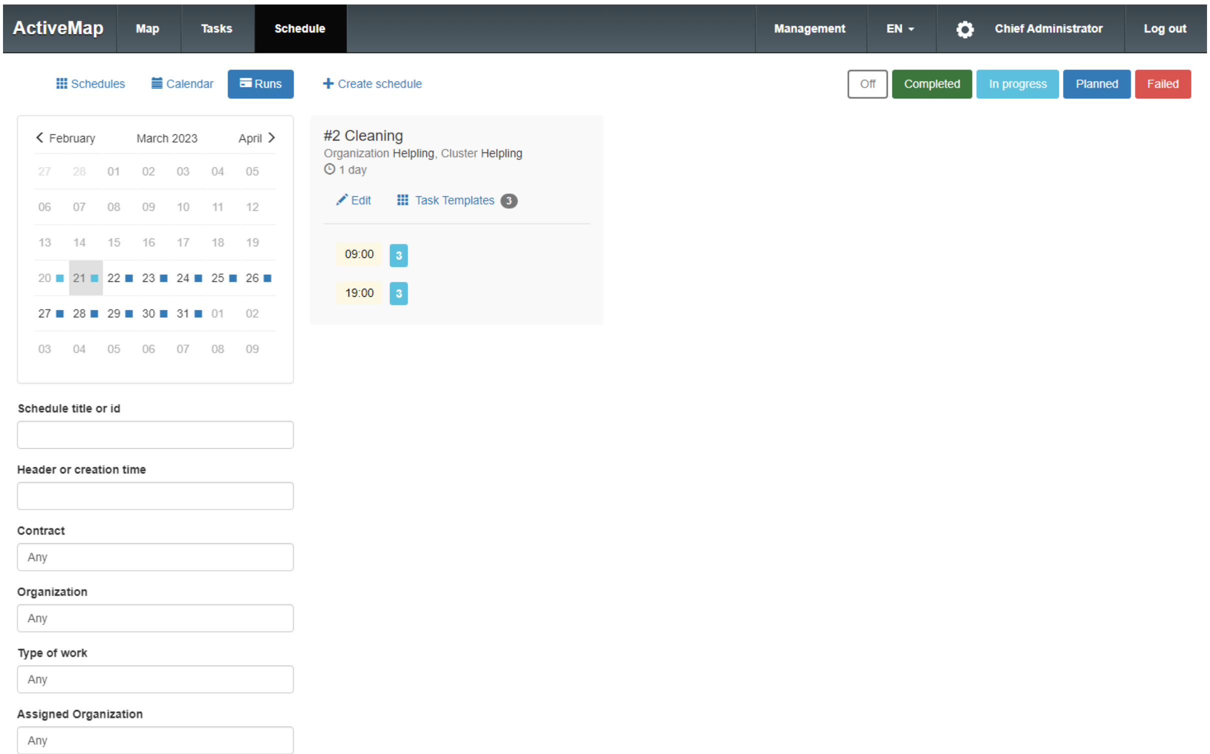


Fig. 2.17: Launches for the selected date

To the right of the calendar the schedule cards with launches for that day are placed. The schedule card displays its name, contract, a button to go to the list of templates attached to the schedule, the start time and the number of created tasks with status marking. Clicking on a start time in the card will take you to the task templates created at that time (Fig. 2.18). These templates can be edited or deleted.

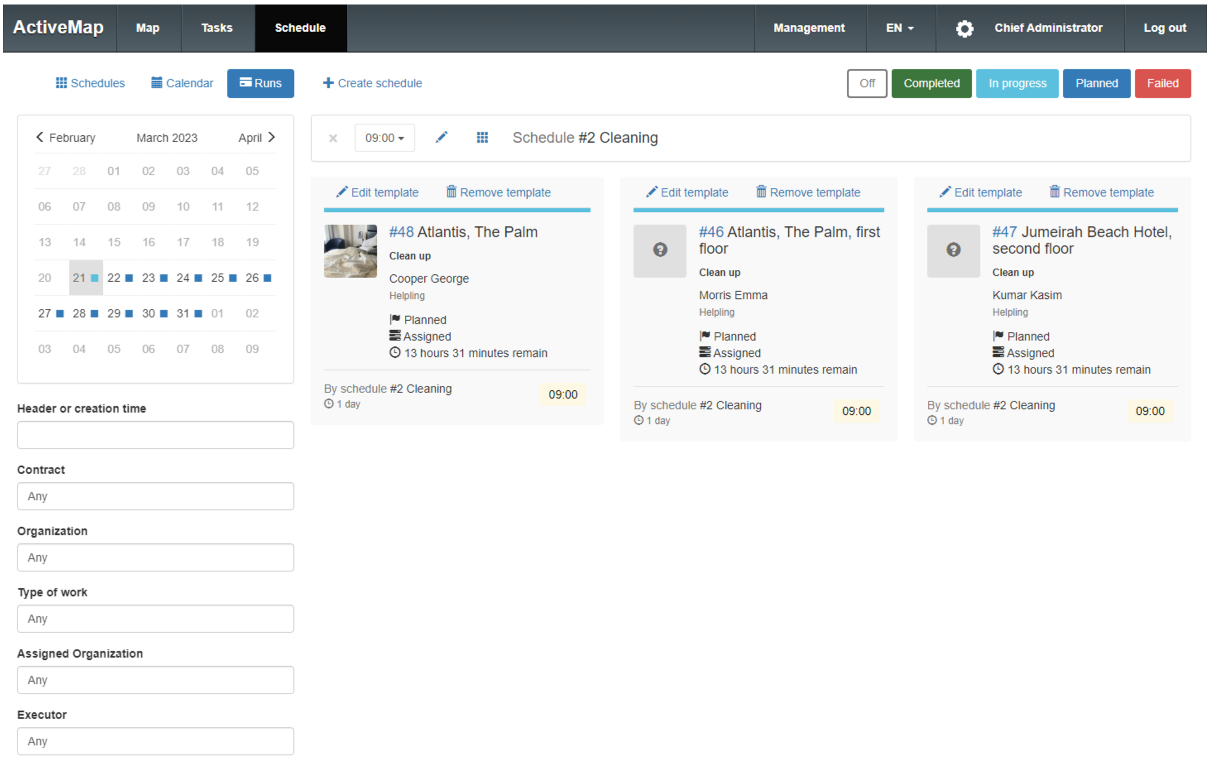


Fig. 2.18: Task templates

Creating and editing schedules and task templates are available for the following roles:

- Administrator,
- Cluster Administrator,
- Organization Administrator.

2.2.3.1 Creating a schedule

To create a new schedule, click on "+ Create schedule" on the top panel of the window. In the opened form, enter the schedule name, task completion deadline and contract, specify the launch time and click on the checkbox to the right of the set time, set the "Enabled" toggle switch, which is responsible for activating the schedule, in the desired position, and check the dates on the calendar on which tasks will be created. Click "Create" to save (Fig. 2.19).

When selecting a contract in the task template, the "Assigned Organization" field will be automatically filled in with the value specified in the contract. If the schedule was created under a contract that specifies service objects, it is not possible to create a task or template based on this contract without service objects.

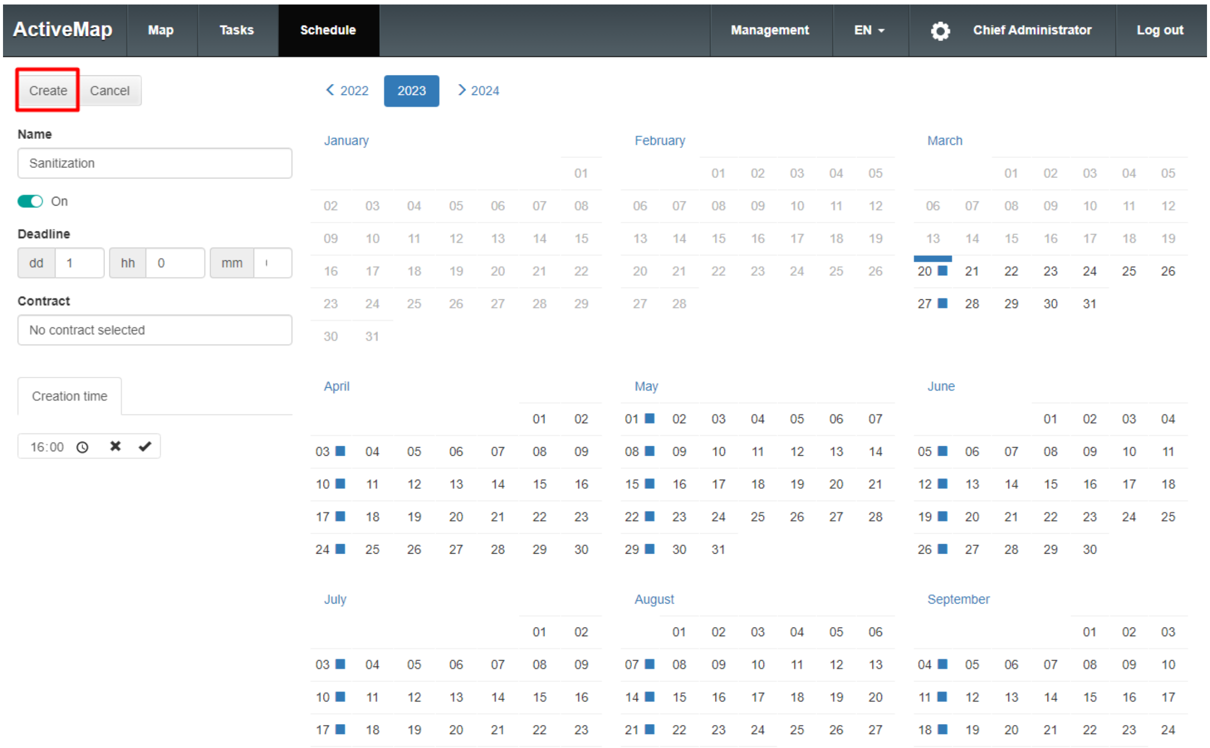


Fig. 2.19: Schedule Creation window

2.2.3.2 Schedule editing

To make changes, select the schedule card that needs to be edited (in the general list of schedules, in the calendar or in the list of launches), and click "Edit" (Fig. 2.20).

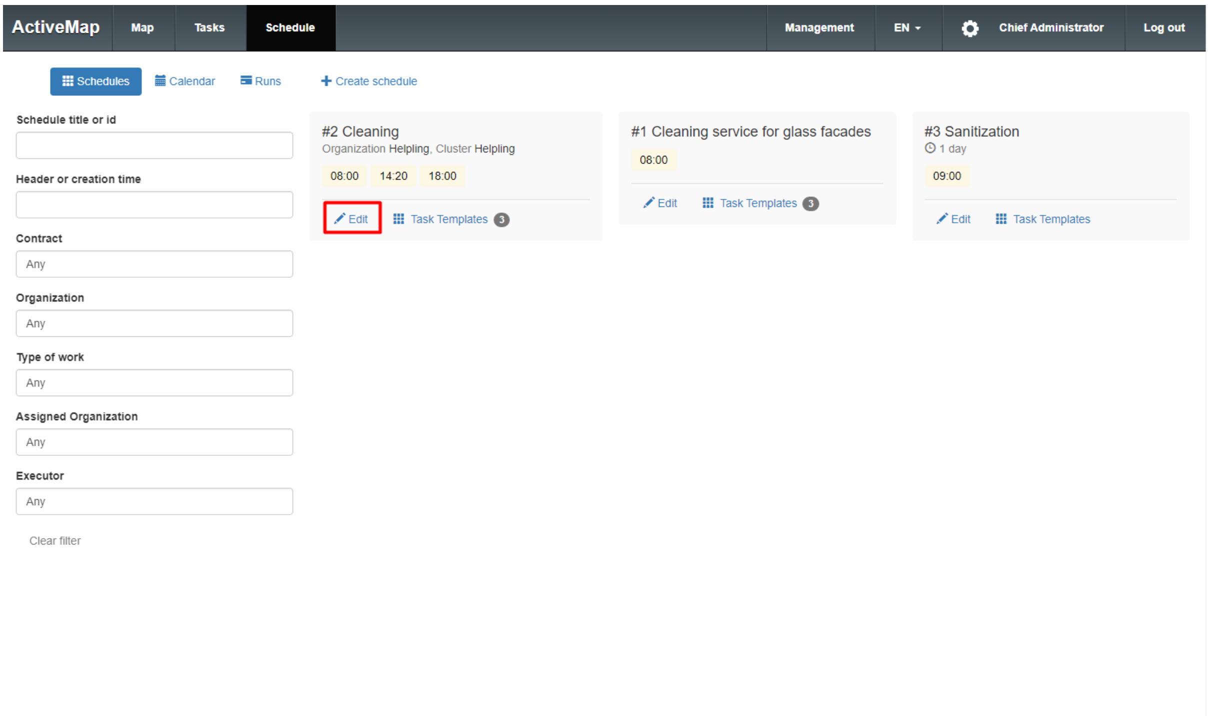


Fig. 2.20: Edit button in the schedule card

This opens the schedule editing window, where you can change its name, due date, add a new start time, disable or delete the current start time (Fig. 2.21).

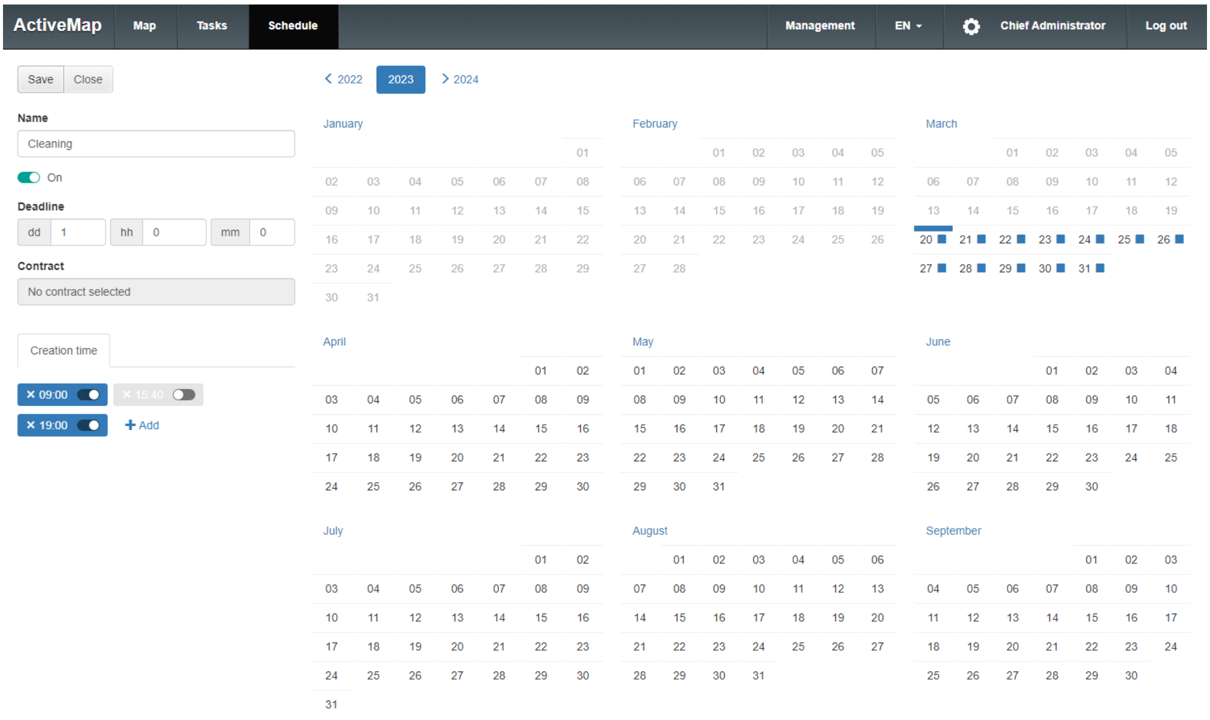


Fig. 2.21: Schedule editing window

The schedule cannot be deleted from the system. To prevent tasks from being created on a schedule in the future, you need to turn off the "Enabled" toggle switch or remove the time for all launches and unmark the dates on the calendar through the edit form.

2.2.3.3 Creating a task template

Task templates are sample tasks that will be created according to a schedule.

Clicking on "Task Templates" in the schedule card opens a window with a list of templates attached to that schedule, if any (Fig. 2.22).

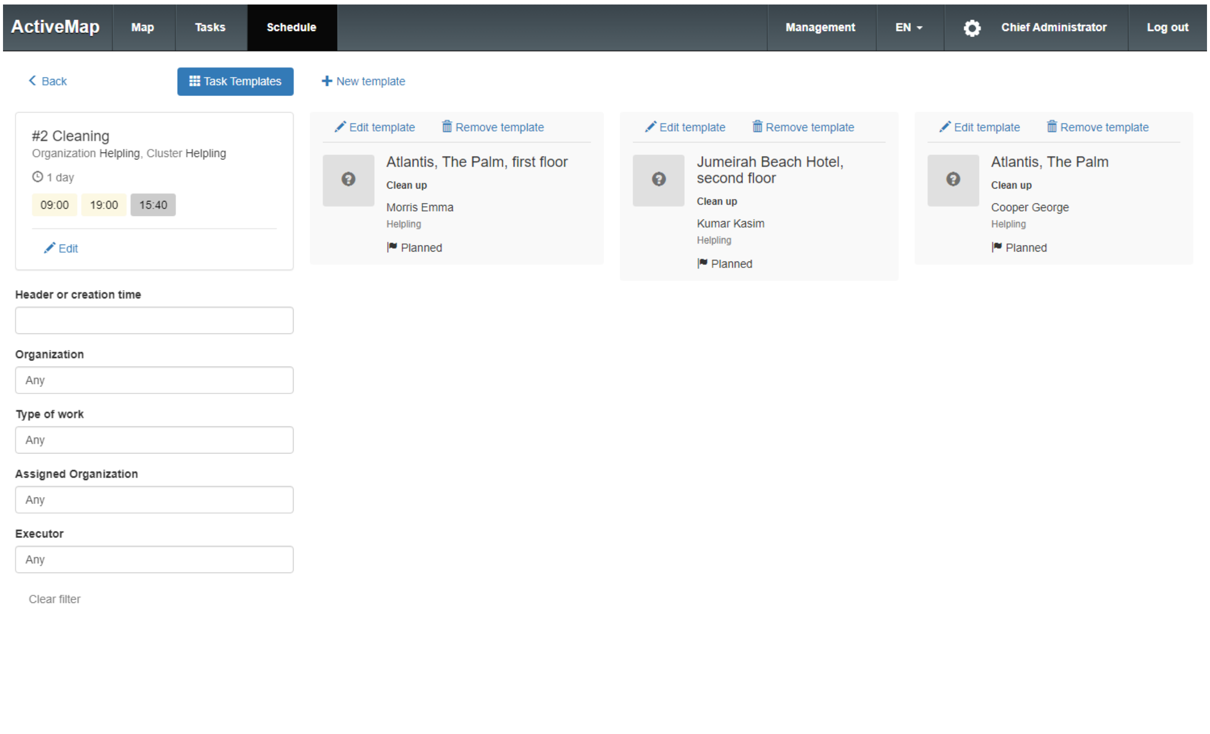


Fig. 2.22: Task templates

To create a task template, click on the "New Template" button, fill in the form, and click "Create" (Fig. 2.23).

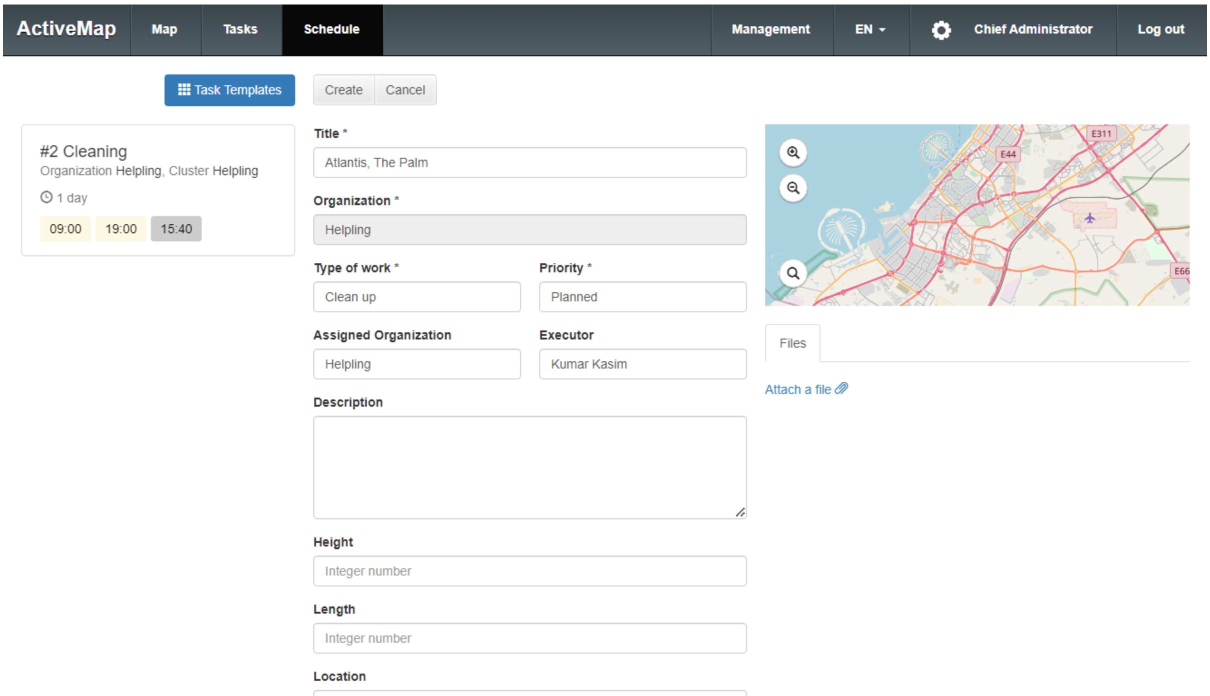


Fig. 2.23: Template creation window

2.2.3.4 Editing a task template

To change the data of a template (typical task), click “Edit template” on the template card (Fig. 2.24).

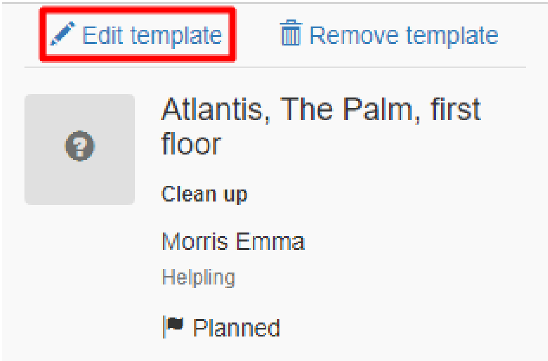


Fig. 2.24: Template editing

The task template card form opens where the user can make changes and save them.

2.2.3.5 Deleting a task template

To delete a task template, click “Remove template” on the task template card (Fig. 2.25).

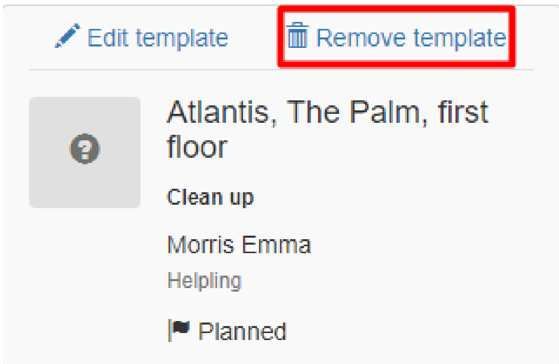


Fig. 2.25: Template deletion

2.2.3.6 Restarting a schedule

If a task has not been created according to the schedule for some reason (for example, due to a mismatch of work type, organization or executor), you can restart the template creation. To do this, click the “Runs” button, select a date and go to the schedule card, make changes to the template and click “Restart” (Fig. 2.26). The ability to restart the schedule is determined by the role of the user.

However, changing the service object in this way is not possible (changes on the server will not be saved). To change the service object, you have to create a new template.

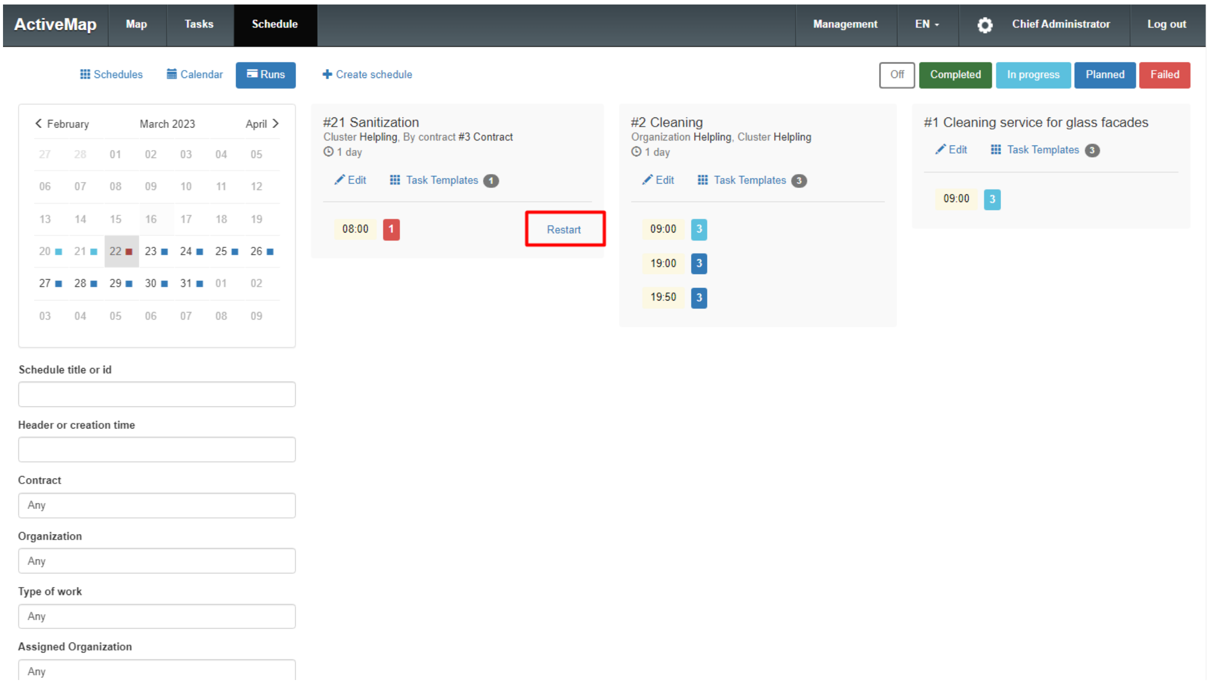


Fig. 2.26: Restart from the schedule card

2.3 Management module

The management module is intended for configuring and managing data and system elements: layers, tasks, reports, users, organizations, etc. Only authorized users with certain access rights can work with it.

The main management tools include:

- exporting, loading and indexing data;
- adding, deleting and editing system elements (tasks, reports, users, organizations);
- configuring up access rights to user information.

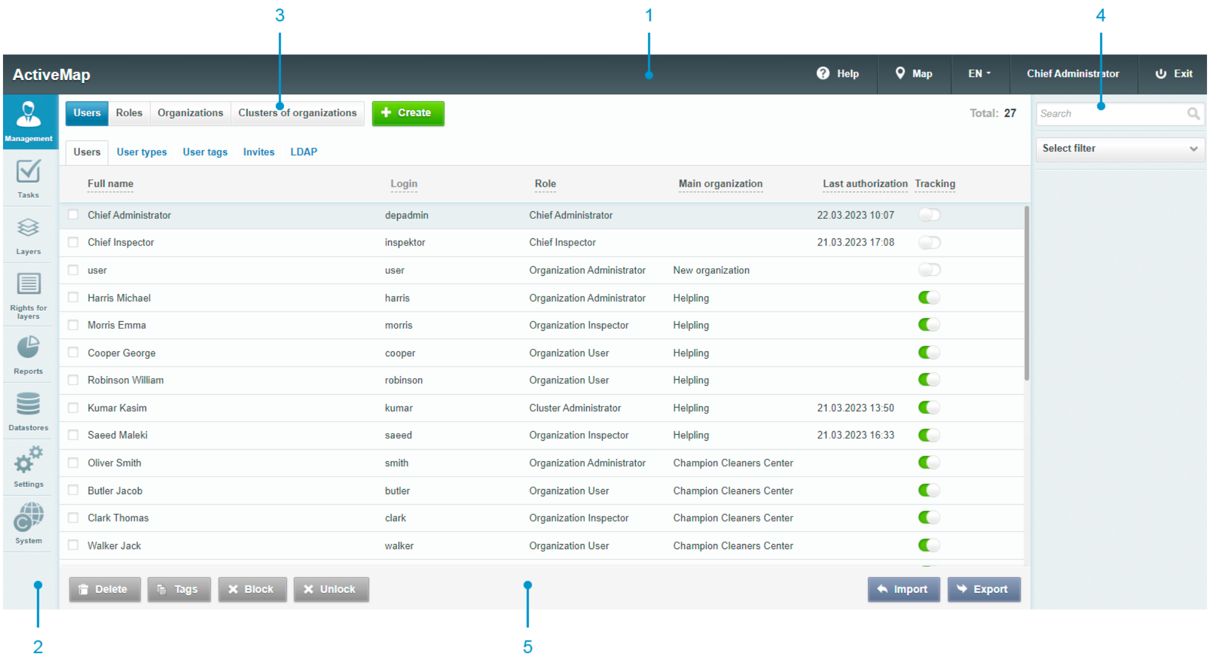


Fig. 2.27: Management module

The management module is divided into the following areas (Fig. 2.27):

1. User panel (contains buttons to access help, map, change program language and exit the system).
2. Navigation panel of functional blocks (contains the main system management tools).
3. Tab bar (each tab contains information and a set of buttons to manage them).
4. Search string and filter (used to search for system elements).
5. Administration area (displays selected elements and their components).

2.3.1 Administration area

2.3.1.1 Table sorting

All information about the main system elements (users, organizations, layers, etc.) is presented in the corresponding tabs in a tabular form. Using these tables, the user can sort the available data.

To organize information about a particular element of the system, you need to go to the tab with that element and left-click on the title of the column by which the sorting should be done. When you click again on the column title, sorting will be done in reverse order.

2.3.1.2 Search string and filter

A search string  is available in the right part of the page.

To search for an element, enter part of its name in the search string, after which all elements that correspond to the entered query will be displayed in the administration area. The search is performed on all elements of the system.

In addition, you can use the filter located below the search string to select data according to specified search criteria. To get the most accurate search results, you can use the search string and filter at the same time (where both tools are available at once).

2.3.1.3 Adding a new element

To add a new element, you have to go to the section of interest and click 

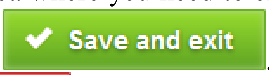
. The appropriate rights are required to add new elements. When you click this button, a new window opens, where you have to fill in the required fields and click 

. To cancel adding a new element, click the 

button.

2.3.1.4 Editing an element

In order to change data on a certain element you have to go to the section of interest, hover over the row with the name of the element, and click on the edit sign  located on the right side of the highlighted row. The edit sign  displayed only after hovering over the row with the name of the element.

After clicking, a form opens in the administration area where you need to enter new information about the selected element and click 

. To cancel editing the element, click the button 

.

In addition, the editing form can be opened by double-clicking on the row with the element name with the left mouse button.

2.3.1.5 Deleting an element

To delete a specific element, go to the section of interest, hover over the row with the name of this element and click on the delete sign  located on the right side of the selected row. The delete sign  appears only after hovering over the row with the element name. Clicking it will open a dialog box confirming the deletion of the element. To delete the element from the system, click OK, to cancel the deletion, click the ✖ Cancel button.

To delete multiple elements, place the mouse cursor on the rows with these elements and check the box next to their names. After that, the Delete button becomes available in the lower part of the administration area. When you click on it, a dialog box confirming deleting the selected elements will open.

Note: When you try to delete your user or organization, the message appears in the administration area informing that deletion is not possible.

2.3.1.6 Data export

The Export button is required to export data as a separate Excel file (if you have the appropriate rights). If you use the search string and then click Export, the downloaded Excel file will contain information only about the found elements.

2.3.2 User panel

The user panel consists of the following elements (Fig. 2.28):

- “Help” - redirects the user from the main system page to the page with manuals.
- “Map” - navigates to the main system page.
- “Interface language” - switches the interface to one of the available languages.
- “User name” - opens a page for editing personal data.
- “Exit” - logs out of the user’s account.

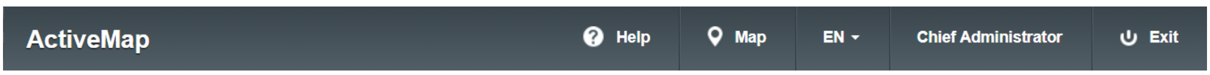


Fig. 2.28: User panel

2.3.3 Navigation panel of functional blocks

The navigation panel has the following functional blocks:

- "Management" - management of organizations, users and their parameters (*"Management" block* (page 28));
- "Tasks" - management of task parameters (*"Tasks" block* (page 47));
- "Layers" - management of layers, layer groups and their parameters (*"Layers" block* (page 66));
- "Rights for layers" - management of rights for layers and groups of layers (*"Rights for layers" block* (page 97));
- "Reports" - viewing the list of reports and managing rights to reports (*"Reports" block* (page 101));
- "Datastores" - viewing and creating storages (*"Datastores" block* (page 106));
- "Settings" - viewing and creating system settings (*"Settings" block* (page 109)).
- "System" - editing global and language settings of the system, activating licenses (*"System" block* (page 112)).

2.3.3.1 "Management" block

In the "Management" block administrator can access detailed information about system users, roles, organizations, clusters and their group permissions. When navigating to the tabs in the block, the following control elements become available: table sorting, search bar, filters, adding a new entry, editing an entry, deleting an entry and exporting data.

2.3.3.1.1 "Users" tab

The "Users" tab contains information about registered users in the system, roles and organizations and includes second level tabs (Fig. 2.29):

- "Users",
- "User Types",
- "User Tags",
- "Invites",
- "LDAP".

Users

Basic information about system users is presented in the form of a table with the following columns:

- “Full name” – full name of the user;
- “Login” - username used to log into the system;
- “Role” - user’s role in the system (Administrator, Chief Inspector, Client, etc.);
- “Main organization” - user’s affiliation with the organization;
- “Last authorization” – user authorization time in the system applications;
- “Tracking” – management of the user’s monitoring function (enabling the tracking of the user’s movements when using ActiveMap Mobile).

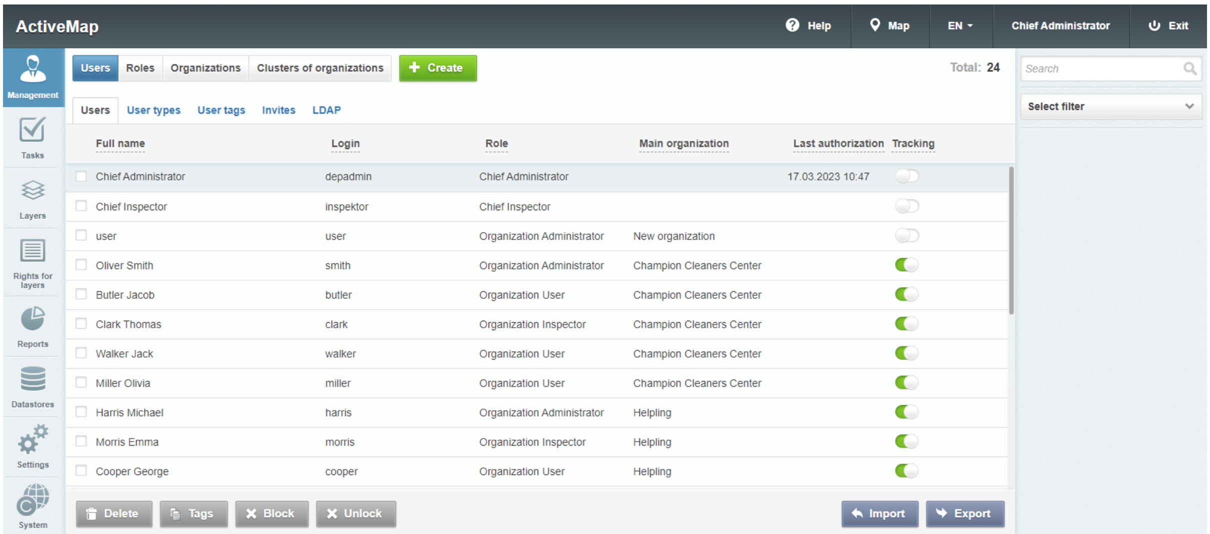


Fig. 2.29: “Users” tab

If information about the license for the number of users has been entered into the system, this tab in the upper right corner will also display information about the maximum number of available users, according to the license received. Deleted, blocked and system users are not taken into account.

Import users

To upload new users to the system, click 

in the lower right corner. A window will open with a choice of actions (Fig. 2.30):

- "Upload file" - import an Excel file containing information about users in the form of a table with the structure set in the template;
- "Download template" - export Excel template with the structure required for correct import;
- "Cancel" - exit the import window.

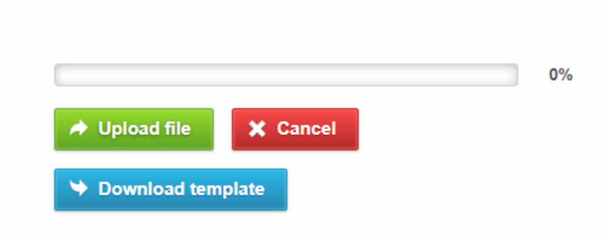


Fig. 2.30: Import users

If the file content is not suitable for import (required fields are not filled in, etc.), the system will display an error message. If you try to import users that already exist in the system, you will also receive an error message. After successful import the new users specified in the file will appear in the system.

To export information about users, click the 

in the lower right corner. A window will open for selecting a directory to save the users.xlsx Excel file, containing information about users in the form of a table with the following fields: full name, login, role, user type, organization, additional organizations, tracking, user tags, e-mail, phone, address, passport.

In addition, in the "Users" tab you can bulk add or remove tags to users. To do this, select users by ticking the appropriate boxes, then click the 

button at the bottom of the screen. A window (Fig. 2.31) will open, where you can select tags to add/remove from the drop-down lists.

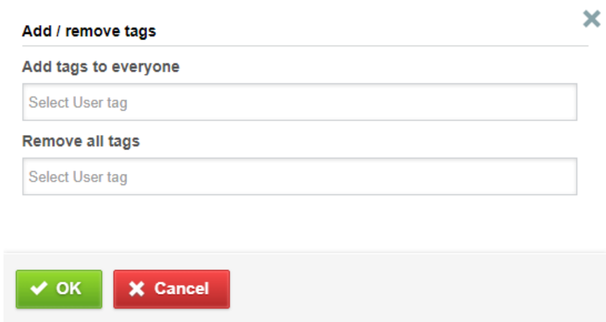


Fig. 2.31: Bulk adding and removing user tags

Creating a new user

To add a new user to the system, click the Create button. A form (Fig. 2.32) will open in the administration area, where you have to:

- fill in the personal data of the user (name, login, password, user type, e-mail, phone number, address, fax, passport and TIN);
- define user's role in the system (information on roles in the system can be found in the section :ref:razdel_roli_v_sisteme);
- enable/disable geoposition monitoring;
- enable/disable authorization via LDAP (single authorization system);
- enable/disable integration with GIS editor MapEditor;
- select the organization to which the user will belong (main and additional);
- add an avatar (file in *.jpg format);
- add user tags (you can read about user tags in section *User tags* (page 34)).

Mandatory fields are marked with an asterisk. Membership in main and additional organizations allows users of all roles to see the tasks and objects within the layers allowed to the specified organization and to manage all the added organizations (both main and additional) for the Organization Administrator. Rights to layers are granted separately within each organization.

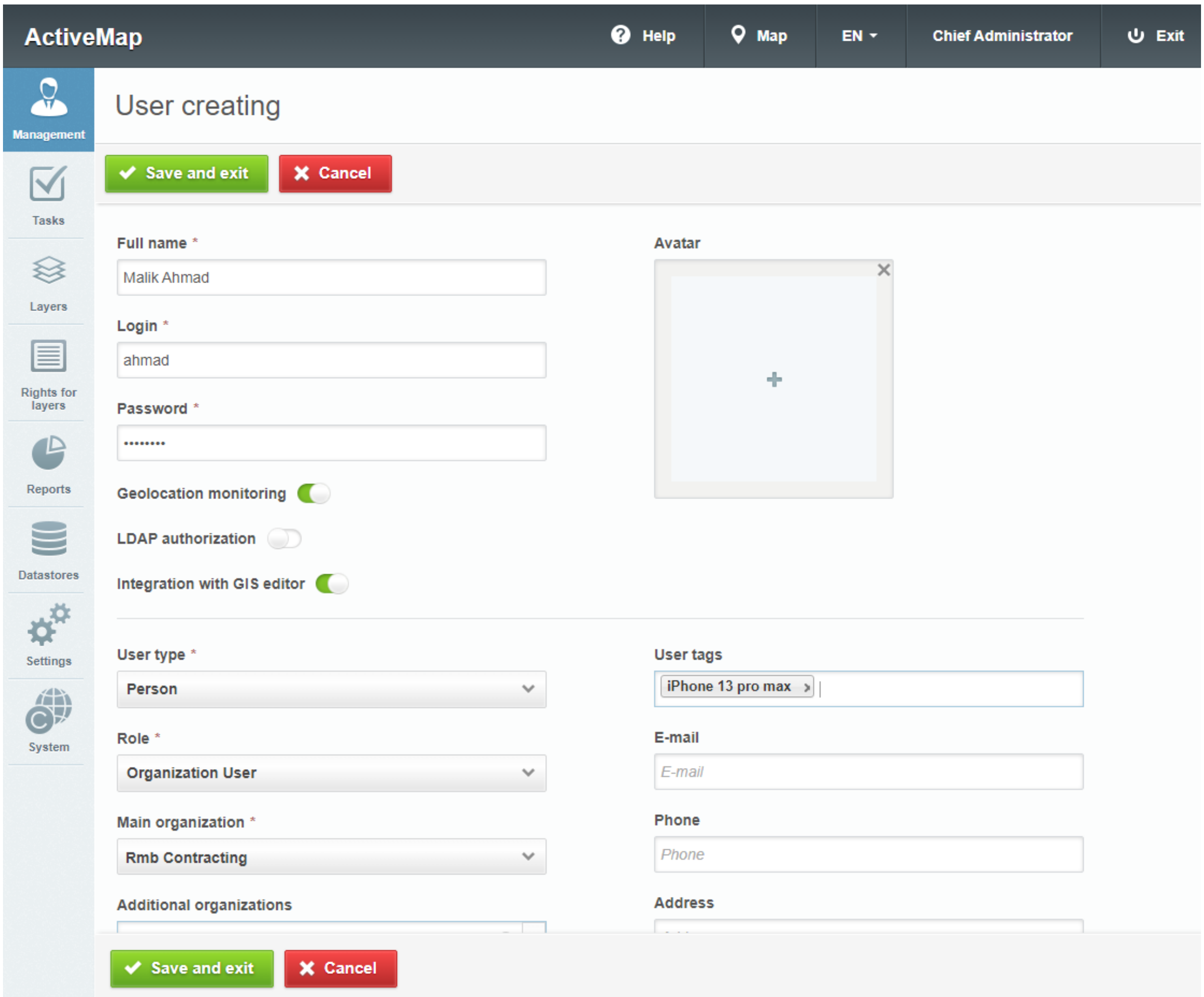


Fig. 2.32: User adding window

Editing user information

To modify user information, click or double-click on the row with the name of the selected user. After that, a form similar to the addition form will open in the administration area where the administrator can fill in/modify the fields with the desired user information. The difference from the adding form is the presence of the **Block** button, which allows to close the user's access to the system.

Deleting a user

In the "Users" tab, the administrator can delete one or several users at the same time.

To delete one user, click  on the right side of the user line. To delete several users at the same time, tick the user rows and press 

at the bottom of the screen. For more details about deleting system elements see *Deleting an element* (page 26).

Searching user

When switching to the "Users" tab, the administrator can use the search bar to find users by their name or login. To find a user by organization, cluster, role, type, tag, login, LDAP authentication status and lock status, use the filter located below the search bar.

User Types

The tab contains a table with information about user types (Fig. 2.33).

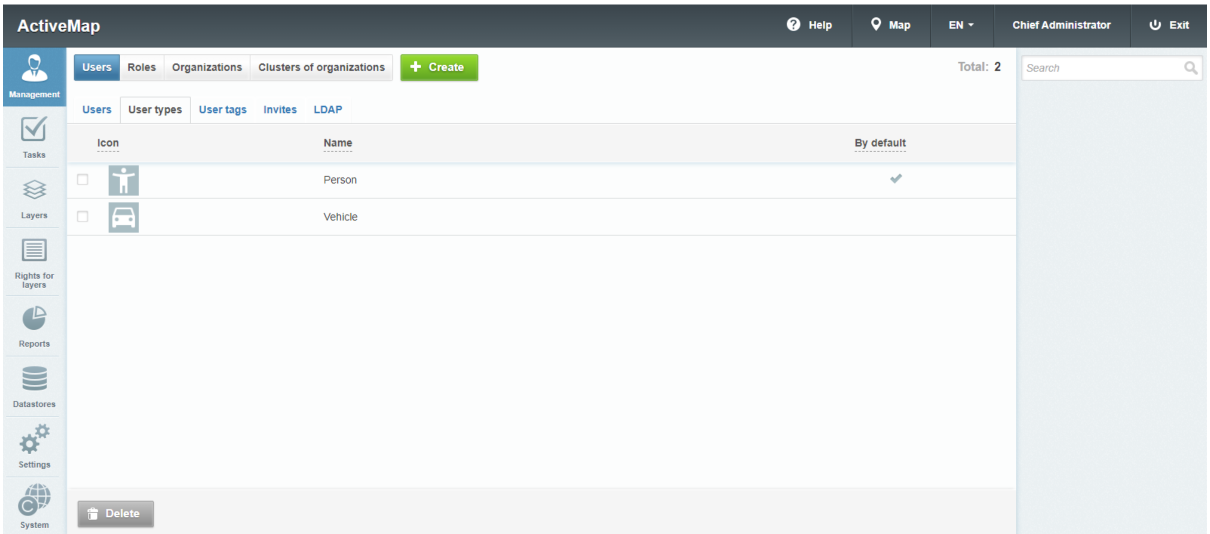


Fig. 2.33: "User Types" tab

There are two user types that are automatically available in the system: "Vehicle" and "Person". "Person" is always the default type and cannot be deleted. Any other user type cannot be made the default.

You can also create other types. To do this, click the 

button at the top of the screen, then a window will open (Fig. 2.34), where you should set the type name add an icon and specify whether to display the avatar and initials of the user on the map.

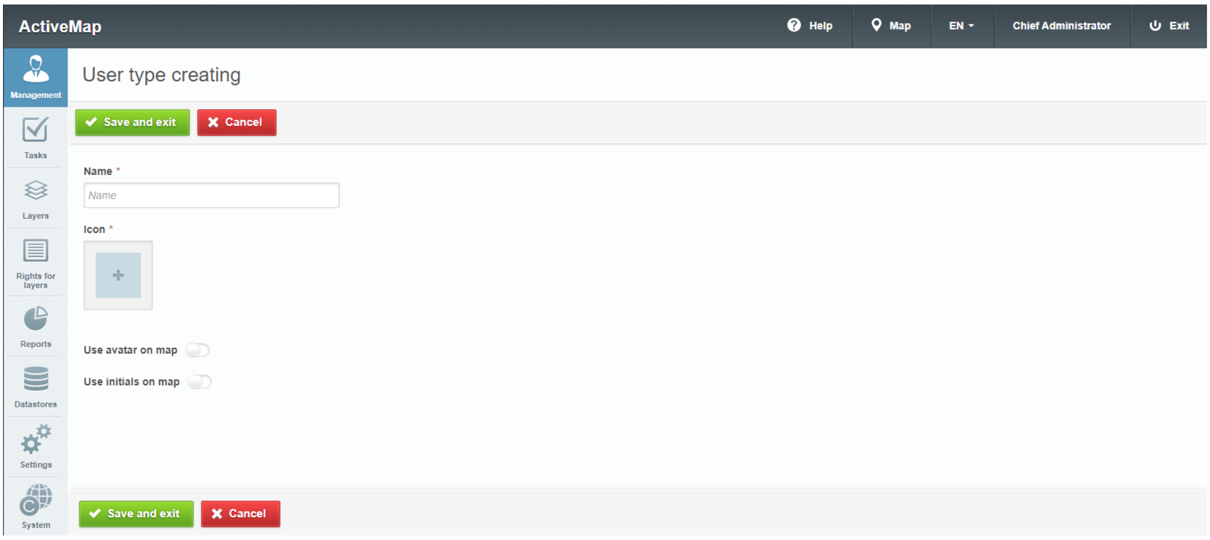


Fig. 2.34: Creating a user type

The name and the icon are mandatory. If both "Use avatar on map" and "Use initials on map" toggle switches are disabled, the icon will be displayed on the map. If both toggle switches are enabled, then the avatar has priority (if any), then the initials, then the icon.

To edit the type of users, hover over the type row and press . A window similar to the creation window will open, allowing you to enter or modify information.

To delete one user type, click  on the right side of the row. To delete multiple user types at once, check the corresponding rows and click the 

at the bottom of the screen. See *Deleting an element* (page 26) for more information about deleting system elements.

User tags

The tab contains a list of user tags with colors and names of tags (Fig. 2.35). Tags are used to display information about the user, specified in addition to the information provided by the system. For example, the user's phone model.

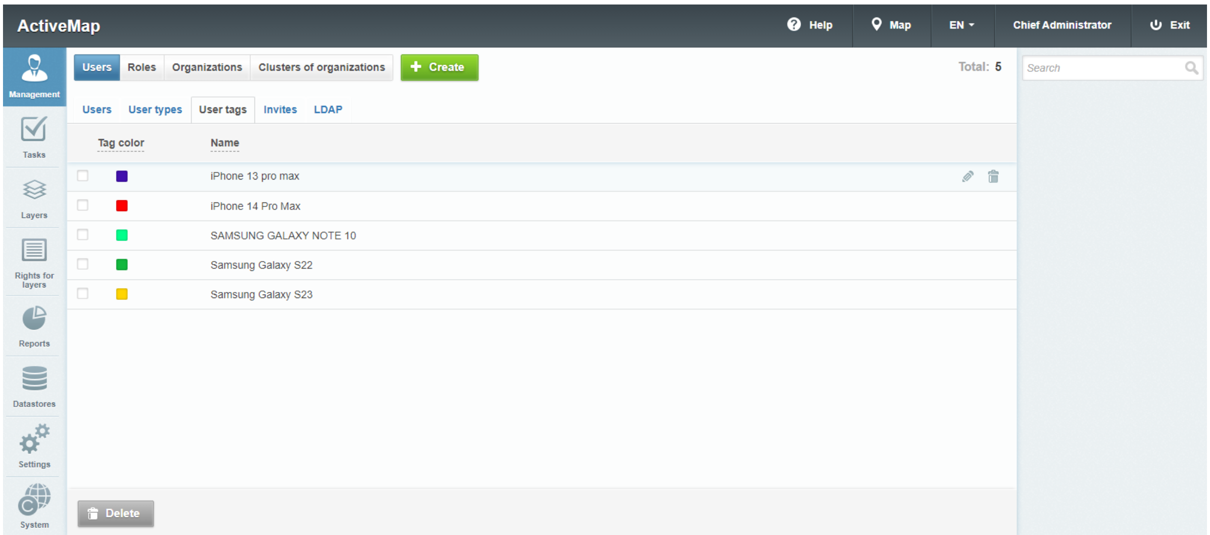


Fig. 2.35: “User tags” tab

To add a new tag, click 

and fill in the “Name” and “Tag color” fields - both fields are required (Fig. 2.36).

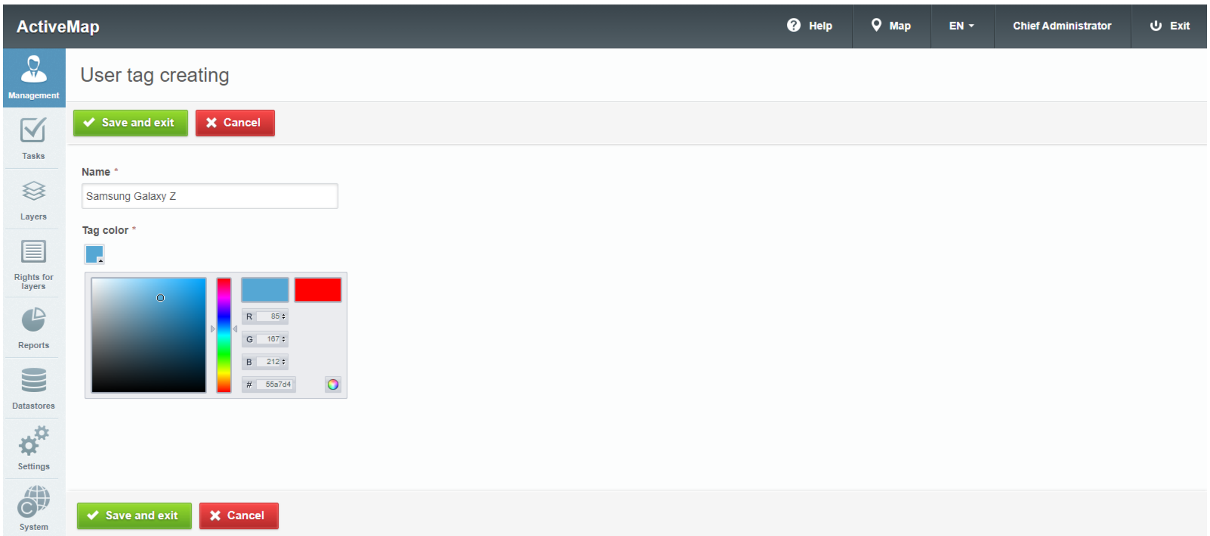


Fig. 2.36: Adding a user tag

After user’s tag is specified in the “Users” tab in the “User tags” field it will be displayed in the user’s card (Fig. 2.37)

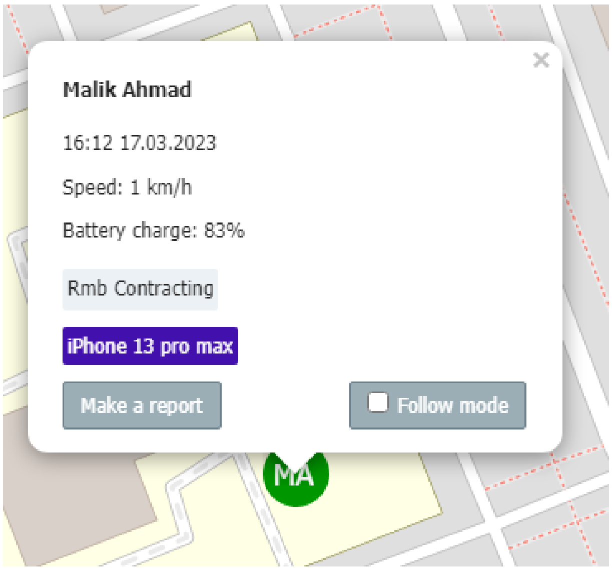


Fig. 2.37: Example of applying a user tag

To edit a user tag, click on the right side of the tag row. A window similar to the creation window will open, allowing you to modify the tag name and color.

To delete one tag, click on the right side of the label row. To delete multiple tags at once, check the corresponding rows and click the Delete at the bottom of the screen. For more details about deleting system elements, see *Deleting an element* (page 26).

Invites

This tab is used to generate links that allow users to log in in the ActiveMap Mobile application without entering the server address, login and password. Information about created invitations is presented in a table. To sort the data, click on the corresponding column header. To search for specific invitations, use the search bar or filter.

To create a new invitation, click on Create. A window will open (Fig. 2.38), where you need to fill in:

- Full name of the user to whom you want to send this link (can be selected from the drop-down list using the search string).
- Link expiration date (may be left blank for an indefinite link).
- Maximum number of authentication attempts (after exceeding the specified number, the link will become inactive).

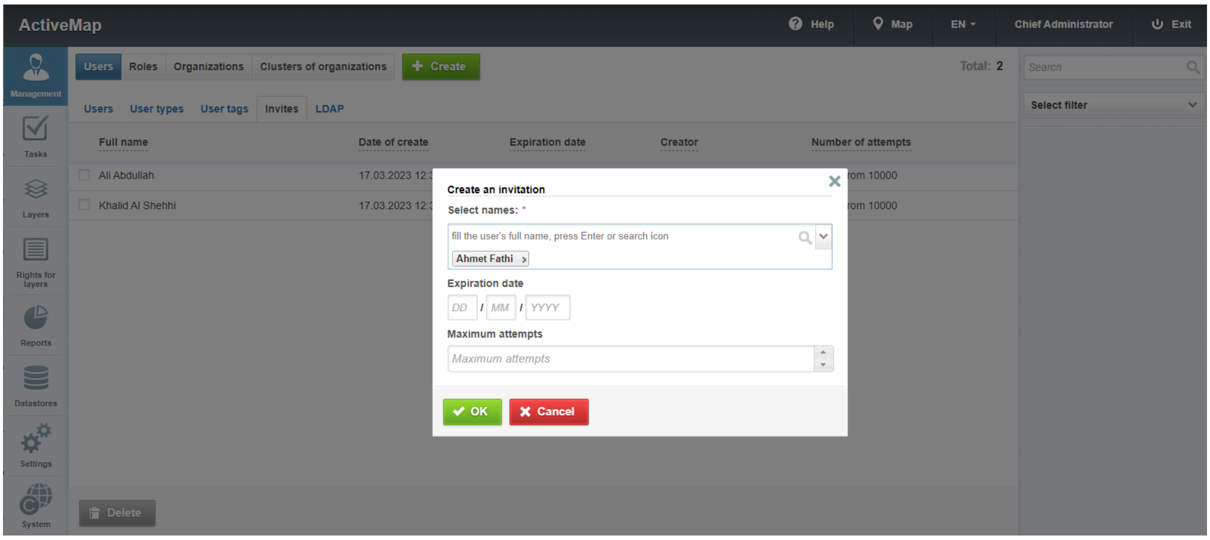


Fig. 2.38: Invitation creation window

When you click on  you will see basic information about the generated invitation with an option to copy this link (Fig. 2.39).

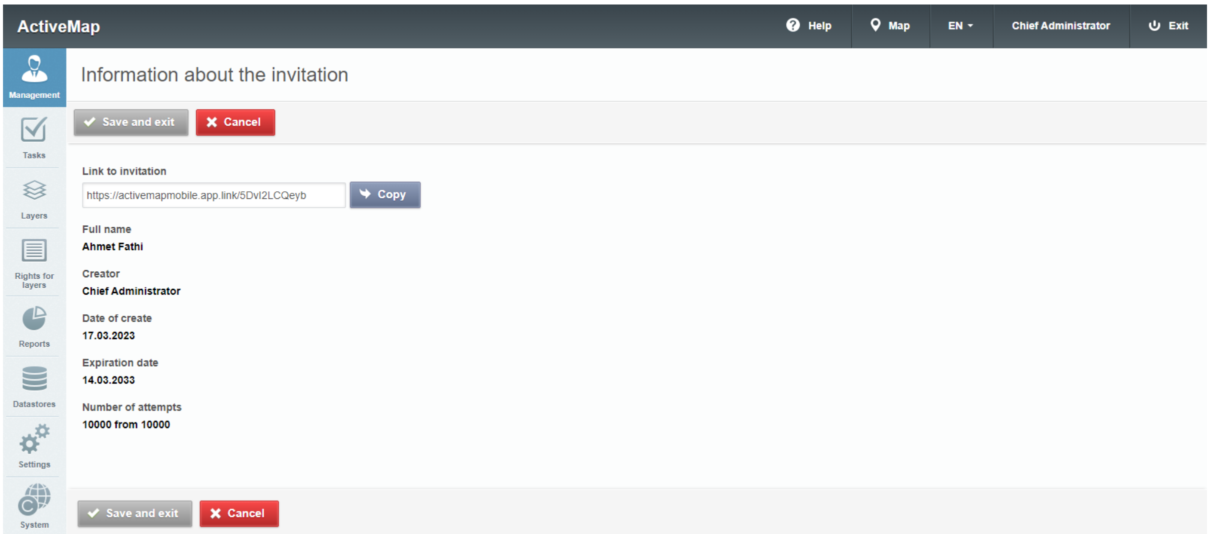


Fig. 2.39: Invitation information

Clicking on  will open a window where you can also copy the link (Fig. 2.40).

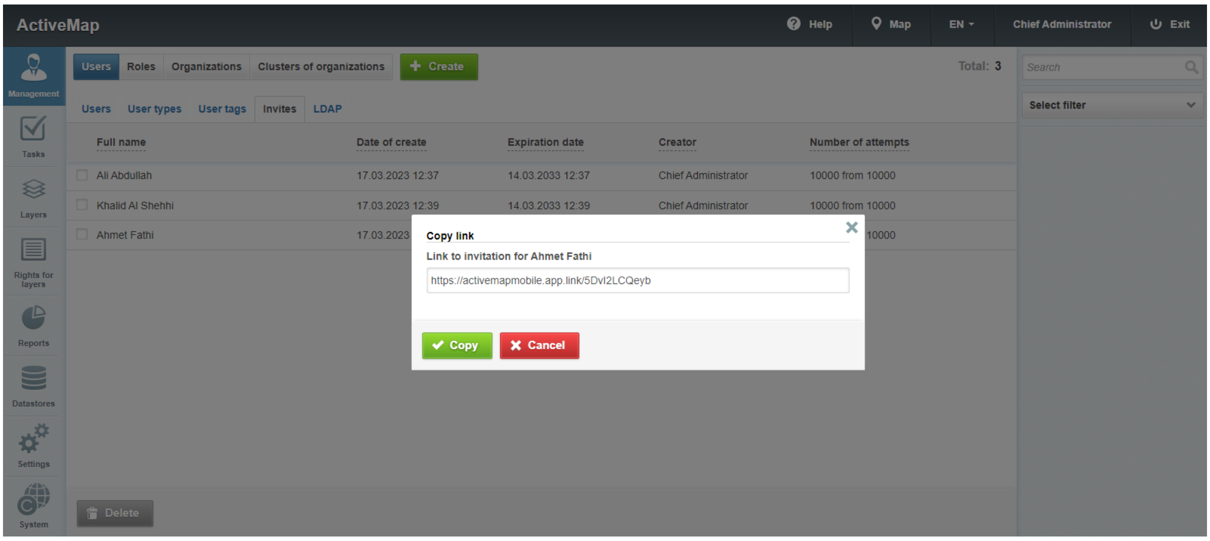
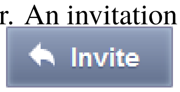


Fig. 2.40: Invitation link

The link can be sent to the end user via familiar messenger.

Clicking on  will delete the created invitation from the list. An invitation can also be deleted by selecting the corresponding row and clicking on the 

button. If the invitation has been deleted and the user has not yet clicked on the link, you will need to create a new invitation and resend the link to the user. An invitation can also be created from a user's profile by clicking on 

and entering the necessary details in the window that opens (:numref:fig1012_4). The created invitation needs to be copied and sent to the end-user.

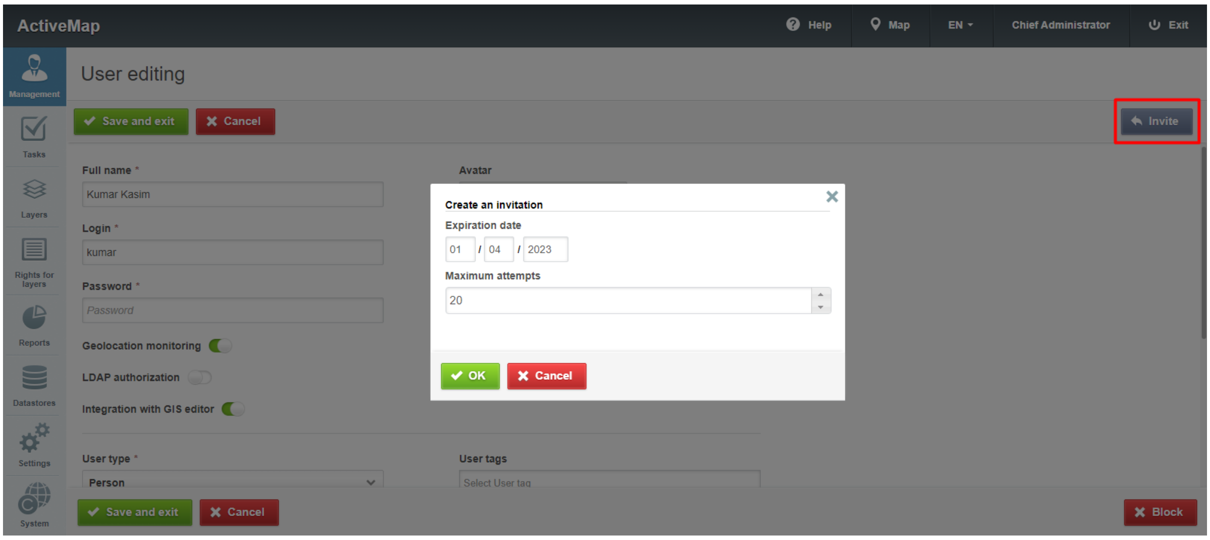


Fig. 2.41: Creating an invitation from user profile

LDAP

LDAP is an open protocol used to store and retrieve data from a hierarchically structured directory. It is typically used to store information about an organization, its assets and users. It is a unified authorization system through which all software products used in the organization work. The ActiveMap system also supports the LDAP protocol by enabling the "Authorize via LDAP" toggle switch in the user settings. The "LDAP" tab (Fig. 2.42) provides settings for integration of ActiveMap with LDAP. By default, LDAP integration is disabled. If integration with LDAP is required, fill the configuration fields with data provided by the organization.

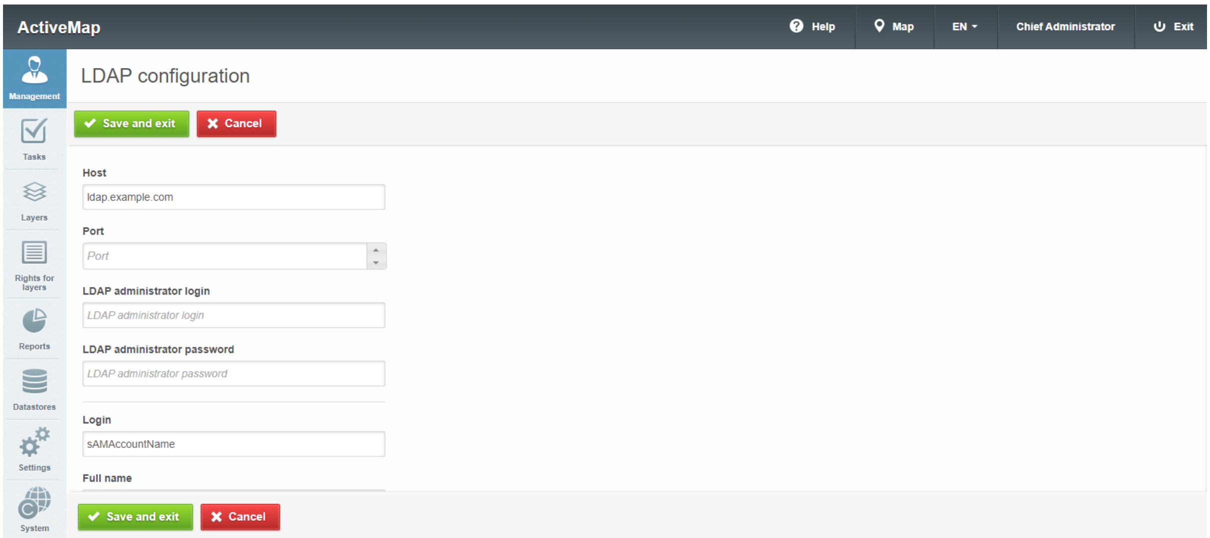


Fig. 2.42: Default LDAP configuration

2.3.3.1.2 "Roles" tab

There are several user roles in the ActiveMap system, which are assigned by administrators when creating user accounts. Roles differ from each other in the set of actions that users can perform:

- **"Administrator"** creates users with any role, reference tables for tasks (types of work, stages, priorities, additional fields, stickers), distributes access rights to layers and reports.
- **"Cluster Administrator"** creates organizations in his cluster, users with the Cluster Administrator, Organization Administrator, Cluster Inspector, Organization Inspector and Organization User roles. Allows users to view and manage the tasks of other organizations in their cluster, to access layers and reports in their cluster.
- **Organization Administrator** creates users with the Organization Administrator, Organization Inspector, and Organization User roles. Allocates access rights to layers and reports to users in their

organisation. Corrects tasks if necessary. Returns tasks for revision.

- **“Cluster Inspector”** checks, assigns and completes tasks within the cluster.
- **“Inspector of the organization”** checks, assigns and completes tasks within the department.
- **“Chief Inspector”** checks, assigns and completes all tasks.
- **“Organization User”** performs or creates tasks.
- **“Client”** creates tasks and does not see tasks created by other users of the organization.

The “Roles” tab displays a list of roles in the system (Fig. 2.43). To rename a role, hover over the role row and click . After making changes, you need to press the confirmation button , or the  button if you do not want to save the changes. To change the order in which roles are displayed, drag the role row up or down and press 

.

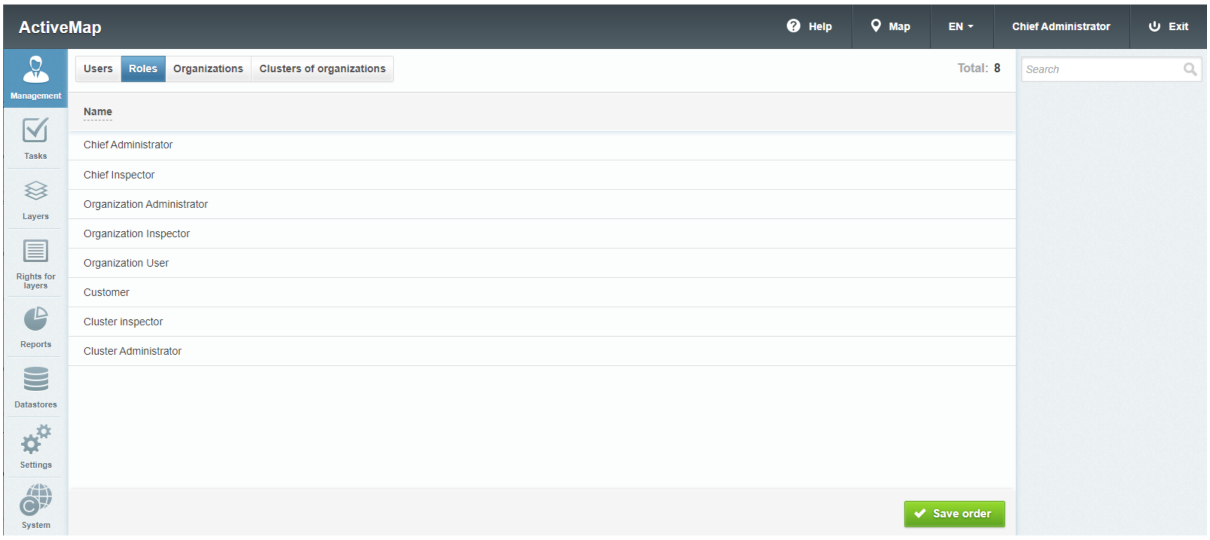


Fig. 2.43: “Roles” tab

2.3.3.1.3 “Organizations” tab

When switching to the “Organizations” tab, the administrator can view a list of all existing organizations in the system and their parameters (Fig. 2.44):

- “Name” - name of the organization;
- “Cluster of the organization” - an association of several organizations for operational monitoring of the work of departments

(more about clusters in the section *"Clusters of organizations" tab* (page 45));

- "Client organization" - an indication of whether the organization is a client (client organization is an association of users who sent their requests through a mobile application, monitor the status of their execution, have the ability to rate the work done, but have limited rights when working in the system);
- "Users" - number of users related to the organization.

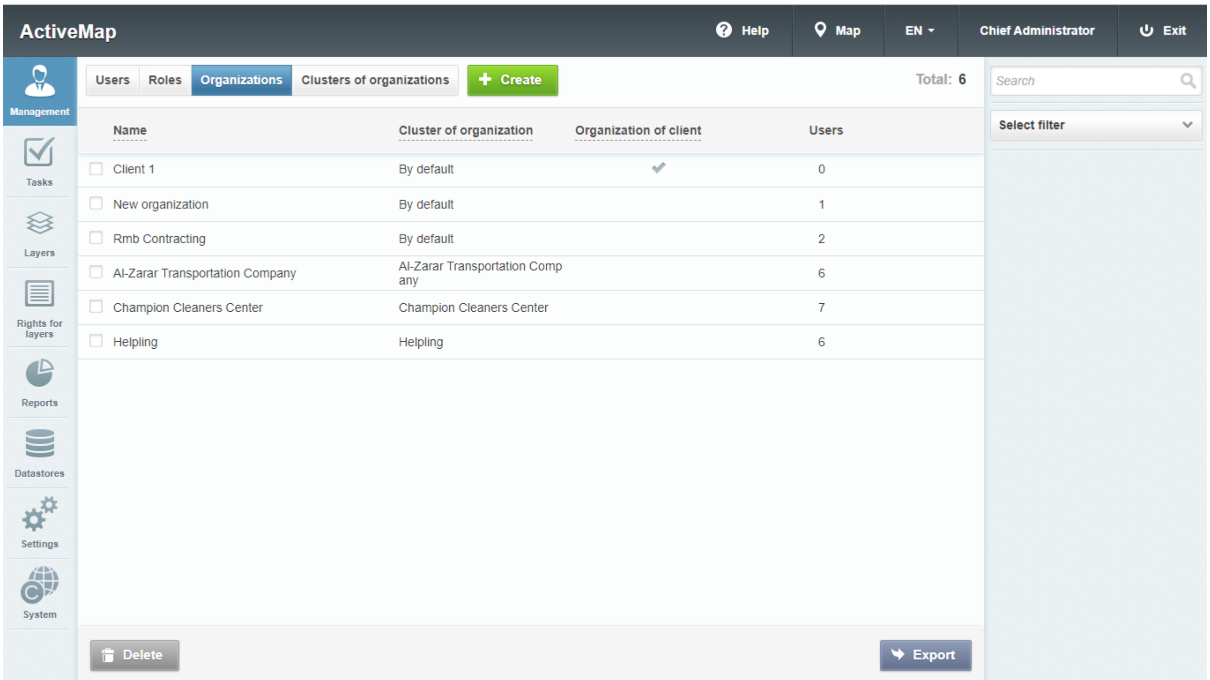


Fig. 2.44: "Organizations" tab

Adding a new organization

To add a new organization to the system, click on the 

button at the top of the window. A window with fields to fill in (Fig. 2.45) will open in the administration area:

- "Name";
- "Client Organization" toggle switch;
- "Integration with GIS editor by default" (the setting is only available for the administrative roles);

  If the administrator has enabled this feature for the organization, then all its users created by the cluster administrator in the future will have integration with the GIS editor by default. If the administrator adds users, then this setting must be activated separately for each employee. When activating the integration, the user should enter his password - only after that he will be able to work in the desktop editor. If integration is not enabled, users will not be created in the database and, accordingly, will not be able to work in the desktop editor. If integration is enabled for the organization, then all users will be created for MapEditor and will be granted rights to layers and tables. If integration was disabled while editing the organization card, all users will be removed from the database.

- “Cluster of organization”;
- “Default datastore”;
- “Maximum number of users”;
- “E-mail”;
- “Phone”;
- “Legal name”;
- Data of the organization (address, fax, TIN, VAT-ID, bank account, bank, correspondent account, SWIFT, BIC, name of the head, name of the accountant);
- “About” (a field in which information can be entered in any form);
- Logo, stamp, signature of the head, signature of the accountant.

To add a logo, stamp and signatures, click the “+” button and select the photo.

To the right of the input fields is the “Visible Area” - these are the boundaries of the map that will be visible to organization users when they log in. The administrator can use the scale bar to zoom in or out of the map, as well as move the map by clicking and holding the left mouse button. After selecting the necessary view, click “Apply” to save the new map boundaries.

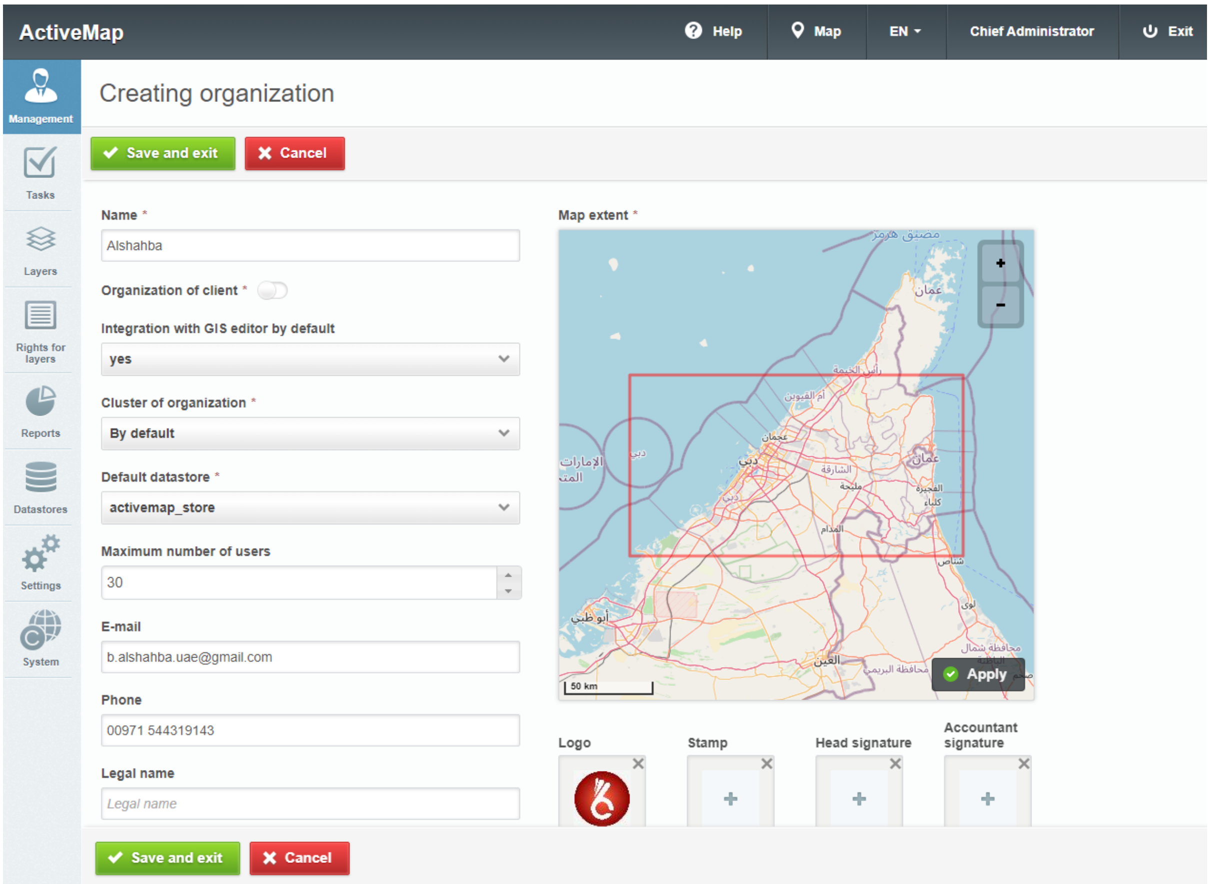


Fig. 2.45: Creating organization

Editing an organization

When pressing (or double-clicking on a selected organization row), a form opens where the administrator can fill in/change the fields of interest about the organization, as well as get a link to register users in the system (Fig. 2.46).

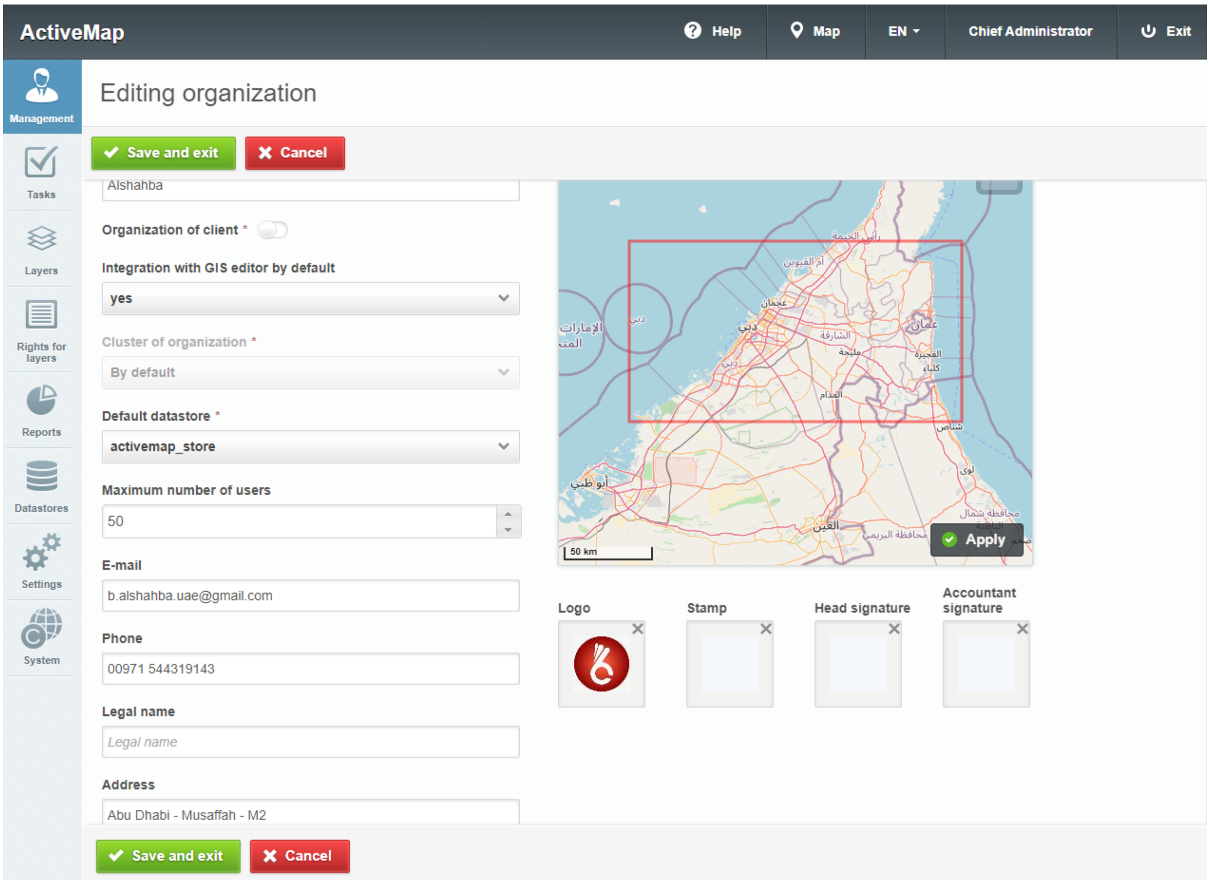
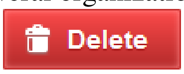


Fig. 2.46: Editing an organization

Deleting an organization

To delete an organization, click  on the right side of the row. To delete several organizations at once, check the corresponding rows and click the 

button at the bottom of the screen. More information on deleting system items can be found in the section *Deleting an element* (page 26).

When you try to delete your own organization, a dialog box appears in the administration area, informing the administrator that such deletion is not possible.

Searching for an organization

In the “Organizations” tab, the administrator can use the search bar to search by name.

2.3.3.1.4 “Clusters of organizations” tab

“Clusters of organizations” tab contains information about the grouping of organizations into clusters (Fig. 2.47). Before being set by the administrator, all organizations are located in the “Default” cluster.

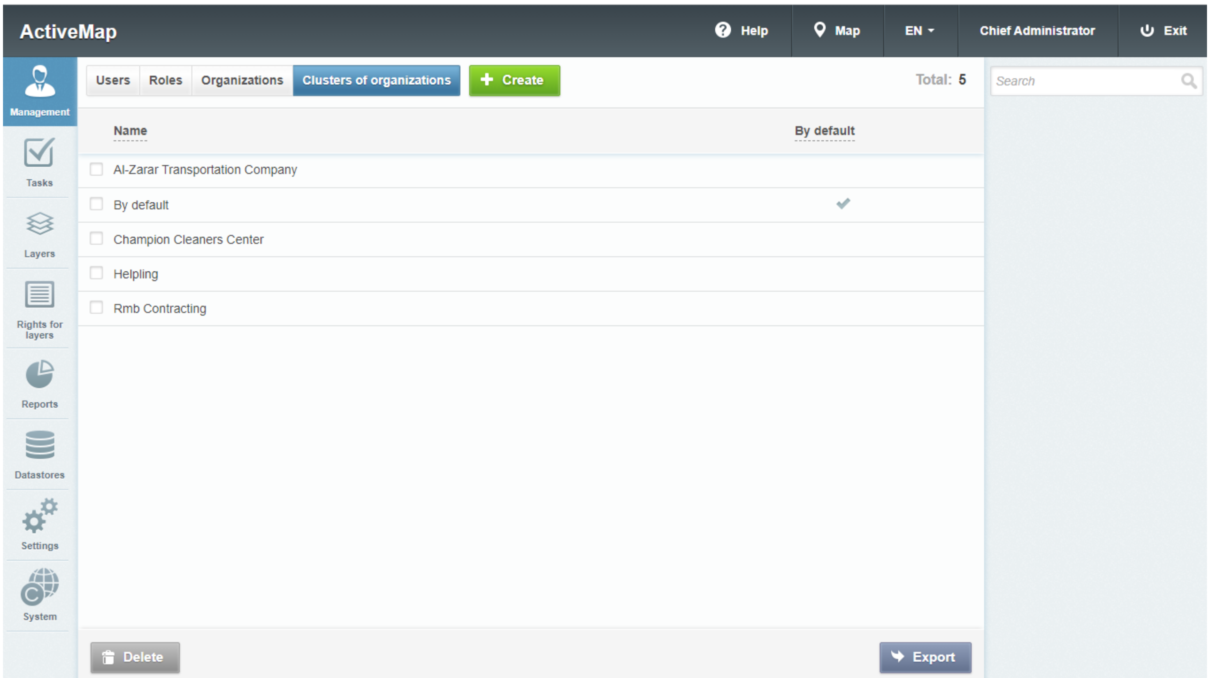


Fig. 2.47: “Clusters of organizations” tab

Adding a new organization cluster

To add a new cluster of organization, click on the 

button. A window will open in the administration area where you have to fill in the name of the cluster (Fig. 2.48). You can activate “Use your list of steps” setting, which will make the cluster isolated and create separate steps for it. The setting can only be activated when creating a cluster, you cannot add or disable it later. An isolated cluster does not have access to global steps, so it is necessary to create its own steps, otherwise tasks cannot be created. More information on creating stages can be found in the section *“Steps” tab* (page 51).

After creating a cluster, it will be available for selection in the organization creation/editing form.

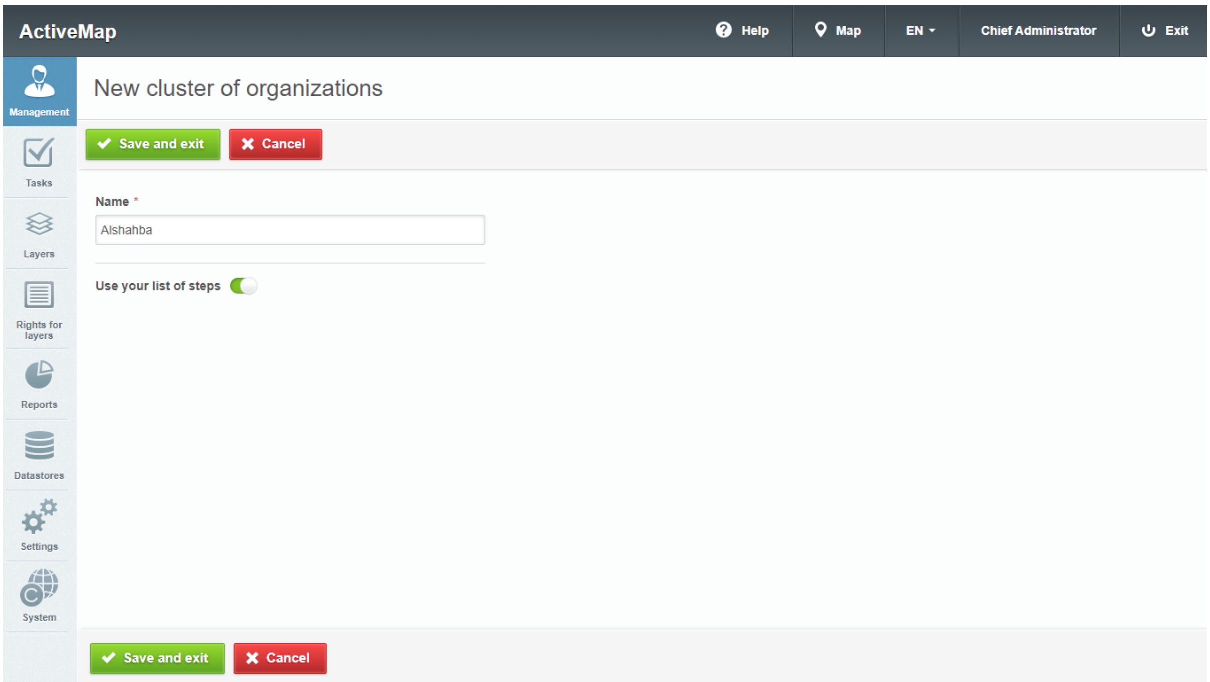


Fig. 2.48: Adding an organization cluster

Editing an organization cluster

In the "Clusters of organizations" tab the administrator can edit information about the organizations of the system. Clicking (or double-clicking on the cluster) opens the form of changing the name of the cluster of organizations with the list of organizations in the cluster (Fig. 2.49).

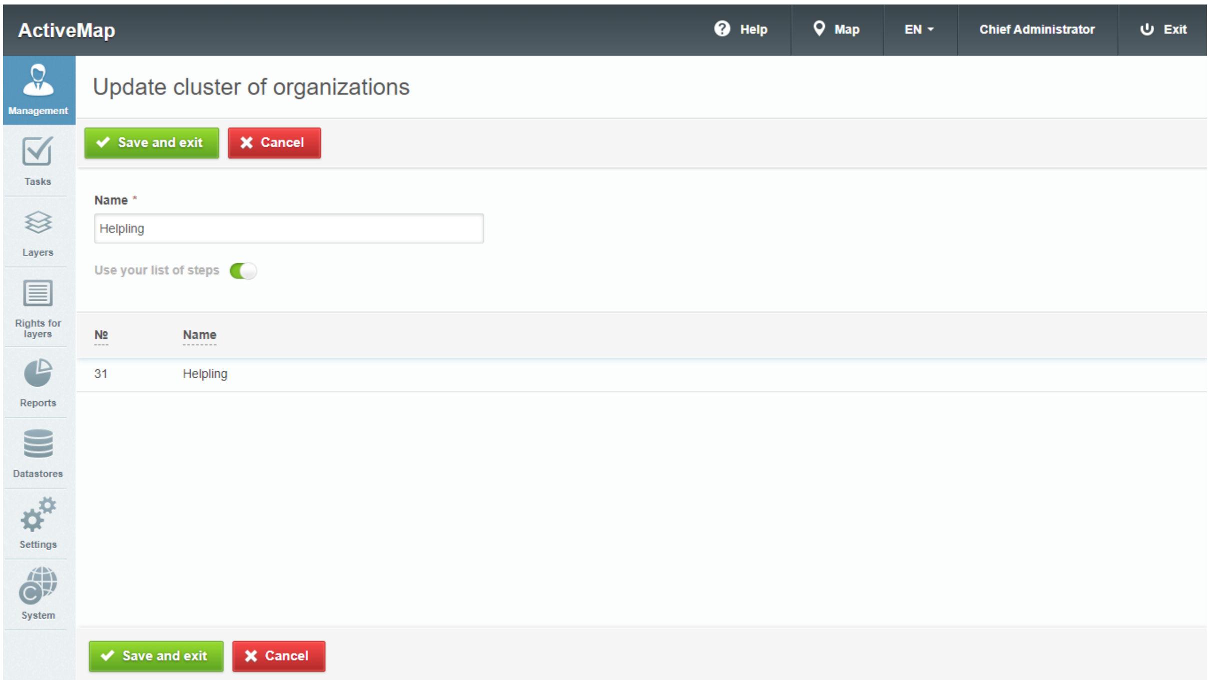


Fig. 2.49: Editing an organization cluster

Deleting an organization cluster

To delete one cluster of organizations, click on the right side of the row. To delete several organization clusters at once, check the corresponding rows and click the **Delete** button at the bottom of the screen. More information on deleting system items can be found in the section *Deleting an element* (page 26).

When trying to delete the "Default" organization cluster, a dialog box appears in the administration area informing the administrator that such deletion is impossible.

2.3.3.2 "Tasks" block

In the "Tasks" block, the administrator can manage task parameters (Fig. 2.50).

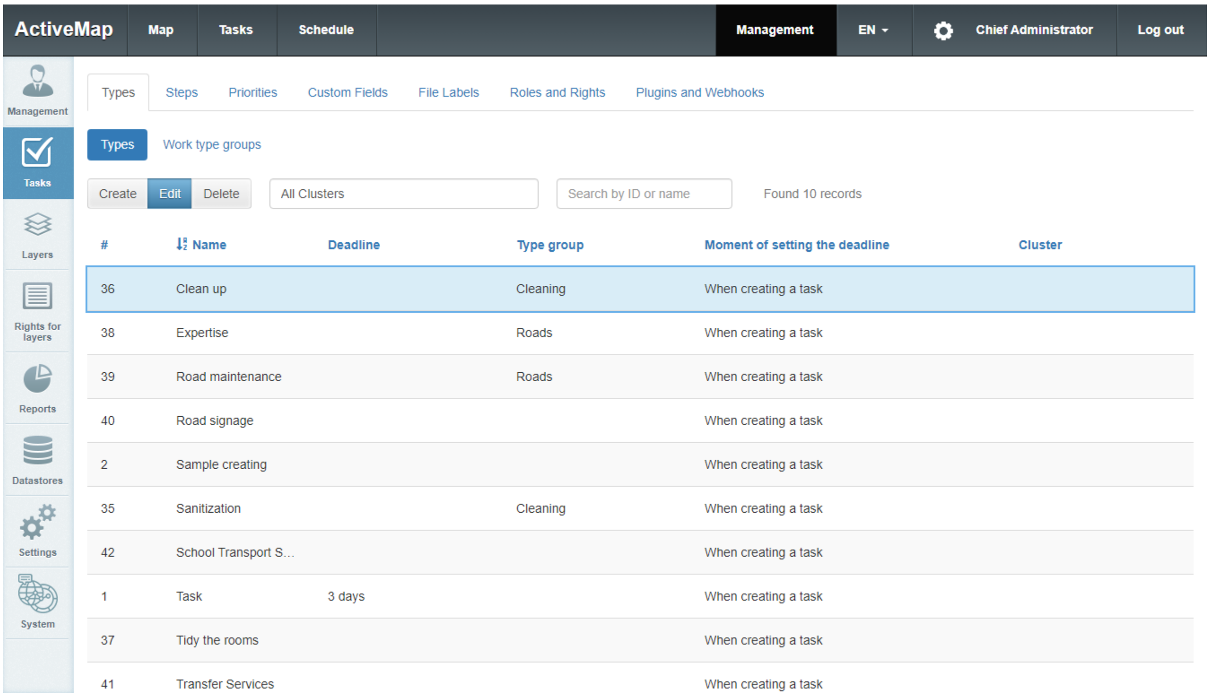


Fig. 2.50: "Tasks" block

The following sections are located at the top of the window for management:

- "Types",
- "Steps",
- "Priorities",
- "Custom Fields",
- "File Labels",
- "Roles and Rights",
- "Plugins and Webhooks".

Types of work, their groups, steps, priorities and plugins can be local (associated with a specific cluster) or global (without association). Global entities can only be administered by the Chief Administrator, while local entities can be administered by both the Chief Administrator and Cluster Administrator. Local entities are not visible to users outside the specified cluster.

By default, when you go to the "Tasks" block, the "Types" tab opens.

2.3.3.2.1 "Types" tab

There are two subsections in this tab: "Types" and "Work type groups".

Local types of work are not visible to users outside the specified cluster and can only be associated with organizations within their cluster. If the "For all organizations" toggle is enabled, then they are available to all organizations in that cluster. Local types of work can only be included in local groups of types of work.

Global types of work can be associated with any organizations. If the "For all organizations" toggle is enabled, then the types of work are available to all organizations in all clusters of the system. Global types of work can only be included in global groups of types of work.

Global entities can be administered only by Chief Administrator, local entities - by Chief Administrator and Cluster Administrator, with one exception - Cluster Administrator can edit the global types of work (when the "for all" mode is not enabled), only when he/she associate or disassociate organizations within the cluster.

"Types" subsection

The "Types" subsection contains a list of existing types of work (Fig. 2.50). To add a new type of work, click "Create". A window will open with fields to fill in (Fig. 2.51):

"Main" tab:

- "Name" - name of the type of work;
- "Cluster" - organization cluster to which this type of work is linked (if the cluster is not specified, the type of work will be available to all organizations);
- "Type group" - group of works to which this type belongs;
- "Deadline" - time required to complete the task (defined by the task description for this type of work);
- "Moment of setting the deadline" - time from which the deadline is counted: "when creating a task" - at the time the task is created in the system, or "when assigning a task" - when the task is assigned to a specific executor;
- "Icon" - task icon, which will be displayed in the task list in the ActiveMap Mobile and ActiveMap Desktop applications.

"Organization binding" tab:

- toggle switch "For all organizations" - makes the type of work available to all organizations in the system (for global types of work) or within the cluster (for local types of work);
- toggle switches with the names of individual organizations - makes the type of work available for the selected organizations.

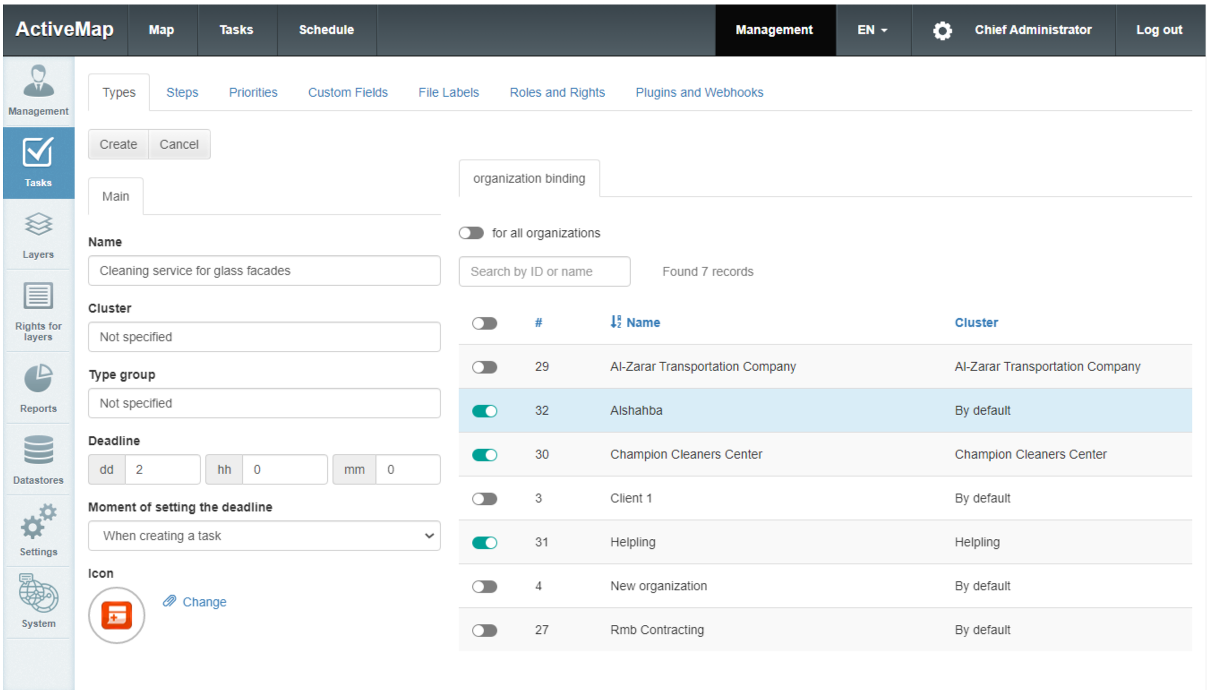


Fig. 2.51: Creating a type of work

To edit a type of work, select the row with the required type by clicking once with the left mouse button and then click “Edit”. A window similar to creating types of work will open, where you can change the field values.

To delete an existing type of work, select the required type with a single left mouse button click and click “Delete”. In the dialog window that appears, you need to confirm the deletion by clicking “Yes” or cancel it by clicking “No”.

“Work type groups” subsection

The “Work type groups” subsection contains a list of existing groups (Fig. 2.52). Groups of types of work allow visually grouping objects in the ActiveMap Mobile and ActiveMap Desktop applications.

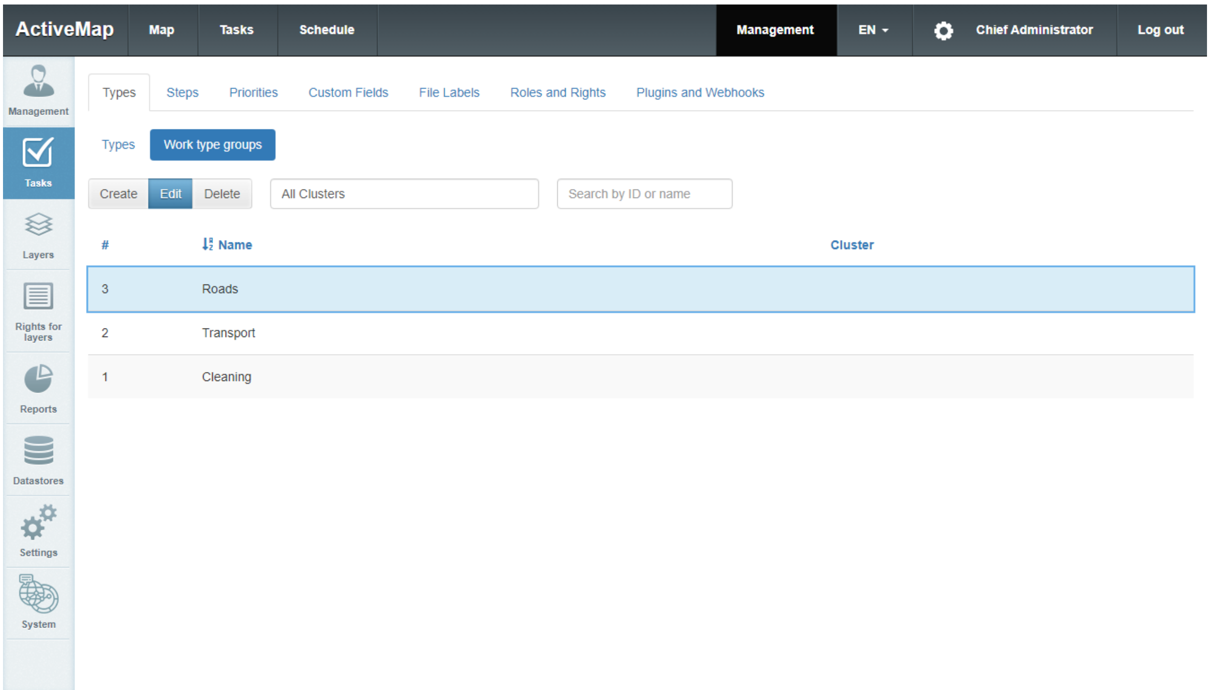


Fig. 2.52: Work type groups

To add a new work type group, click "Create". A window will open asking you to enter a name for the group. After that, the group will be available in the corresponding field when creating the work type.

To edit a group of work types, select the group in the list and click "Edit". A window similar to the creation window will open, where you can change the name of the group.

To delete a group of work types, select it in the list and click "Delete".

2.3.3.2.2 "Steps" tab

This tab displays a list of existing work steps (Fig. 2.53).

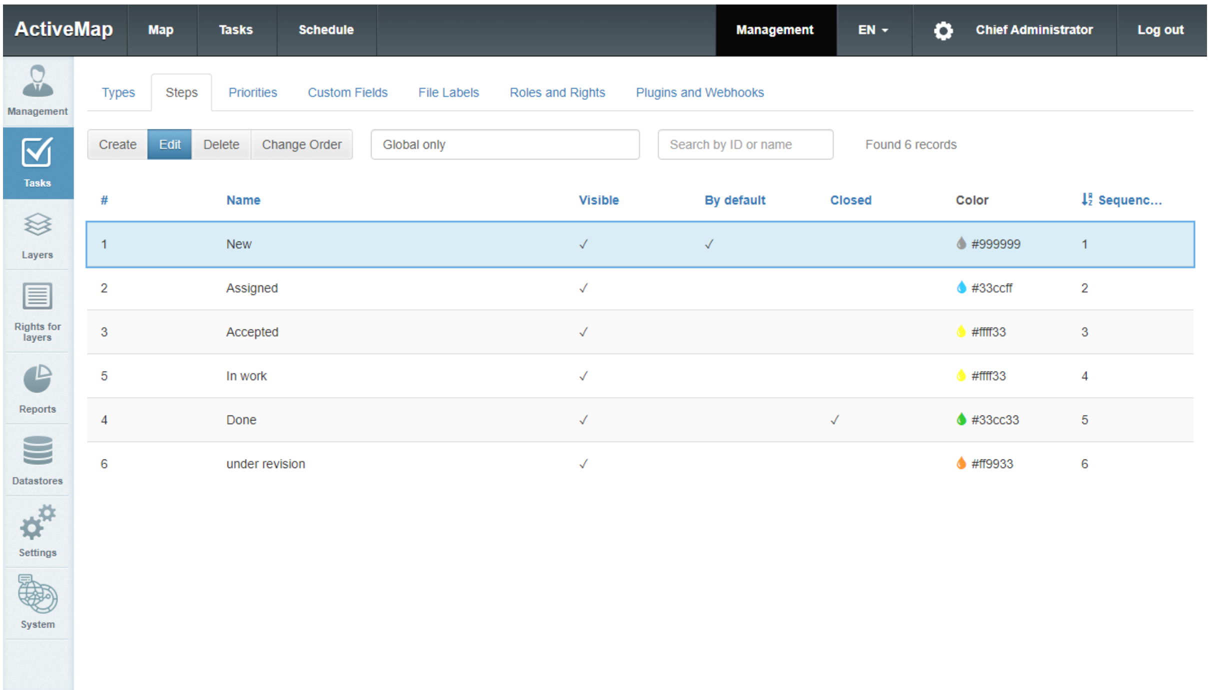


Fig. 2.53: "Steps" tab

Local (cluster-specific) and global (unrestricted) steps of work are distinguished. Steps can be sorted within the group. The Chief Administrator can sort any group, and the Cluster Administrator can only sort local steps in his/her cluster.

To add a new step, click "Create". A window will open, where you have to fill in the following fields (Fig. 2.54):

- "Name" - name of the work step;
- "Cluster" - belonging to a cluster of organizations (if no cluster is specified, the step will be available for all organizations);
- "Color" - color of step displaying in the list of tasks (specified as RGB code);
- "Visible" toggle switch - visibility of the stage being created;
- "Default Step" toggle switch - automatically setting at task creation;
- "Step of a closed task" toggle switch - passing to this stage means that the task is closed.

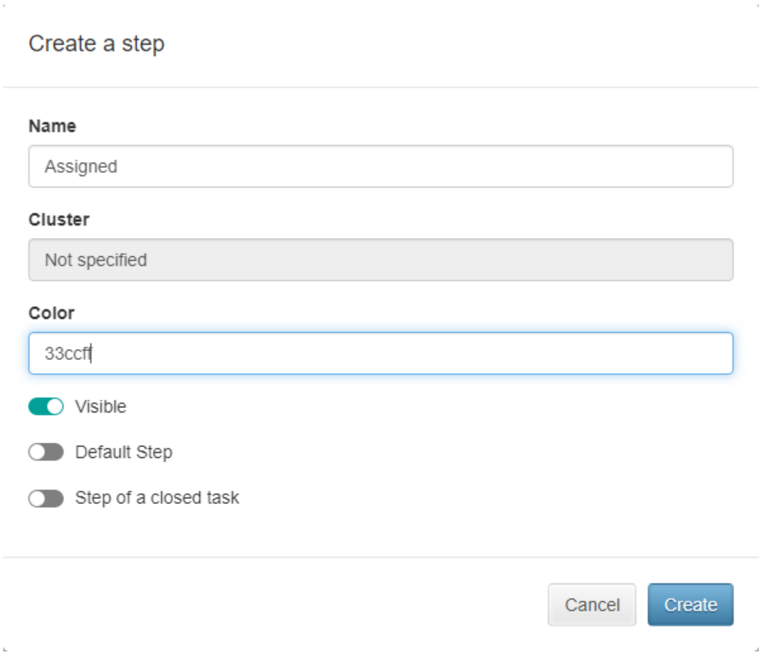


Fig. 2.54: Creating a step

To edit an existing step, select it by clicking on it once with the left mouse button and then click on "Edit". After that click on "Edit" button. This will open a new window in which you can edit the values in the fields mentioned above.

In addition, you can set the order in which steps are displayed in the system. To do this, select the appropriate cluster (if you plan to change the order within an isolated cluster), click "Change Order", drag the stage to a new position in the list and save the changes.

To delete a step, select it with a single left mouse click and click "Delete". In the dialog box that appears, you should confirm the deletion by clicking "Yes" or cancel it by clicking "No".

Only Chief administrator can create, modify and delete a global step, while a local step can be created by Chief administrator and Administrator of the corresponding cluster. You can only create a local step within a cluster if that cluster is isolated ("Use your list of steps" setting is activated). To create a local step, select the corresponding cluster from the drop-down list, after which a list of local steps of the selected cluster will be displayed. When creating a new step, name of the selected cluster will be filled in automatically, then you need to enter a new value and save the changes. The created step will be available only within the selected cluster.

If the cluster does not have steps and the first one is created, it is automatically assigned the "default" value. The "default" step cannot be deleted. If another step is marked as "default", the checkbox will be automatically removed from the previous step. The first non-"default", non-closing step will be considered as "assigned" step. If there is no such step, the step will not change when you change the executor. If a task is created or edited within an isolated cluster, only the local steps of that cluster can be used. Within a regular cluster, only global steps can be used. Global steps are not available to an isolated cluster. When creating such a cluster, it is mandatory to create the steps for it, otherwise tasks cannot be created.

2.3.3.2.3 “Priorities” tab

This tab displays a list of existing work priorities (Fig. 2.55). Priorities allow you to group the types of work by importance.

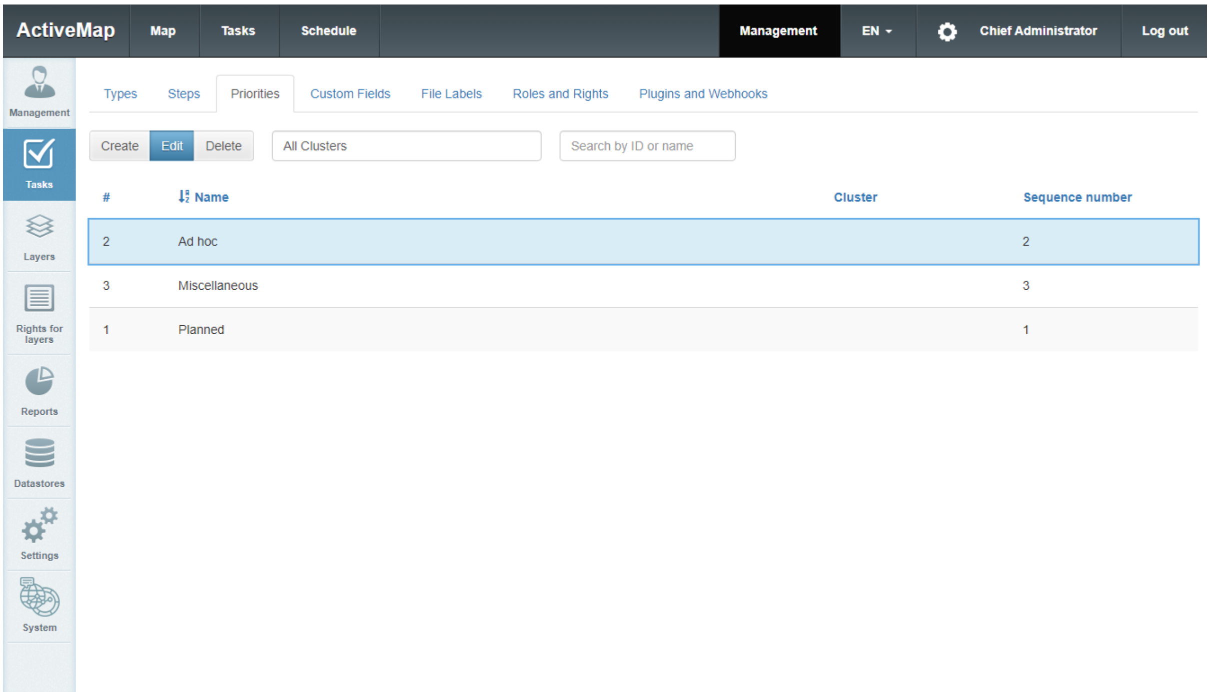


Fig. 2.55: “Priorities” tab

To add a new priority, click “Create”. In the window that appears, you only need to specify the name and, if necessary, the cluster of the new priority (local priority will be available only within the selected cluster). Id and serial number will be assigned automatically (Fig. 2.56). You can also upload a custom icon or leave the default one.

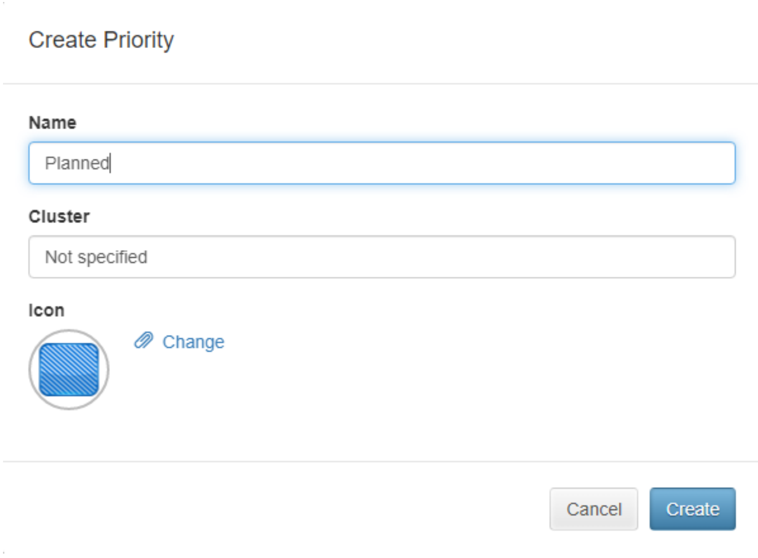


Fig. 2.56: Creating a priority

To edit an existing priority, select it with a single left mouse click and click “Edit”. This will open a window where you can change the name of the selected priority. To delete an existing priority, select it with a single left mouse click and then press “Delete”. A dialog box will open, where you should confirm the deletion by clicking “Yes” or cancel it by clicking “No”.

2.3.3.2.4 “Custom Fields” tab

This tab displays a list of existing custom fields (Fig. 2.57). Custom fields are used to add user-defined fields to the task creation form. Such fields can be attached to a certain type of work and correspond to its theme. For example, for types of work that involve interaction with a client by a field specialist, a field in the format of “Phone number” can be created, into which the client’s phone number will be entered.

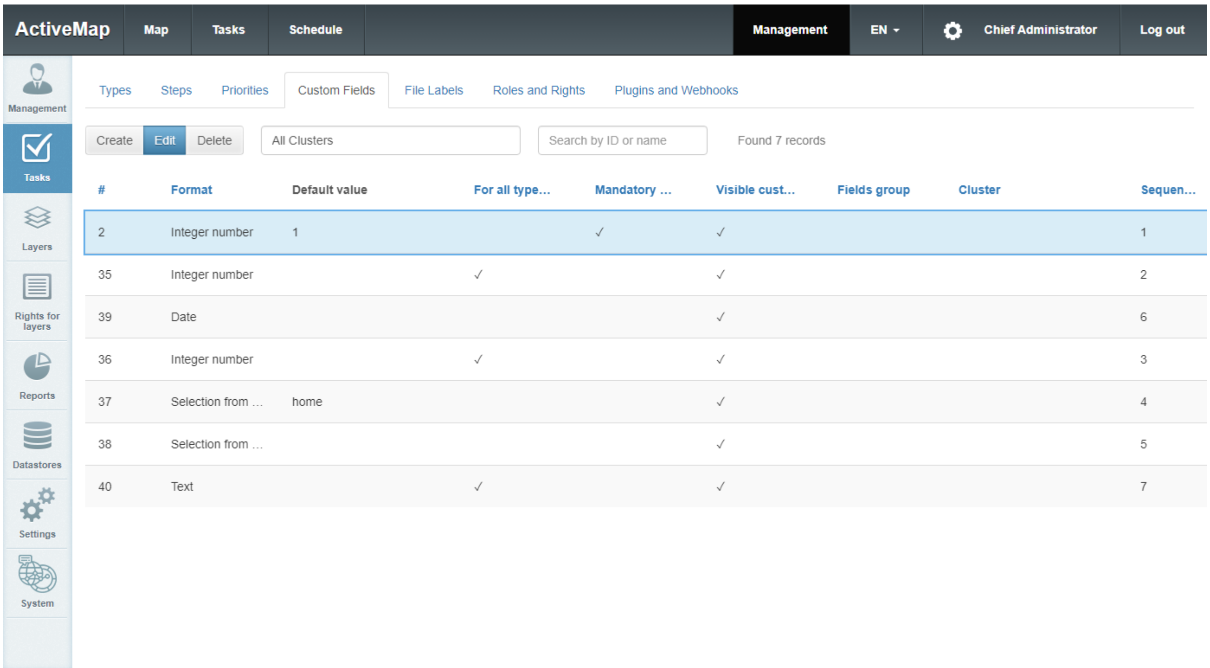


Fig. 2.57: “Custom Fields” tab

Custom fields can be local (with binding to a particular cluster) and global (without binding). Global entities can be administered only by Chief Administrator, local entities can be administered by Chief Administrator and the Cluster Administrator. There is an exception - Cluster Administrator can edit global custom field (if “for all” mode is not enabled), while only attaching or detaching local types of work of this cluster.

To add a new custom field, click “Create”. A window will open with fields to fill in (Fig. 2.58):

“Main” tab:

- “Name” - name of the field.
- “Format” - data format of the field, one of the following values should be selected:
  - String - short text field;
  - Text - extended text field;
  - Integer number - integer field;
  - Real number - field with real numeric value;
  - Date - date and time;
  - Logical value - choice from true and false options;
  - Selection from the list - format with the possibility of specifying a list of options;
  - Phone number - format with the possibility of calling a specified number from the task window;

  - Barcode - numeric decoding of barcode;
  - Geometry - geometric information.
- "Mandatory custom field" - toggle switch for mandatory filling of the created field.
- "Visible custom field" - toggle switch for visibility of the created field for users.
- "Default value" - automatically filled field value.
- "Fields group" - selection of a group of custom fields.

The list of fields to be filled in may vary depending on the selected format. For fields with the "String", "Text", "Integer number", "Real number" type, you can additionally enter "Regular expression" - a pattern string that sets a template for custom field. For text-format fields (string and text) - the minimum and maximum length of the field, for the "Selection from the list" type possible values should be specified.

"Binding to type of work" tab:

- "For all types of work" toggle switch - makes the field available for all types of work in the system (global custom fields) or within a cluster (local custom fields);
- toggle switches with names of individual organizations - makes the field available for selected types of work.

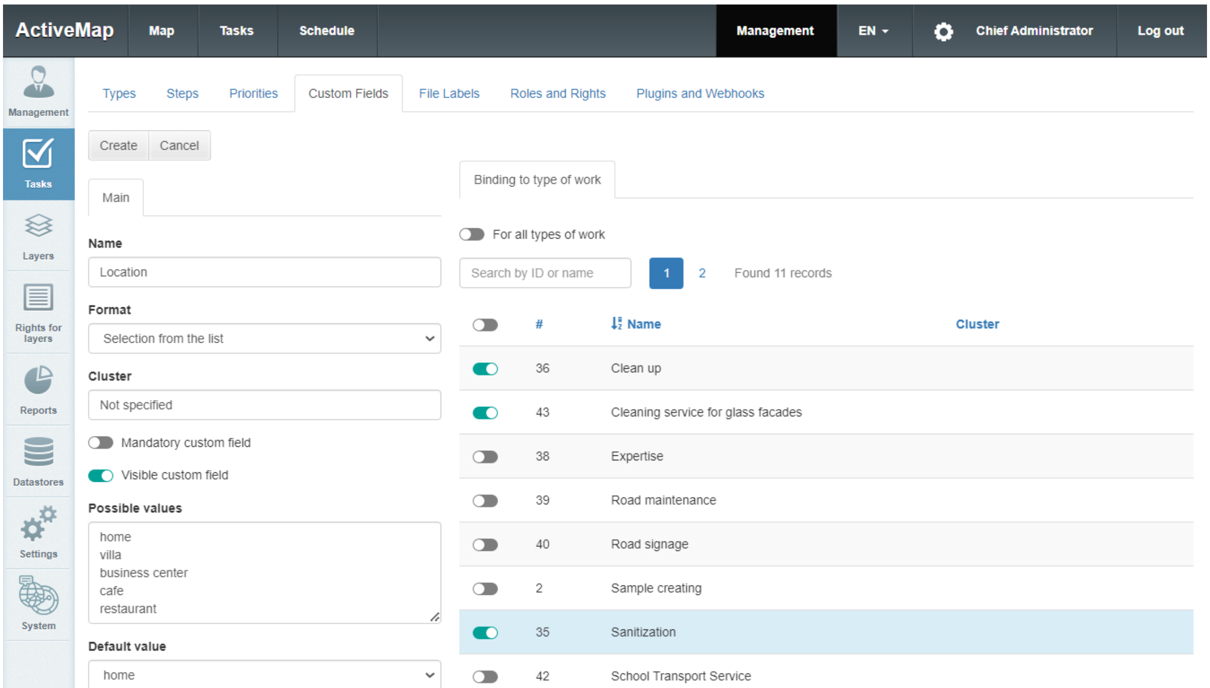


Fig. 2.58: Creating a custom field

To edit an existing custom field, select it with a single click of the left mouse button and click "Edit". A window will open where you can change the values of the fields mentioned above.

To delete an existing custom field, select it with a single click of the left mouse button and click the "Delete" button. In the appearing dialog box you need to confirm or cancel the deletion.

2.3.3.2.5 "File Labels" tab

This tab displays a list of existing stickers - file labels (Fig. 2.59). They are used to mark photos when creating and editing tasks. For example, these could be "Before" and "After" labels to indicate photos showing progress in ongoing work.

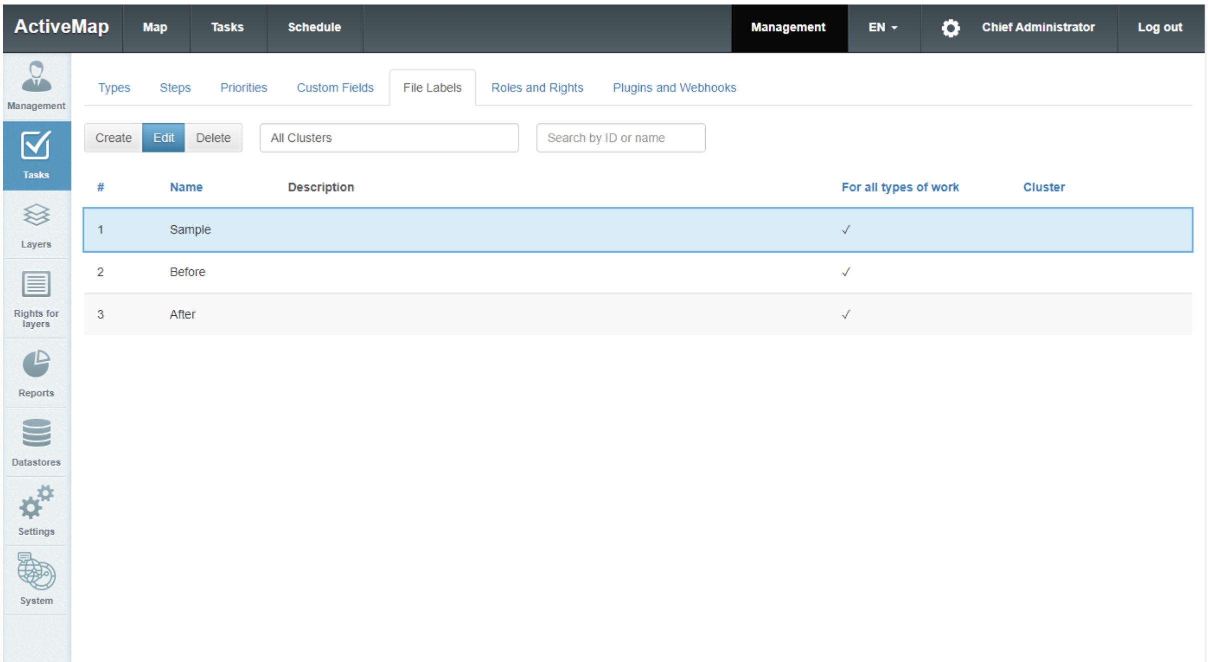


Fig. 2.59: "File Labels" tab

Stickers can be local (linked to a specific cluster) or global (not linked). Global entities can only be administered by the Chief Administrator, local entities - by the Chief Administrator and the Cluster Administrator. There is an exception - the Cluster Administrator can edit the global sticker (when "for all" mode is not enabled), while only attaching or detaching local types of work of his/her cluster.

To add a new label, click "Create", a window will open with fields to fill in (Fig. 2.60):

"Main" tab:

- "Name" - name of the label;
- "Description" - brief description of the label.

  Tab "Binding to types of work":

- toggle switch "For all types of work" - makes sticker available for all types of work in the system (global sticker) or within the cluster (local sticker);

- toggle switches with the names of individual organizations - makes the sticker available for selected types of work.

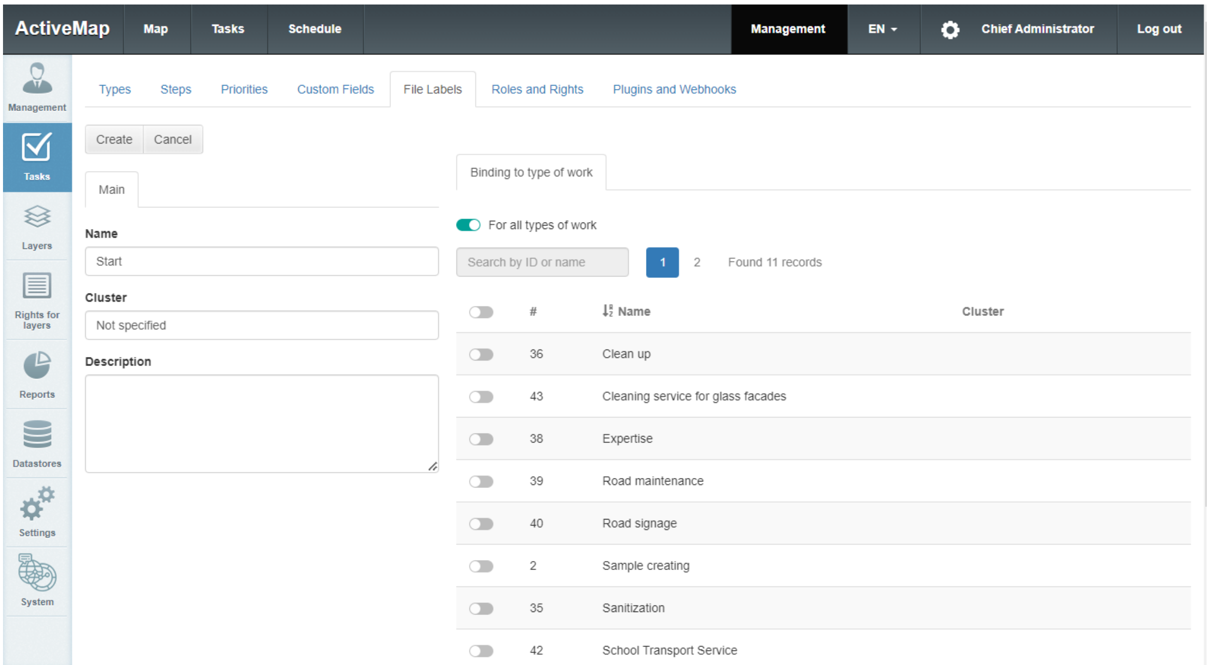


Fig. 2.60: Creating a label for files

To edit an existing label, select it with a single click of the left mouse button and click “Edit”. A window will open where you can change the values of the fields mentioned above. To delete an existing label, select the row of the desired label with a single click of the left mouse button, and then click “Delete”. In the dialog box that appears, confirm deletion by clicking “Yes” or cancel it by clicking “No”.

2.3.3.2.6 “Roles and Rights” tab

This section allows you to view the permissions of users with different roles (Fig. 2.61). For a detailed description of the possible roles, see *“Roles” tab* (page 39).

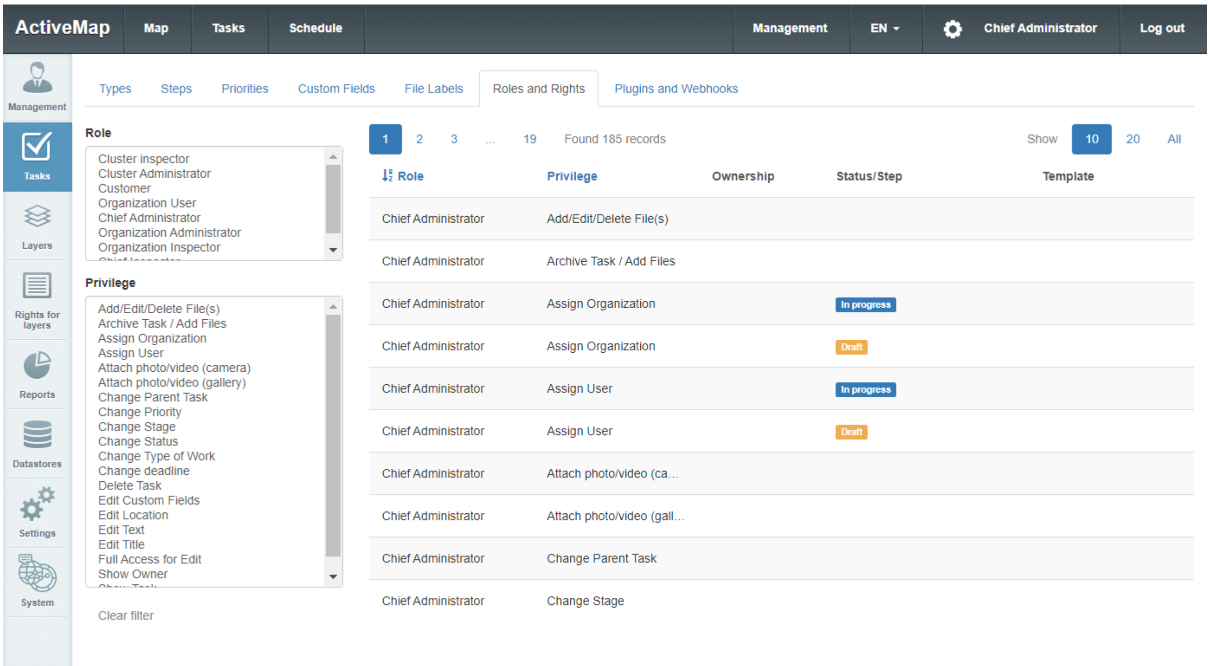


Fig. 2.61: "Roles and Rights" tab

To view the rights of a specific role, select it in the "Role" window. The list on the right side of the screen displays the permissions for that role. To view roles that have a specific permission, select it in the "Privilege" window. The result will be displayed in the list on the right side of the screen. "Clear Filter" button resets the role and permission selection, as a result, all roles and all rights are displayed in the list.

2.3.3.2.7 "Plugins and Webhooks" tab

This tab displays existing plugins and webhook destination servers (Fig. 2.62). Plugins are scripts written in Python. They are used to automate actions with tasks and further adapt the system to operating peculiarities, e.g., for automatic:

- creation of new tasks after the occurrence of certain conditions in the task being performed;
- transferring tasks to another status or step when attaching a certain number of files or filling in the specified fields;
- adding a comment on any change in the task;
- attaching files to the task and stickers to files;
- setting the main photo of the task.

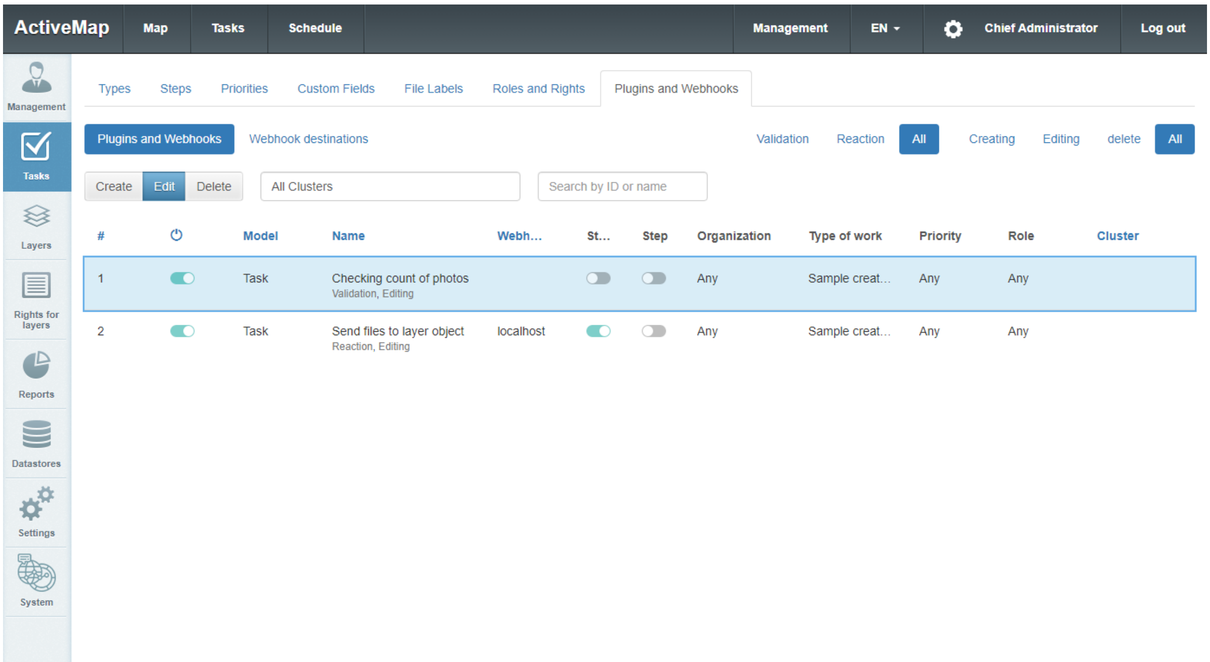


Fig. 2.62: "Plugins and Webhooks" tab

Scripts and webhook destination servers can be local (bound to a specific cluster) and global (unbound). You can specify a cluster when creating a script/destination server but cannot change or delete it from the script/destination server. If the script is local, then only a global server or a local server of the same cluster can be specified. If the script is global, then any script can be specified. Priorities and types of work can be specified both local in relation to its cluster and global. Local scripts are applied to tasks and comments only in their own cluster. Only Chief Administrator can create, edit and delete global and local scripts.

Plugins and Webhooks subsection

To add a new plugin, go to the corresponding subsection and click "Create". The plugin creation window will open (Fig. 2.63).

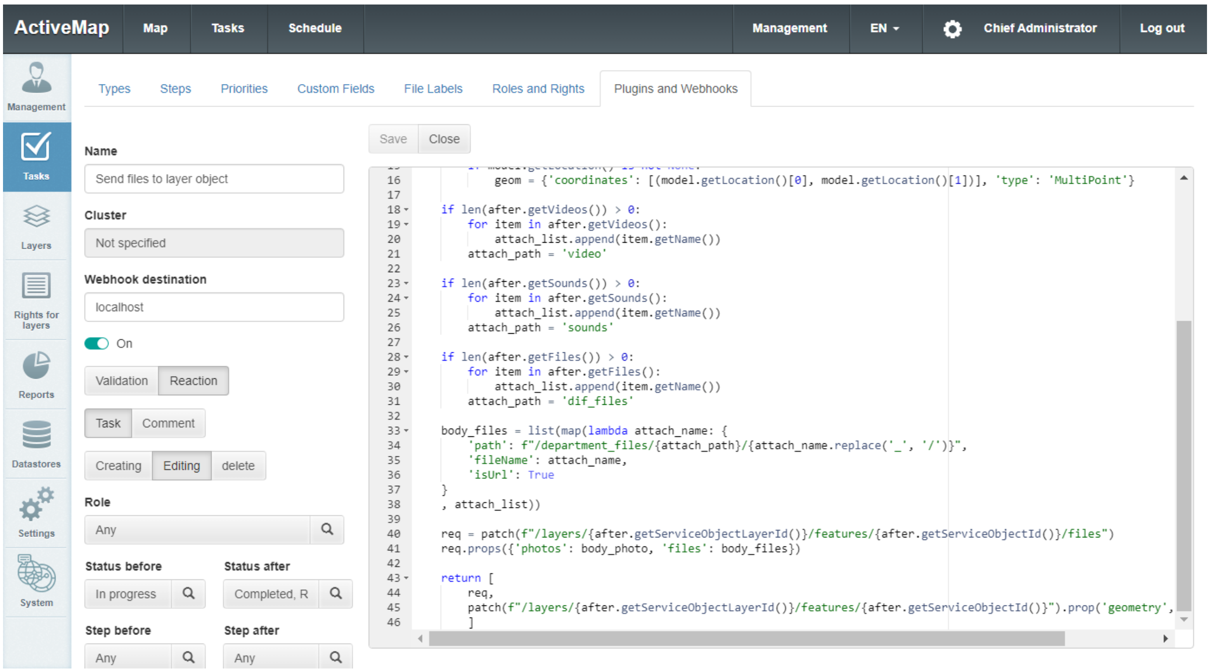


Fig. 2.63: Plugin creation

In the left part of the opened window, you should configure the parameters: fill in the "Name" and "Description" fields, specify the cluster if necessary, switch the "Enabled" toggle to the desired position.

Select the values of the following fields:

- "Type" - type of plugin (validation or reaction).

Validation is performed before saving, reaction - after saving the task in the database. Validation allows you to check the correctness of a task when creating/editing it. The validator plugin should return one of three possible values:

- *valid()* – everything is correct, you can save it.
- *invalid()* – error, cannot be saved.
- *invalid(String error)* – error, saving is not possible, show the given error message.

Reaction allows you to send a request for another operation on the same task or several such requests in response to a successful operation on the task. For example, in response to attaching new files to a task, send a request to change the custom field in the same task that stores the number of files. The request is executed in a separate thread from the reaction. In reactions you can specify the user on behalf of whom the request to create/edit the task will be executed. If the reaction has an attached server and generates a relative request, the request is sent to the attached server (the request will be ignored if the server is turned off or removed).

Webhooks are the special kind of reaction. This is an automated launch of http requests in response to operations on entities (tasks or comments). Unlike regular reactions, webhooks can be written for both tasks and comments. For webhooks on tasks, operations for creating/editing/deleting tasks are available, and only the operation of creating a comment is available for webhooks on comments. To send a request, the reaction must return the result of executing one of the special functions:

- *return post(url)*,
- *return patch(url)*,
- *return put(url)*,
- *return delete(url)*,
- *return get(url)*.
- "Model" – the entity on which the operation is performed (task or comment).
- "Operation" – the operation that triggers the plugin (creation/editing/deletion for tasks, creation for comments).

Depending on the selected type, model and type of operation, the following fields will be displayed:

Validation when creating/deleting a task:

- "Role" – users with which role can apply the plugin.
- "Organization" – task-creating organizations that have access to the plugin.
- "Type of work" – types of work for which the plugin will work.
- "Priority" – priorities for which the plugin will work.

Validation when editing a task:

- "Role" – user roles that can use the plugin.
- "Status before" – task statuses for which the plugin will work.
- "Status after" - the status to which tasks will be transferred after the plugin is triggered.
- "Step before" – steps of task execution for which the plugin will work.
- "Step after" - the step to which tasks will be transferred after the plugin is triggered.
- "Organization" – organization-creators of tasks for which the plugin is available.
- "Type of work" – types of work for which the plugin will work.
- "Priority" – priorities for which the plugin will work.

Validation when creating a comment:

- "Role" – users with which role can use the plugin.

In all of the above fields, you can select multiple values. “Destination server” will be added to this list of fields - the address of the server to which relative requests are sent.

The field on the right should be filled with a Python script. Roles, statuses and steps before/after, organizations, types of work, and priorities can be specified directly in the script in more complex combinations than can be enabled by toggling switches in the left part of the window. If these field values are mentioned in the script, default values (“any”) can be left for them in the left part.

Script examples are given in the *1. Plugin script examples* (page 121) section.

After filling in all the required fields, click “Create”. The created plugin will appear in the general list of plugins. If necessary, each plugin in the list can be edited or deleted.

“Webhook destinations” subsection

Destination servers are needed for grouping webhooks and for fast change of the destination server. For example, if you have 5-10 webhooks and their API entry point has changed, you only need to change the destination server address. If the reaction has an attached server and generates a relative request, the request is sent to the attached server (the request will be ignored if the server is turned off or removed).

To add a new server, go to the appropriate subsection and click “Create”. In the window that opens, fill in the “Name”, “Cluster” (if necessary) and “URL” fields, switch the “Enabled” toggle to the desired position (Fig. 2.64).

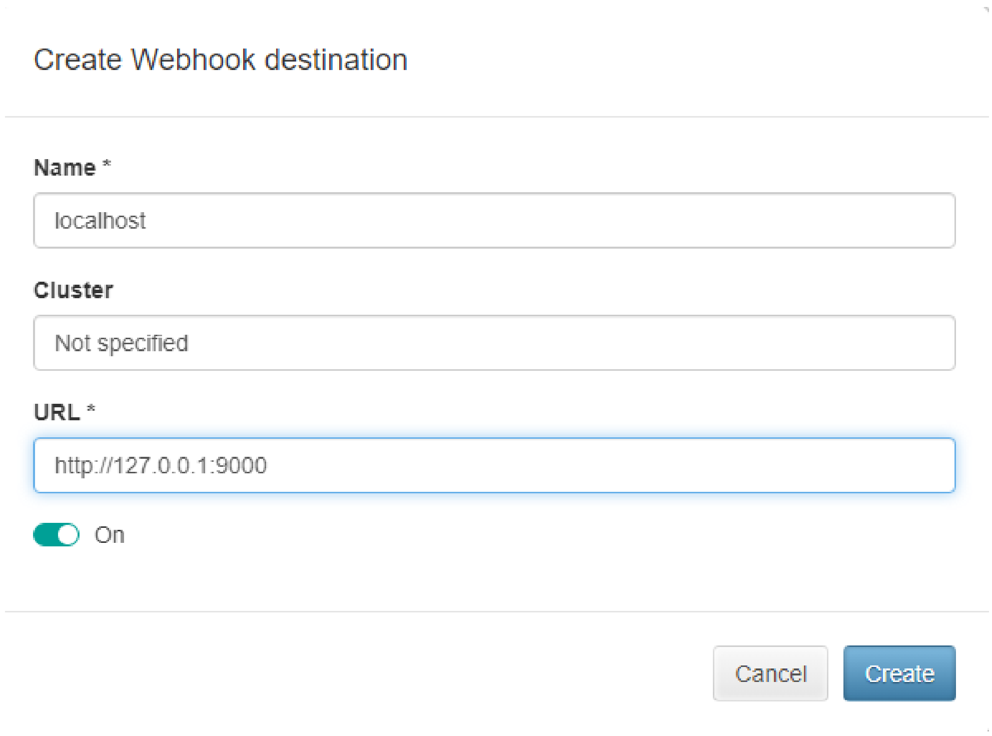


Fig. 2.64: Creating a destination server

The created server will appear in the general list of webhook destination servers (Fig. 2.65). If necessary, the server data in the list can be edited or deleted (except for the cluster). The cluster can be set when the destination server is created, but cannot be changed or deleted.

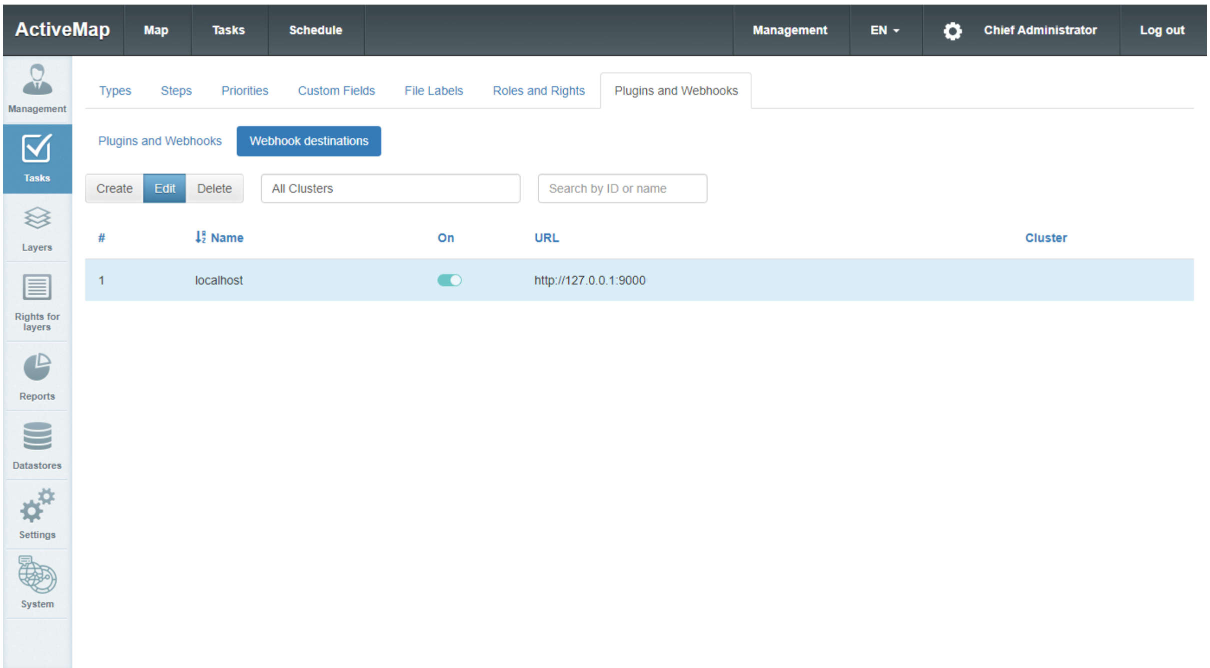


Fig. 2.65: List of webhook destination servers

2.3.3.3 "Layers" block

The "Layers" block is intended for work with cartographic layers of the system, tables and their groups. If you switch to the "Layers", "Groups", "Tables", "Icons" tabs, you get access to the following controls: sorting of tables, search bar, adding new records, editing records, deleting records, exporting data (Fig. 2.66).

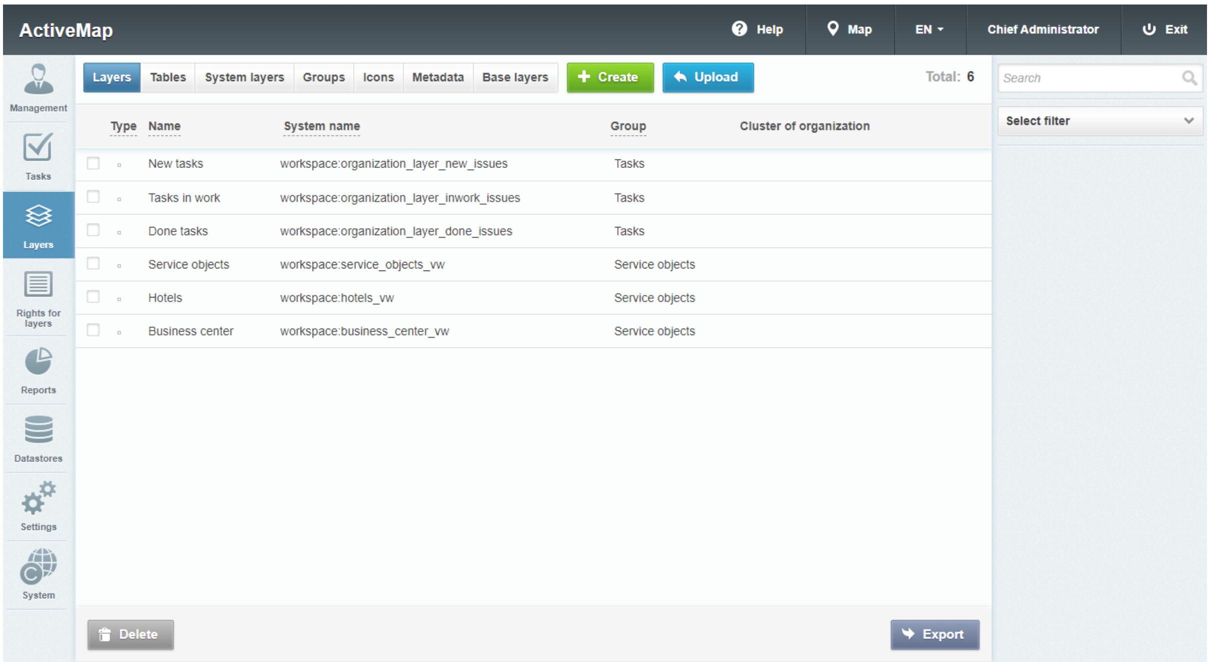


Fig. 2.66: "Layers" block

2.3.3.3.1 "Layers" tab

In the "Layers" tab administrator can view detailed information about the system layers, create or load new layers. A layer is a visual representation of a set of geographic data on any digital map.

When you switch to the "Layers" tab in the administration window, a table with the following columns becomes available (Fig. 2.66):

- "Type" – geometry type (point, line, polygon or raster) that determines how the layer object appears on the map.
- "Name" – name of the layer in interface.
- "System name" – name of the layer in database.
- "Group" – belonging to a certain group of the system.
- "Cluster of organizations" – an association of several organizations for operational monitoring of the work of departments (more about clusters in the section *"Clusters of organizations" tab* (page 45)).

When switching to the "Layers" tab, the administrator can use search string and filters (by group, data store, geometry type, belonging to raster layers, by service objects and cluster), as well as tools for creating new layers and editing/deleting existing ones.

Create a new layer

To create a new layer in the system, click  - the layer creation window opens, containing the tabs: "Main", "Attributes", "Service Objects" and "Default rights".

"Main" tab

The first tab that opens is the "Main" tab, where you need to fill in the following fields (Fig. 2.67):

- "Layer cluster" - belonging to the cluster of organizations. Cluster selection is available when creating a layer as an Chief Administrator. When creating a layer as an Administrator of the Cluster, affiliation with the cluster will be automatically determined.
- "Name" – name of the layer in interface.
- "System name" – name of the layer in the database, consisting of latin letters, without spaces or special characters. It is generated automatically when entering information in the "Name" field. If a non-latin title is entered in the "Name" field, transliteration is used. If you are not satisfied with the received name, you can enter your own version in this field. Automatic input will not work if you first fill in the "System name" and then the usual "Name". Unlike the name, the system name cannot be edited after the layer has been created.
- "Group" - group of layers in which the layer will be displayed.
- "Datastore" - database in which the layer will be stored.
- "Geometry type" - point, line or polygon.
- "Layer protocol":
  - WMS - providing information in the form of a geographically referenced images;
  - WFS - providing information in the form of geospatial data.
- "Projection" – code of one of the common geographic projections.
- "Use for search" - indexing the layer to search for its objects.
- "Style" - description of peculiarities of layer displaying on the screen (color, size, transparency and other properties of layer objects and their labels).

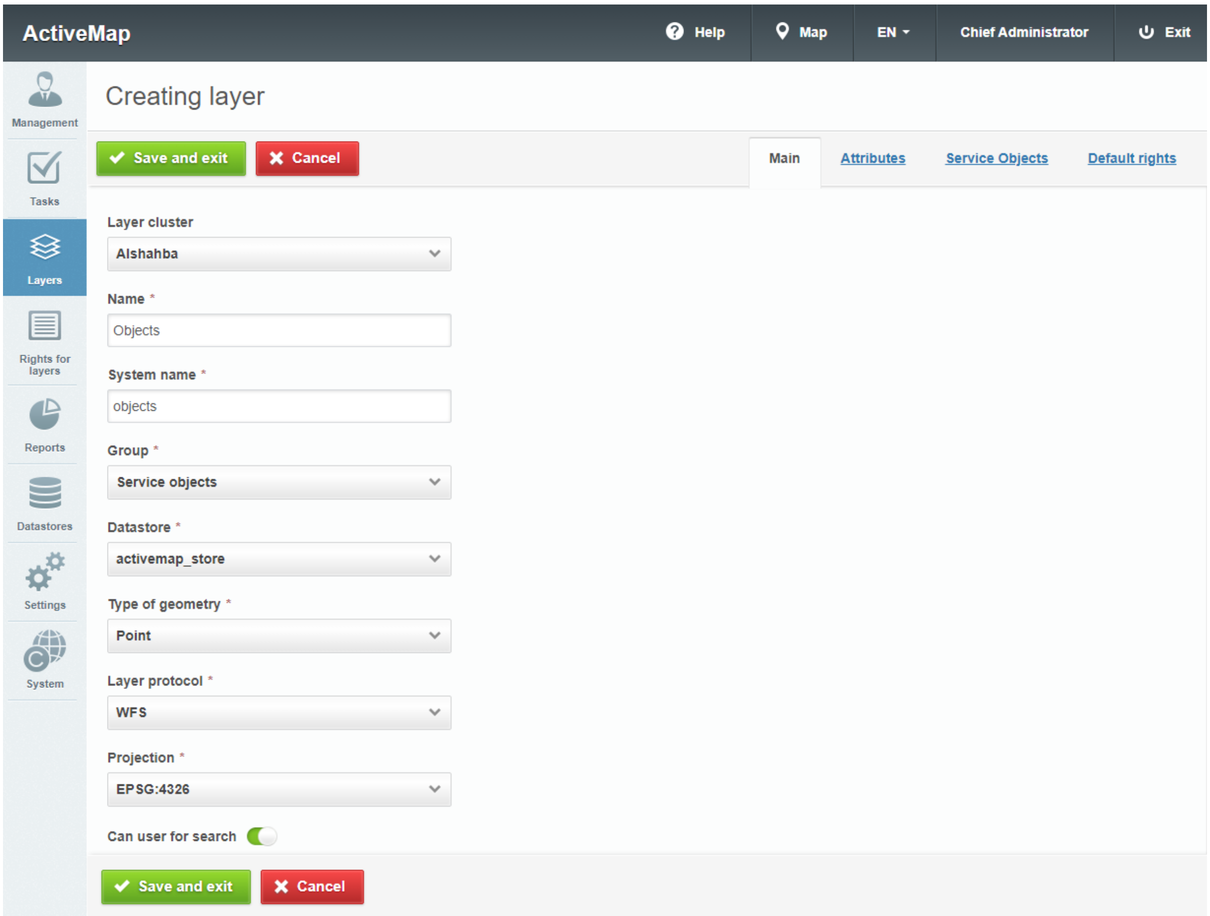


Fig. 2.67: Creating a layer

When creating and editing a layer, user can select one of the following styles:

- "Basic" - default style (point, line or polygon).
- "Simple" - style, where you can select an attribute for the caption and set its color, background, transparency and size (Fig. 2.68).

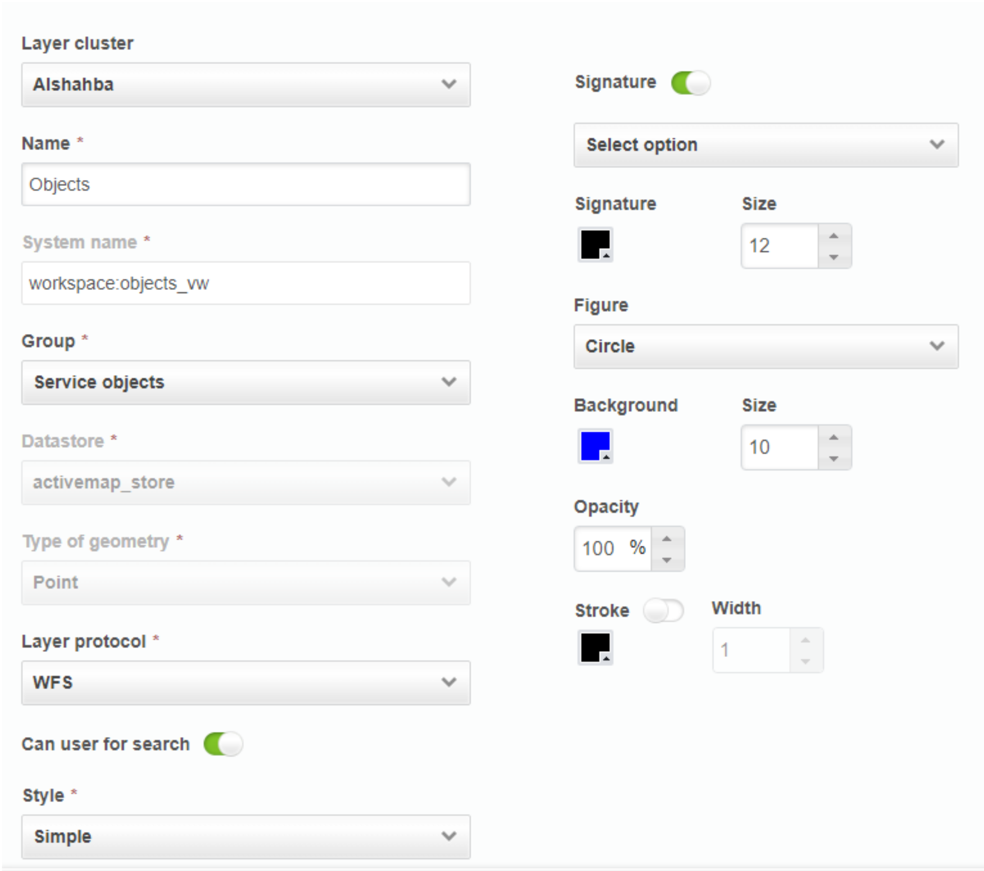


Fig. 2.68: Simple layer style

If you select the simple style and the point geometry type, you can set the form of displaying points for each object (circle, triangle, square) or choose a style with an icon. Background color and icon size can be set, the shape can be outlined. If you use the style with icon, you should select one of the icons from the drop-down list and specify its size. The system also supports loading your own icons (more details in *"Icons" tab* (page 91)).

If you select line as the geometry type, you can set the background color and line thickness. To set a color for the stroke, select the appropriate stroke option.

If you select polygon as the geometry type, you can set not only the colors and sizes for the stroke, but also the transparency for the background.

- "Advanced" - a style generated using the GeoCSS language with support for filters and a legend. When this style is selected, a separate form with code (Fig. 2.69) appears to the right of the input fields. See *2. Examples of advanced layer styles* (page 122) for examples of extended styles. More details on the rules for creating geocss styles can be found at https://docs.geoserver.org/stable/en/user/styling/workshop/css/css.html.

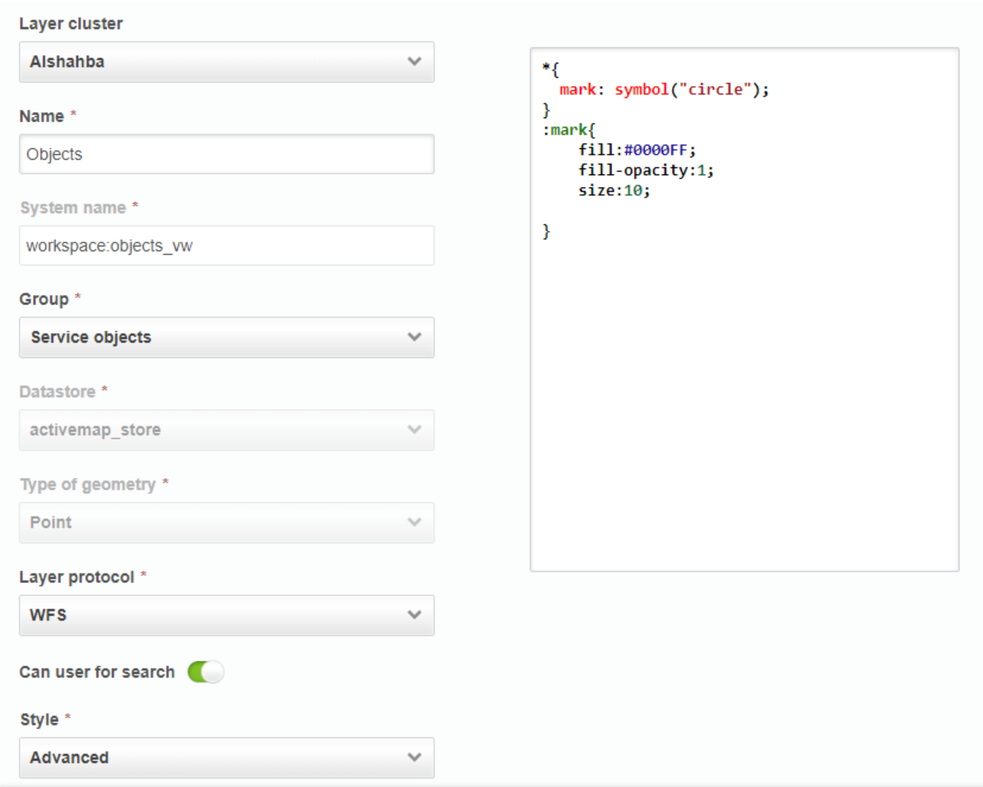


Fig. 2.69: Advanced layer style

“Attributes” tab

In the upper part of the window there are fields “Title format” and “Subtitle format”. It is possible to form a mask for the layer from one or several attributes, which will be the title (subtitle). To set up a new mask, the administrator should click on “Title” or “Subtitle” in the desired attribute. It is possible to add a brief explanation for better perception.

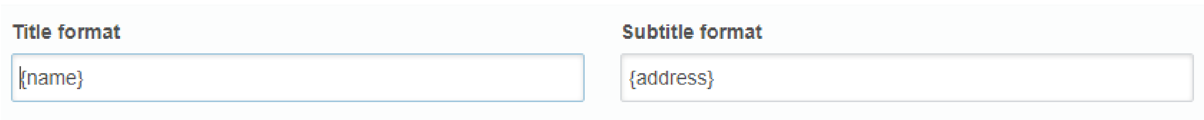


Fig. 2.70: Example of configuring the title and subtitle mask

To add new attributes, fill in the “Name” and “Type” fields and click 

. The following types of attribute fields are supported:

- String,
- Integer,
- Boolean,
- Float,
- Date,
- Date and time,

- Refrence table,
- Data table,
- Organization connection,
- Cluster connection.

A table with two fields appears in the administration area: the attribute name and its type. New attribute will appear in the first line of the table (Fig. 2.71). The following actions are available to the administrator:

- changing the attribute's name;
- defining additional parameters of the attribute:
  - "Title" - clicking on the line makes attribute the title of the object's card that is displayed when you click on the object on the map.
  - "Subtitle" - clicking on the line makes attribute the subtitle of the object's card that is displayed when you click on the object on the map.
  - "For search" - toggle switch to use the attribute for search.
  - "Hide" - toggle switch to hide the attribute from users.
  - "Cannot be edited" - toggle switch for attribute editing availability.
  - "HTML escape" - toggle switch to interpret the attribute as HTML content (expands the possibilities of filling in attribute fields, for example, their content can be a link or formatted text).
  - "View in pop-up window" - toggle switch to display the attribute in the object's card that is displayed when you click on the object on the map.

To add the next attribute, you have to fill in the form with fields again and click 

.

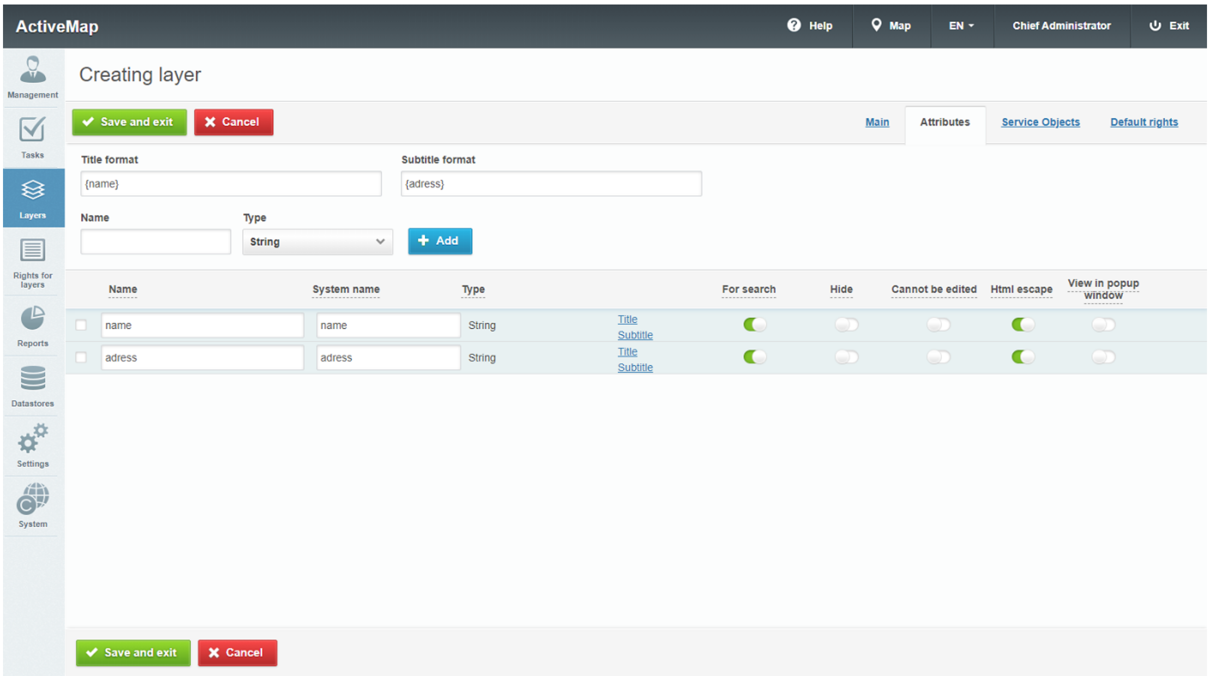


Fig. 2.71: Adding layer attribute data

The program allows to add a field to the layer to configure the display of objects of the same layer for users of different organizations and clusters. Objects of this layer will only be visible to the users of the organization (or cluster) specified in this field. To configure the display, you need to create a field with the data type "Organization connection" or "Cluster connection" (Fig. 2.72). The layer can have only one link field (either with an organization or with a cluster), when you try to create a second link field, the system will display a message: "The system attribute is already presented in the layer".

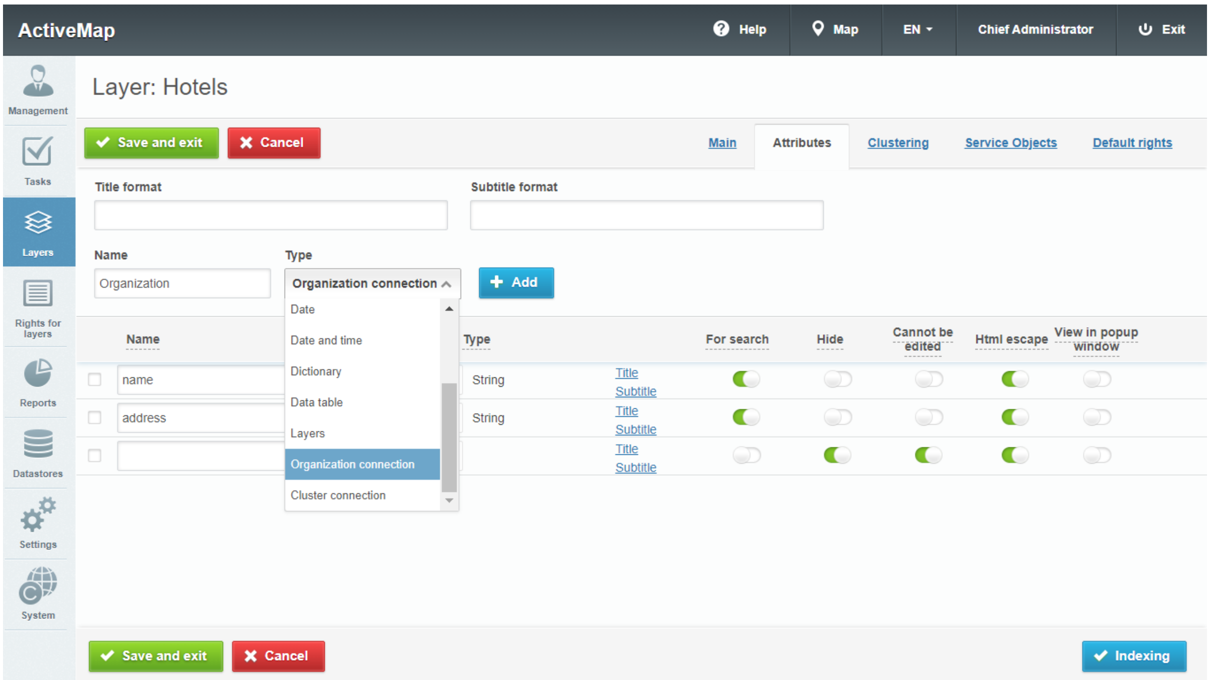


Fig. 2.72: Creating a link to an organization

When creating a layer object with a link field to an organization or cluster, you can select the desired option from the drop-down list (Fig. 2.73).

Users with "Administrator" and "Chief Inspector" roles can leave the system filter field empty when creating an object, and the object will be available to all users. For other users, the field is filled by default with the name of the main organization or main cluster of the user, and the object is only accessible to users of this organization or cluster.

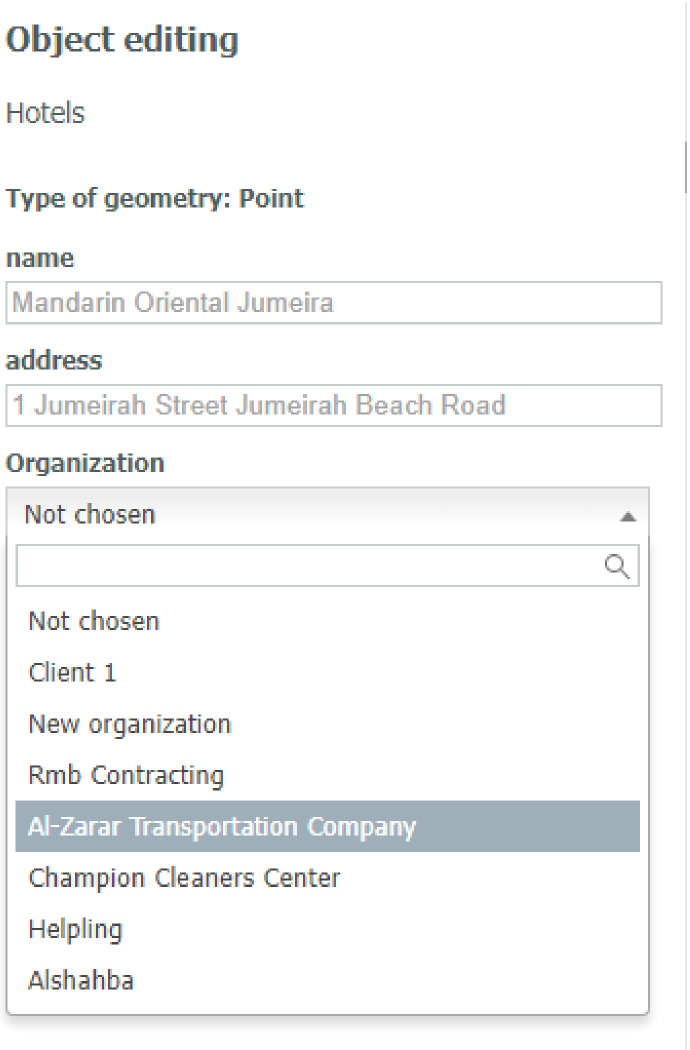


Fig. 2.73: Filling in a link field to an organization when creating an object

To facilitate the process of filling the created attribute fields, as well as to filter objects on the map by attribute values, you can set the link to a reference table, to a data table or other thematic layers. To do this, create a table in the "Tables" tab of the "Layers" block (*"Tables" tab* (page 81)) and select "Reference table (dictionary)" or "Data Table" as the field type of the current layer. To link to a thematic layer, select the "Layers" type and select the thematic layer. After that, a drop-down list with the names of available tables (Fig. 2.74) will appear to the right of the field type. After selecting a particular table, you will have to specify a "Value Field" with a data type of "integer" (the source field for the link) and a "Name Field" (the field that stores the names of the elements).

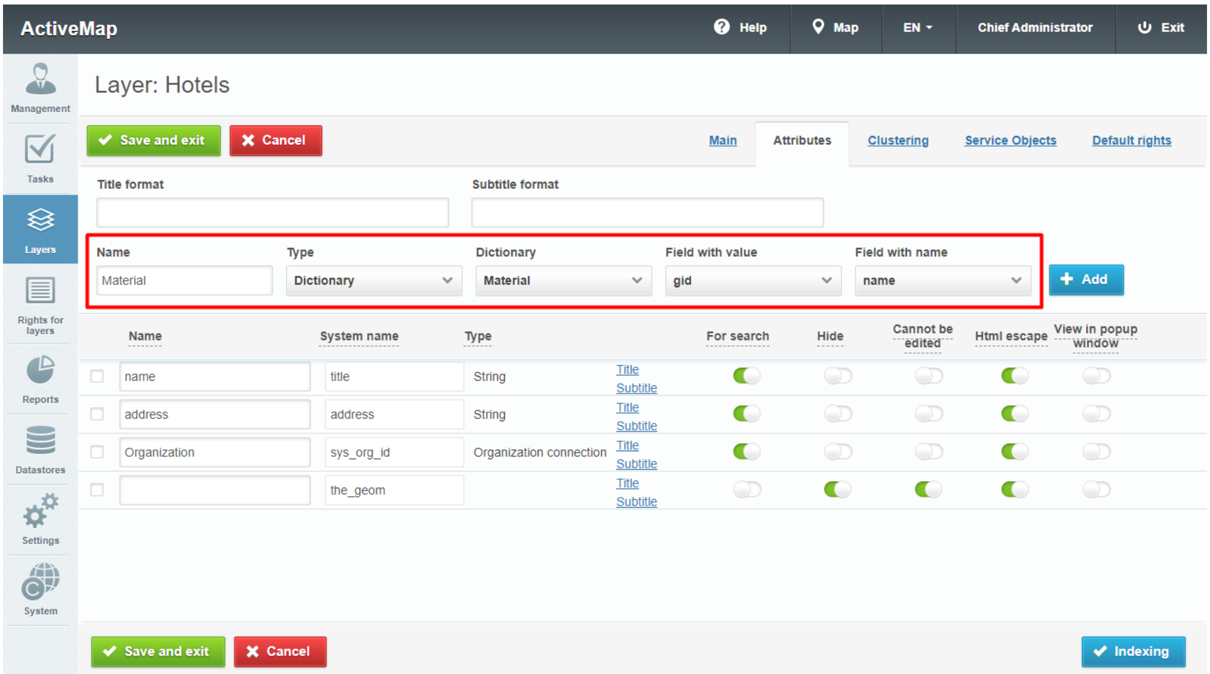


Fig. 2.74: Attaching a refrence table to the layer field

After attaching a reference or data table (Fig. 2.75) it will be possible to select one of the values from the drop-down list instead of entering an attribute value when creating new layer objects and when filtering.

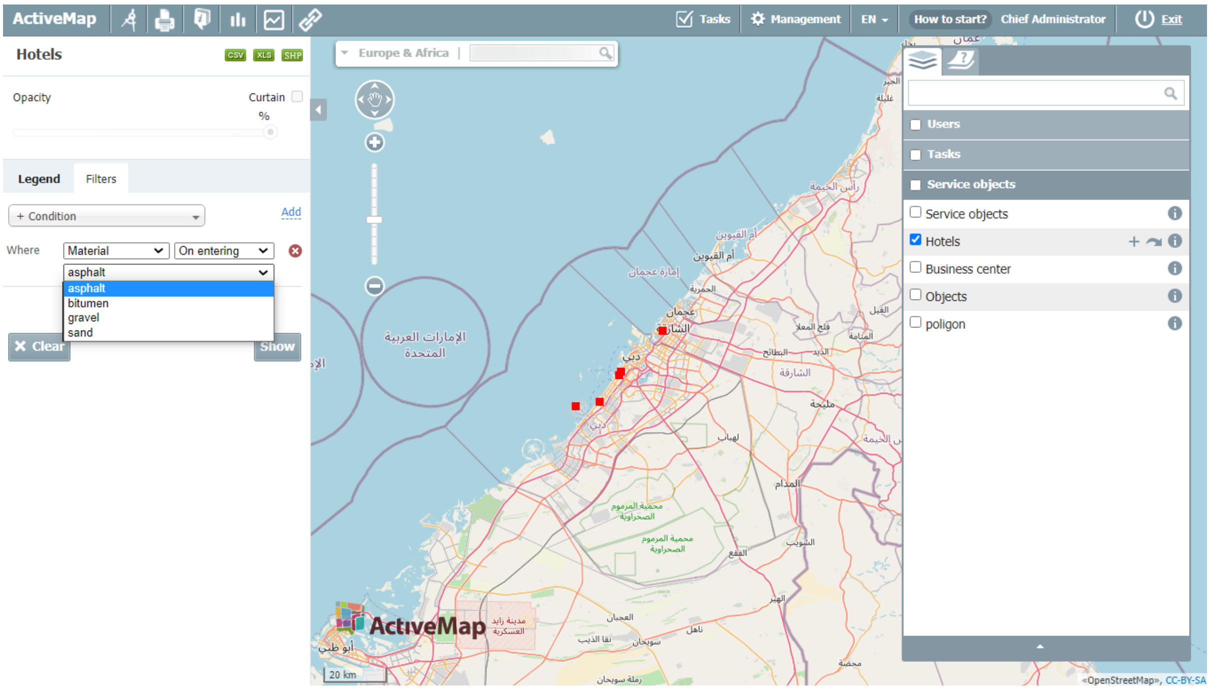


Fig. 2.75: Using reference table to filter layer objects

"Service Objects" tab

Service objects are layers containing objects of interest of the user organization, which are related to its activities. In this tab you can set the mapping between the fields of this layer and the fields of tasks that will be created based on the service objects. This means that when creating tasks with a link to service objects, all or part of the task fields will be automatically filled with data about this service object. The mapping determines which fields it will be.

You can define a layer as a service layer in the "Rights for layers" block (for more details, see *"Rights for layers" block* (page 97)). Depending on the settings in the "Rights for layers" block, some users can use the layer as a service layer, while others can use it as a regular layer.

To configure service objects, you need to enable the corresponding toggle switch, then select an attribute for the name of the service object from the layer fields and click . The name format will display its mask. The name can consist of several attributes - to do this, create a corresponding mask by adding new attributes.

To set the mapping of service layer attributes and task fields, click **+ Add a match**, select the layer attribute and the task field from the drop-down lists. To delete the mapping, click the button  next to the mapping. The attribute format can include several layer fields. You can also add an explanation to this line to better understand the information in tasks.

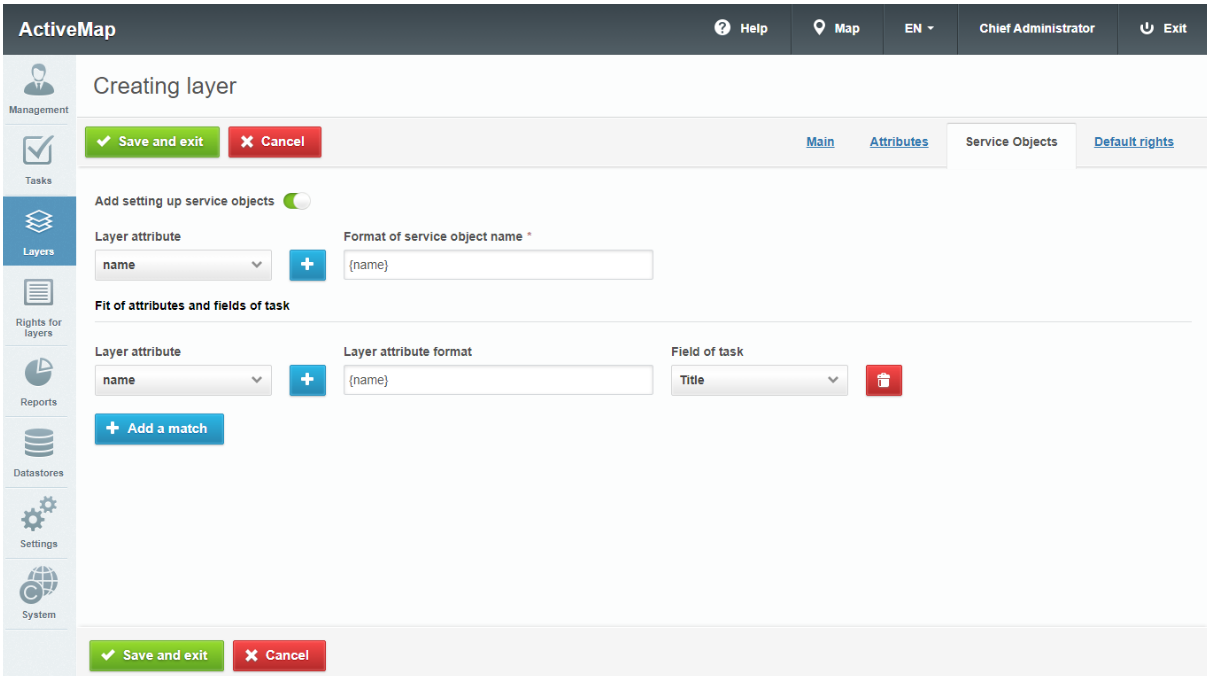


Fig. 2.76: "Service objects" tab

"Default rights" tab

In this tab you can set the default rights for viewing/editing/managing, as well as set the rights for using the layer as a layer with service objects. In order to set the rights, select the options from the drop-down lists:

- "All Roles" - rights will be granted to all roles;
- "Roles" - select roles, for which you want to set up permissions;
- "Multiple organizations" - selection of either all client organizations or all non-client organizations, or all regardless of this criterion;
- "Organization" - selecting the organization for which the rights will be set up.

After selecting the parameters, click 

. A new row appears in the table below where you should set the necessary rights using the "Service Objects", "View", "Edit", "Manage" toggle switches (you can find more details about the rights in the section *"Rights for layers" block* (page 97)).

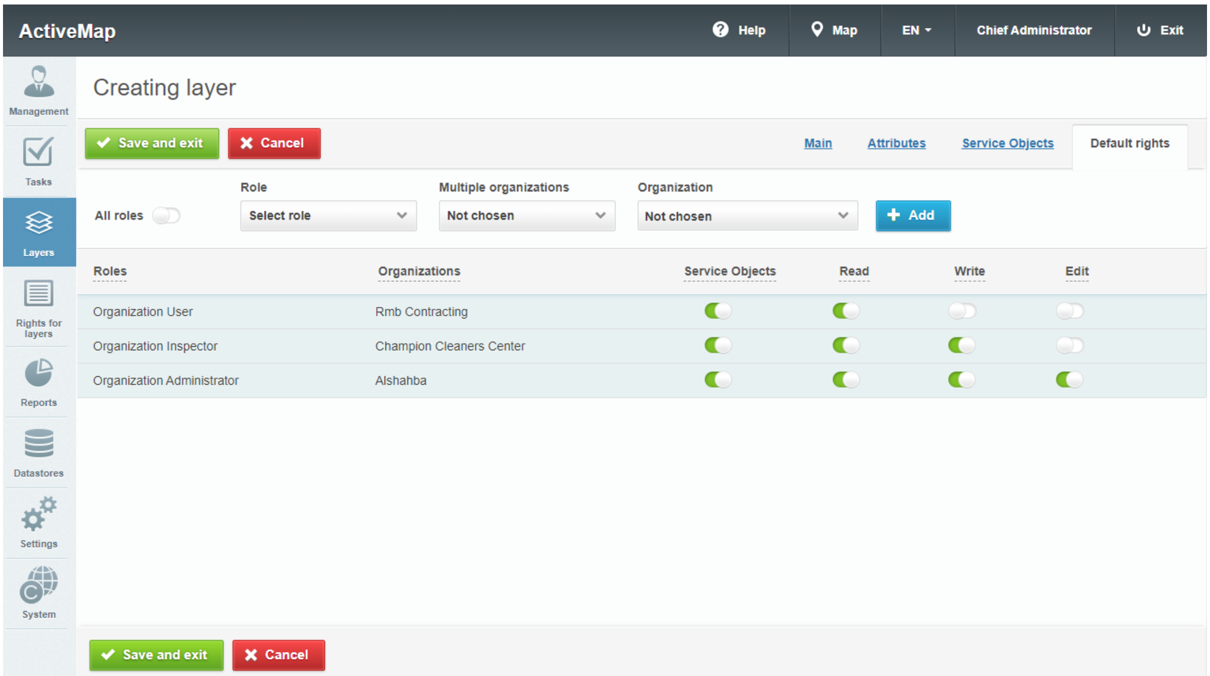


Fig. 2.77: "Default rights" tab

Editing layer information

To change layer information, click  or double-click on the row with the name of the selected layer. After that, a form (similar to the add form) will open in the administration area where you can fill in/change the fields of the layer (Fig. 2.78).

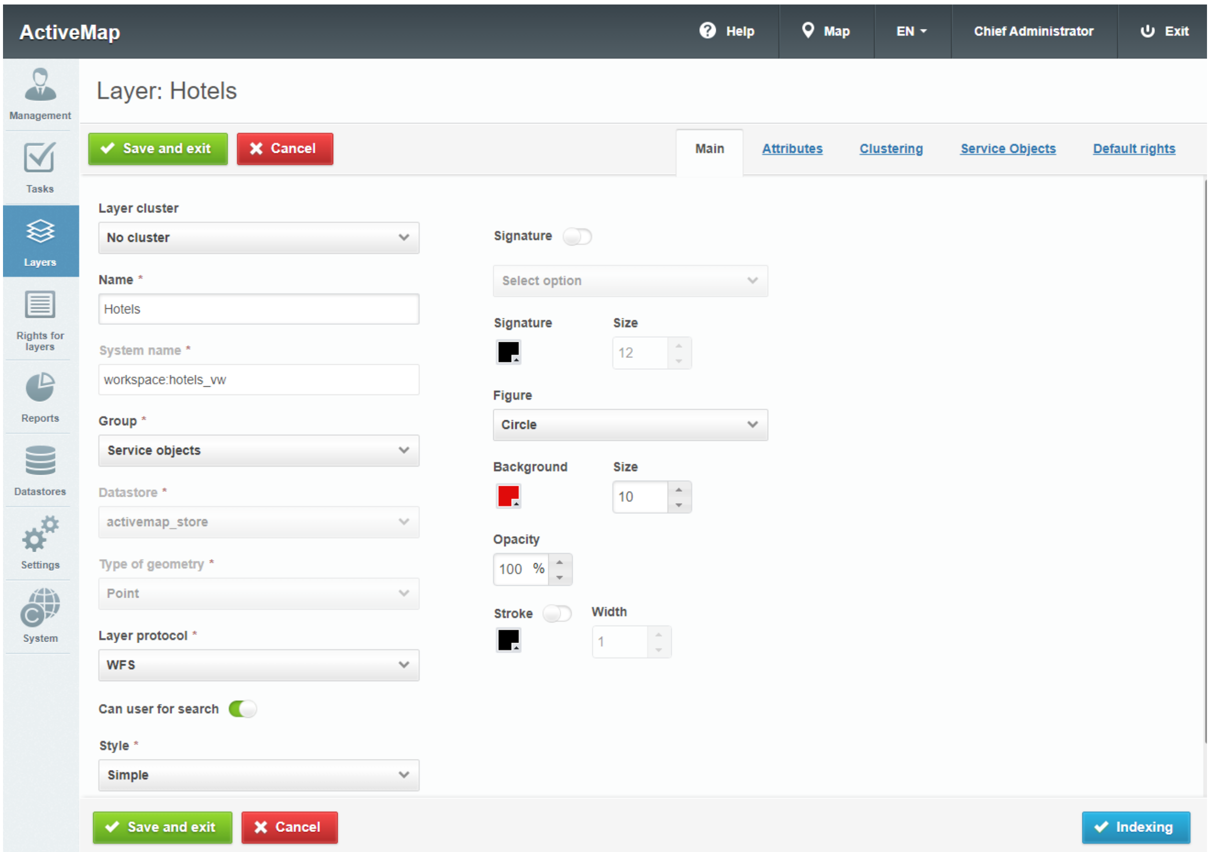
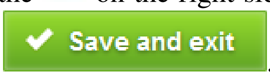


Fig. 2.78: Editing layer information

When you change cluster membership, users in the new cluster will automatically be granted rights to the layer, configured by default. Users in the previous cluster will retain their rights to the layer and can edit them if necessary.

In the editing window, the "Index" button 

becomes available to the administrator. Clicking it will cause a full update of the information about the selected layer. The administrator can use this button if new information has been added and is temporarily absent in the search results.

To change information about layer attributes, switch to the "Attributes" tab in the layer editing window. Here you can delete an attribute by clicking on the  on the right side of the line. To save the changes made, click 

. To cancel editing the layer, click

.

When editing a point layer (i.e., a layer with the "Point" geometry type), the "Clustering" tab appears in the administration area in addition to the "Main" and "Attributes" tabs.

Clustering is the display of a group of point layer objects located nearby with a single mark on the map. Clustering is possible only for point layers with WFS display method. The amount of objects grouped into a cluster is displayed as a number. The proximity of objects to be included in the cluster is calculated based on the scale.

When you switch to the "Clustering" tab in the editing window, a form opens where you can enable clustering, set the maximum zoom level and create a new cluster (Fig. 2.79). Here there are graphs with the following headers: object count, icon and label color.

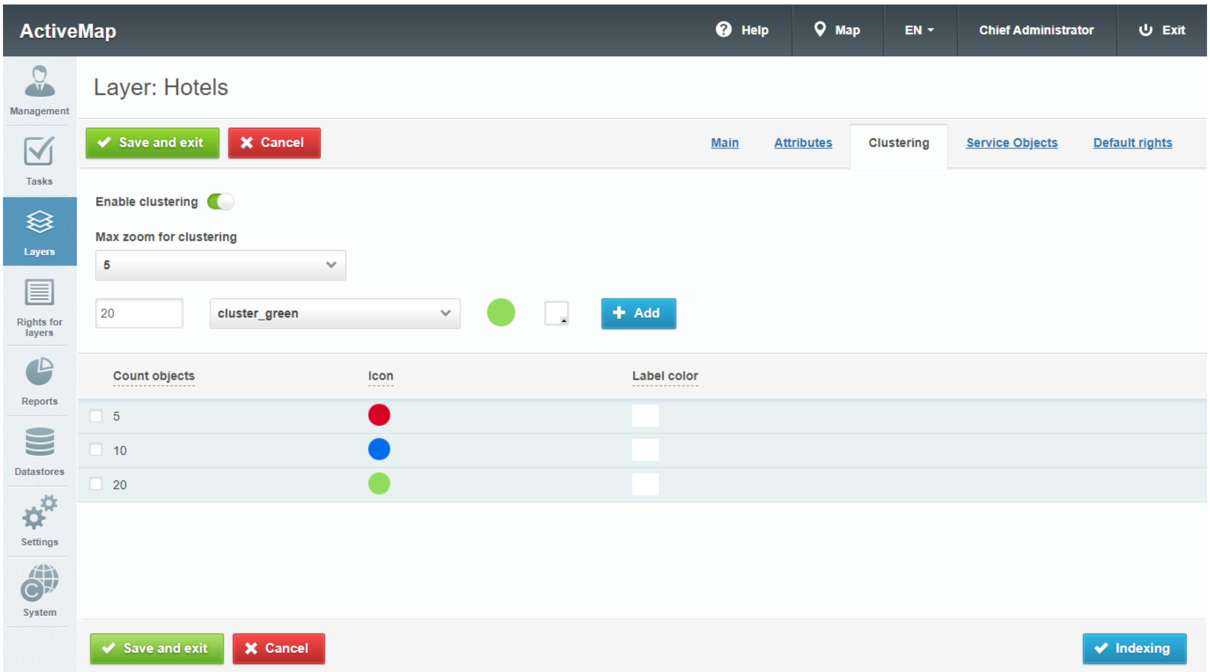


Fig. 2.79: Layer clustering settings

To add a new cluster, specify in the input field the number of objects contained in this cluster, select the image displayed on the map, set the label color and click 

.

The column "Object Count" shows the range of the number of objects that corresponds to a specific cluster. If the number 5 is next to the first cluster, 10 is next to the second, and 15 is next to the third (as shown in Fig. 2.79), it means that up to 5 objects fall into the first cluster, from 6 to 10 in the second, and from 11 to 15 in the third. If the third cluster with 15 objects is the last in the list, then there will be no finite number of objects for it.

The "Icon" column stores cluster images that become available when viewing the map. The “Label color” column displays the color used for the caption on the map.

Layer deletion

To delete a layer, click on the right side of the layer row. To delete multiple layers at once, check the corresponding rows and click the button at the bottom of the screen. The delete confirmation window will appear with a choice of layer deletion modes: “Delete from geoportal”, “Delete from geoserver” and “Delete from database” (Fig. 2.80). You can choose multiple options. To completely delete a layer, you need to select all 3 items. To confirm the deletion, click , to cancel - .

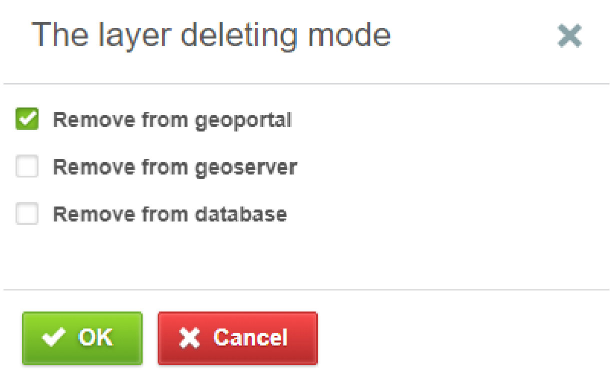


Fig. 2.80: Layer deletion confirmation

Layer Search

In the “Layers” tab, the administrator can work with the search bar and filters. There are filters by group, geometry type, layer type (raster/vector), service objects and clusters.

For example, when choosing the filter “By geometry type”, a form will appear where you need to select one of the types (point, line or polygon) from the drop-down list to filter out layers. After that, layers with the selected geometry type will be displayed in the administration area.

To clear the filtering results, click “Clear all”.

Layer loading

To import a layer into the system, you need to click the 

button located at the top of the "Layers" tab. A pop-up window will appear, through which the user can choose a layer from computer. Archived shape-layers in zip format, as well as GeoTIFF files, are allowed for uploading. It is desirable to compress (lzw) the geotiff file and build pyramids for it. This can be done using the tools of the GDAL library (https://gdal.org/).

The stages of layer loading are displayed in the information window (Fig. 2.81).

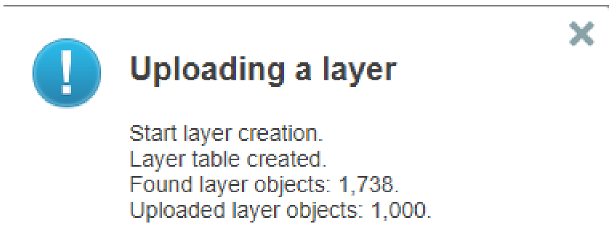


Fig. 2.81: Displaying layer loading stages

After loading, the same window will open as when creating a layer. The geometry type and layer display protocol will be automatically determined, while the remaining fields need to be filled in. Meanwhile, attributes (if any) are also set automatically. In addition, the user can independently select a data storage from the presented list in the "Main" tab.

"Tables" tab

The "Tables" tab contains information about the system's tables and dictionaries (refrence tables).

Refrence tables and associated tables are used to solve the following tasks:

- Simplification of the process of filling attribute fields when working with objects (when connecting a refrence table or table with data, users will be able to select the value of the attribute field from the suggested variants, rather than entering it manually);
- Filtering layer objects on the map;
- Creation of thematic maps based on refrence tables;
- Applying style according to the refrence table.

When switching to the “Tables” tab, a table with the following columns becomes available (Fig. 2.82):

- “Title” - name of the table in interface.
- “name in DB” - name of the table in database (consisting of the letters of the Latin alphabet, by default, transliteration of the “Title” field).
- “Table type” (“Data table” or Dictionary (“Reference table”)).
- “Cluster of organization” - name of the organization cluster to which the table will belong.

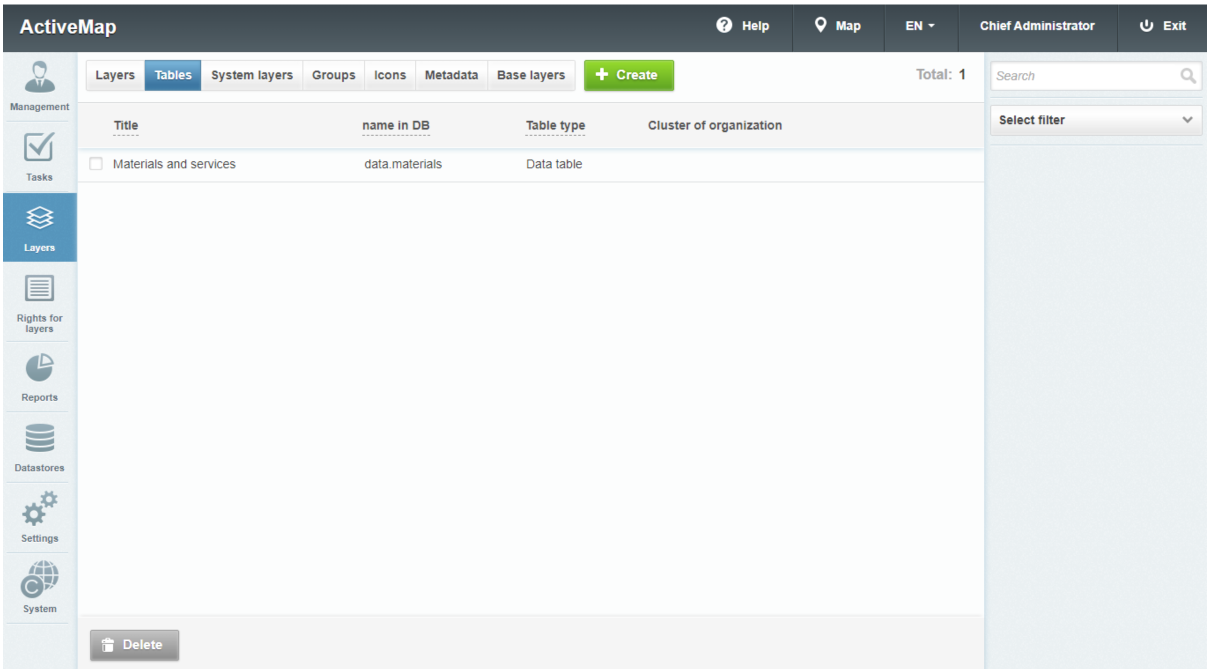


Fig. 2.82: “Tables” tab

To add a new table, click 

at the top of the window. The “Main” tab will appear, similar to the layer creation form (Fig. 2.83).

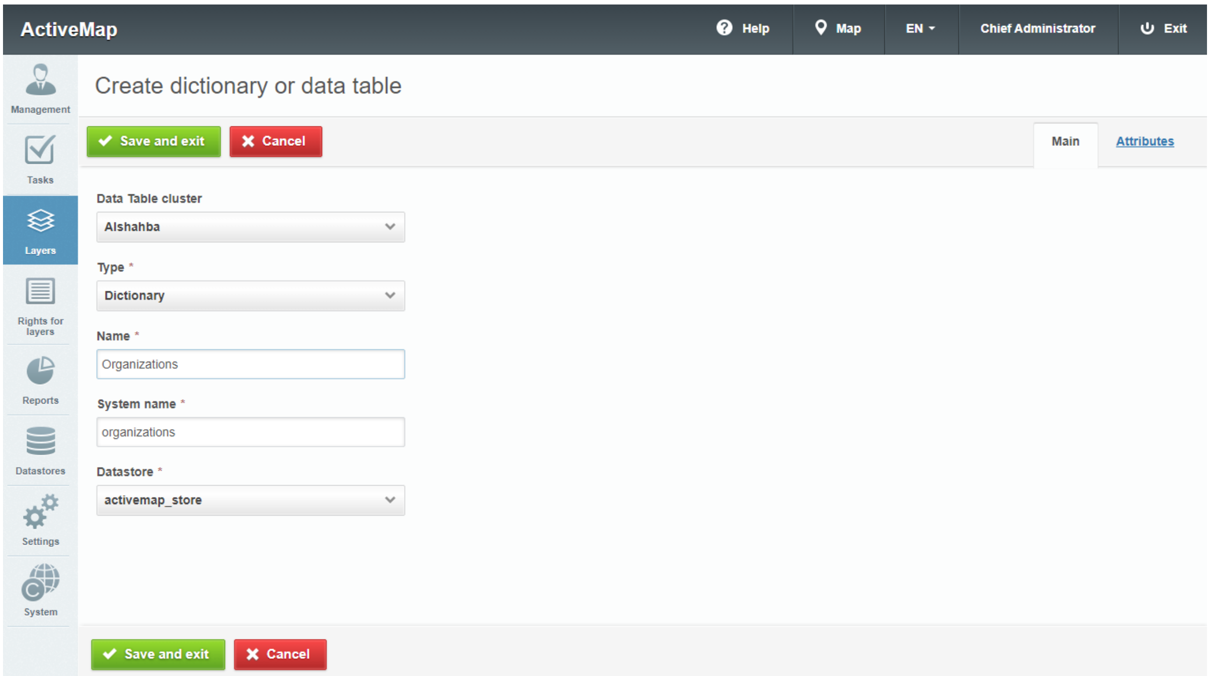


Fig. 2.83: Creating a table

You need to fill in the following fields here:

- “Data table cluster” - belonging to the cluster of organizations. Cluster selection is available when creating a table under the Chief Administrator role. When creating a table under the Cluster Administrator’s role, the cluster belonging will be determined automatically.
- “Type” - type of the table (reference table (dictionary) or data table).
- “Name” - name of the table in interface.
- “System name” - name of the table in database, consisting of the letters of the Latin alphabet, without spaces and special characters. It is formed automatically when entering information in the “Name” field. If a non-latin title is entered in the “Name” field, the transliteration is used. If you are not satisfied with the received name, you can enter your own variant in this field. Automatic entry will not work if you fill in the “System name” first, and then the usual “Name”. Unlike the name, the system name cannot be edited after the table is created.
- “Datastore” - the database in which the table will be stored.

To set the attribute fields, switch to the “Attributes” tab. To add a new field, enter the name in the input field, select the attribute type and click on 

 (Fig. 2.84).

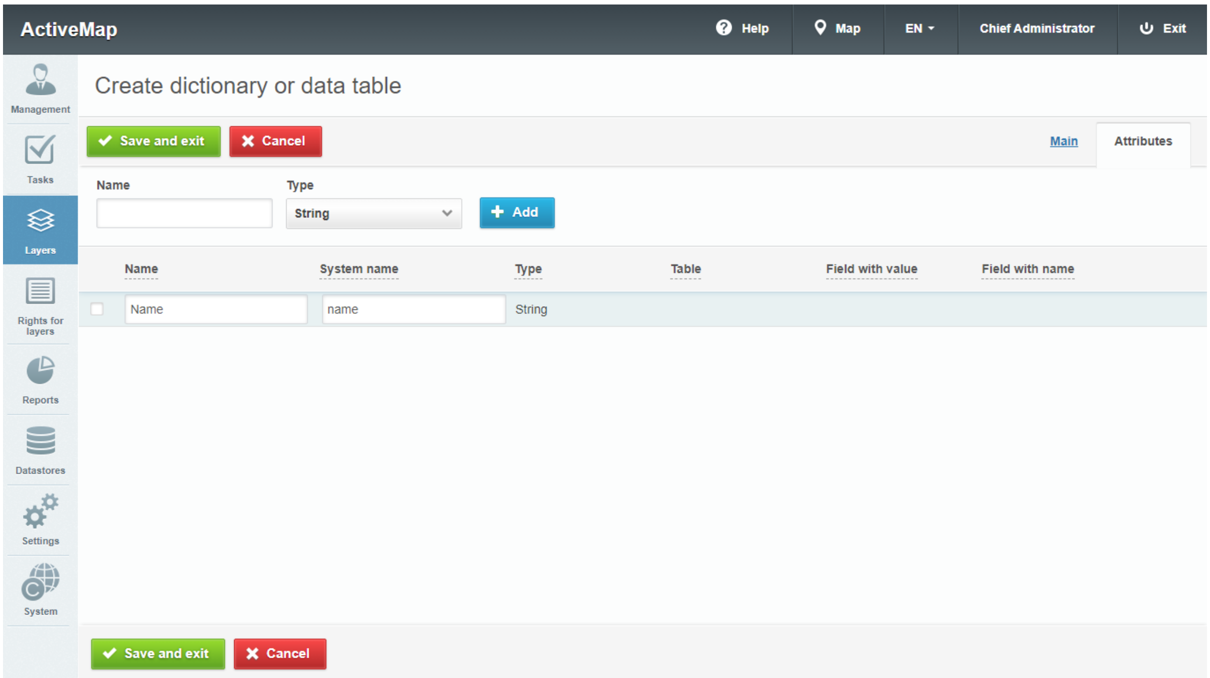
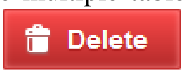


Fig. 2.84: Adding attribute data to a table

After entering all the necessary information, click 

.

To modify a table, click  on the right side of the corresponding line. A window similar to the table creation window will open where data can be changed and added. When changing the cluster membership, default permissions for the table will be automatically granted to the users of the new cluster. Permissions for the table for users of the previous cluster will be saved. They can be edited, if necessary.

To delete a table, click  on the right side of the corresponding line. To delete multiple tables at once, check the corresponding lines and click the 

button at the bottom of the screen. More details on deleting system elements can be found in section *Deleting an element* (page 26).

Reference tables

Refrence table (dictionary) is a table with data of a systematic form, designed to facilitate the user's actions when working with attribute information on objects.

To form a refrence table (dictionary), you have to create and fill in a table with the "Dictionary" data type with attribute fields, among which there must be a source field for linking with integer values ("id" or "gid") and a value field - an attribute field, in which the names of reference elements are stored (Fig. 2.85). Attaching a reference to a layer field is described in *Create a new layer* (page 67).

> **Attention:** Values in the source field for linking must be unique. Without this, it is impossible to attach the refrence table (dictionary) to another table.

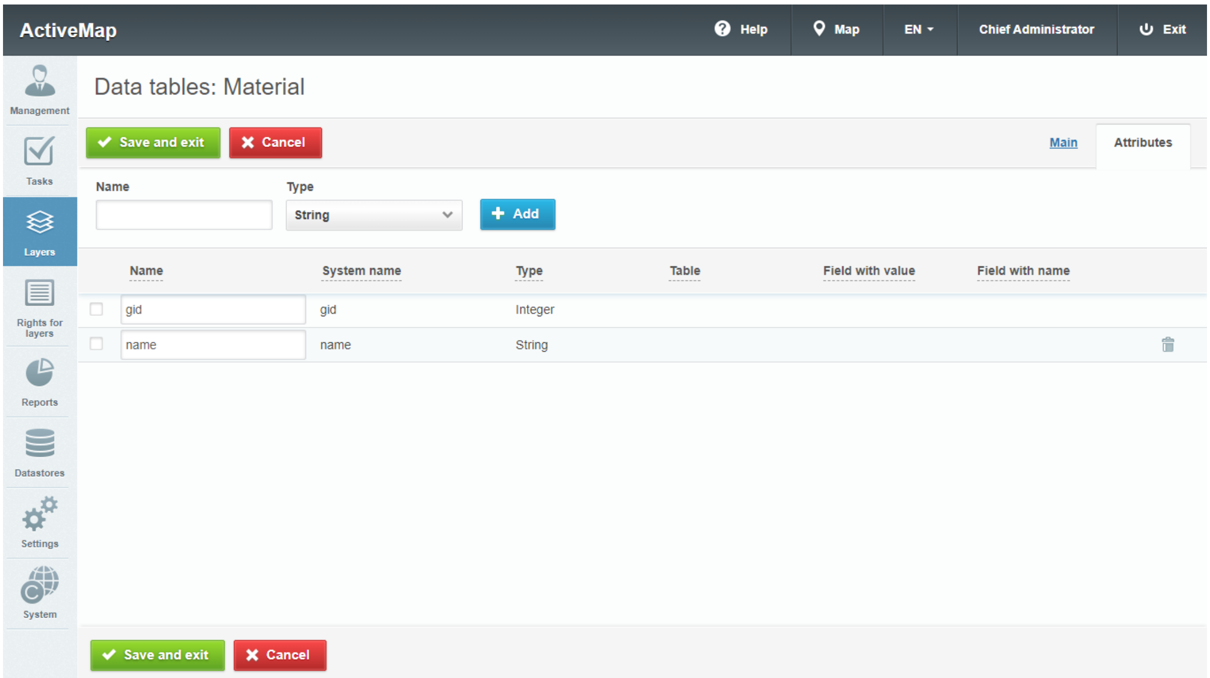


Fig. 2.85: Refrence table (dictionary) attributes

** Relationships between tables**

Objects of different tables can be logically related to each other. Tables are connected by a "one-to-many" relationship, which means the ability to link several objects of one table (child table) to one object of another table (parent table).

To create a "one-to-many" relationship, you need to add a link field (integer type) to the child table (Fig. 2.86) and set up the relationship with the parent table (described in *Create a new layer* (page 67)). The parent table must have a text field to describe its objects with the "String" type (Fig. 2.87). This field will be used when displaying values in the key field of child table objects.

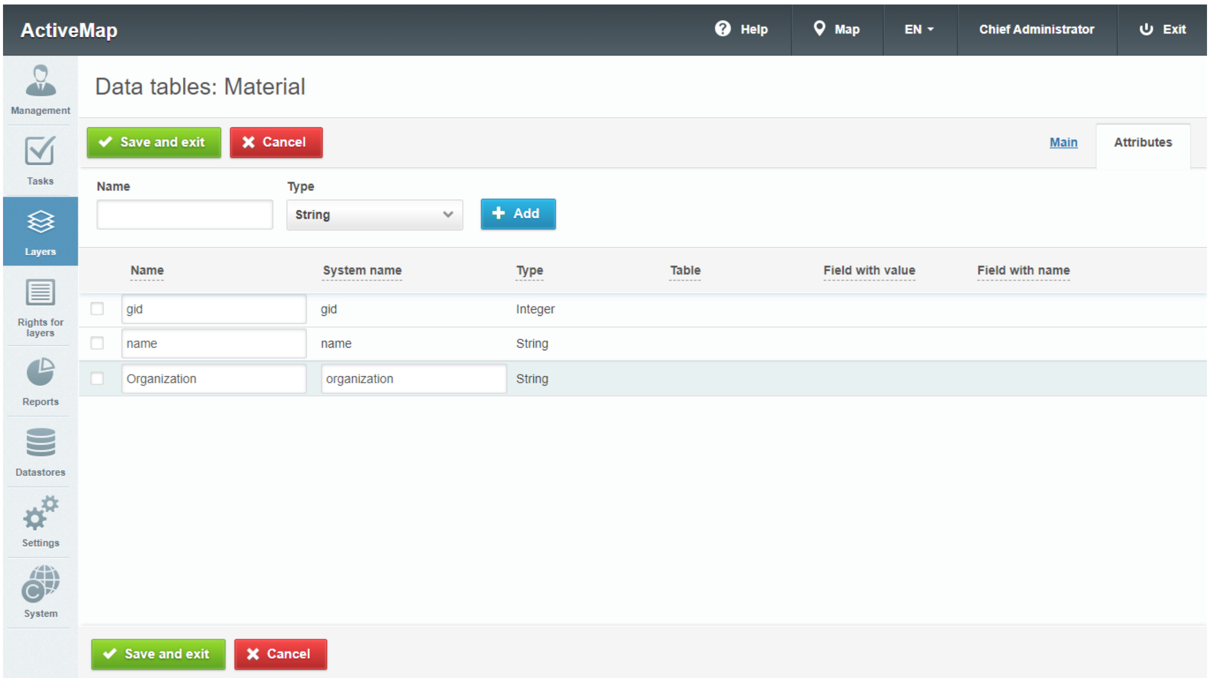


Fig. 2.86: Parent table attributes

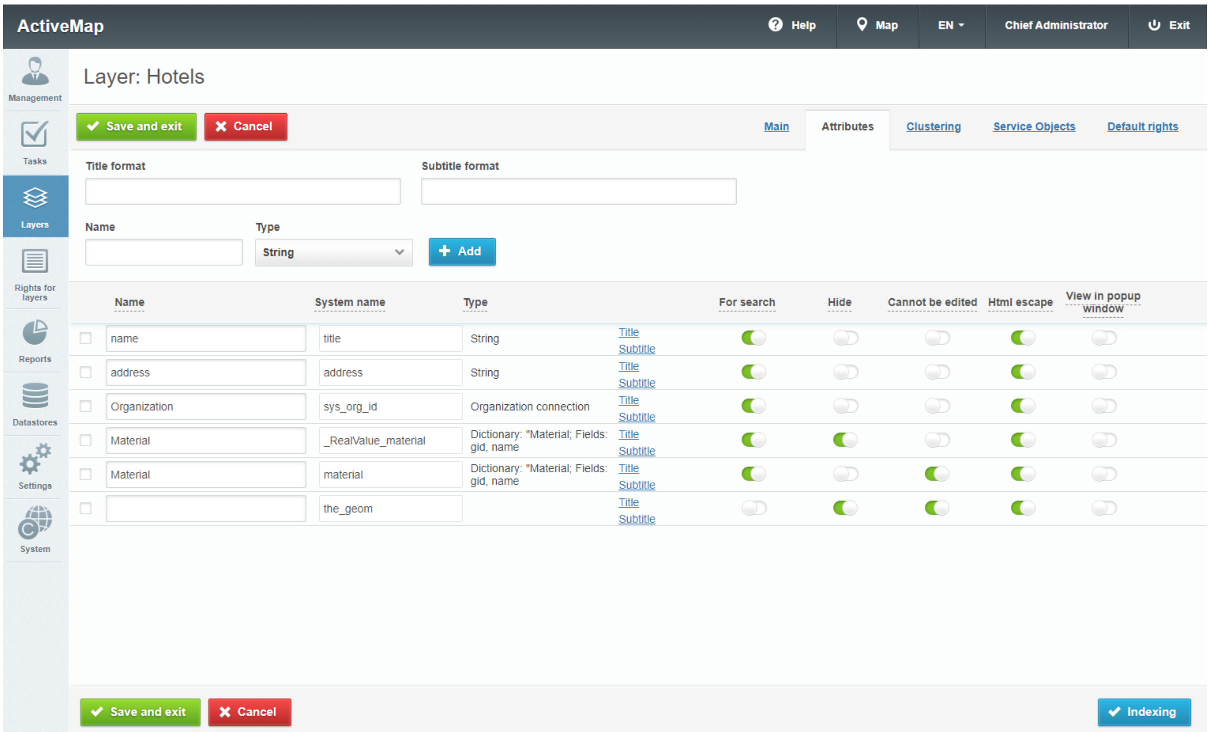


Fig. 2.87: Child table attributes

2.3.3.3.2 “System layers” tab

The “System Layers” tab displays system-created layers (Fig. 2.88). Usually, there is only one layer - “Users”. Geographic data for it is taken from the coordinates of ActiveMap system mobile application users. The style for this layer is set programmatically.

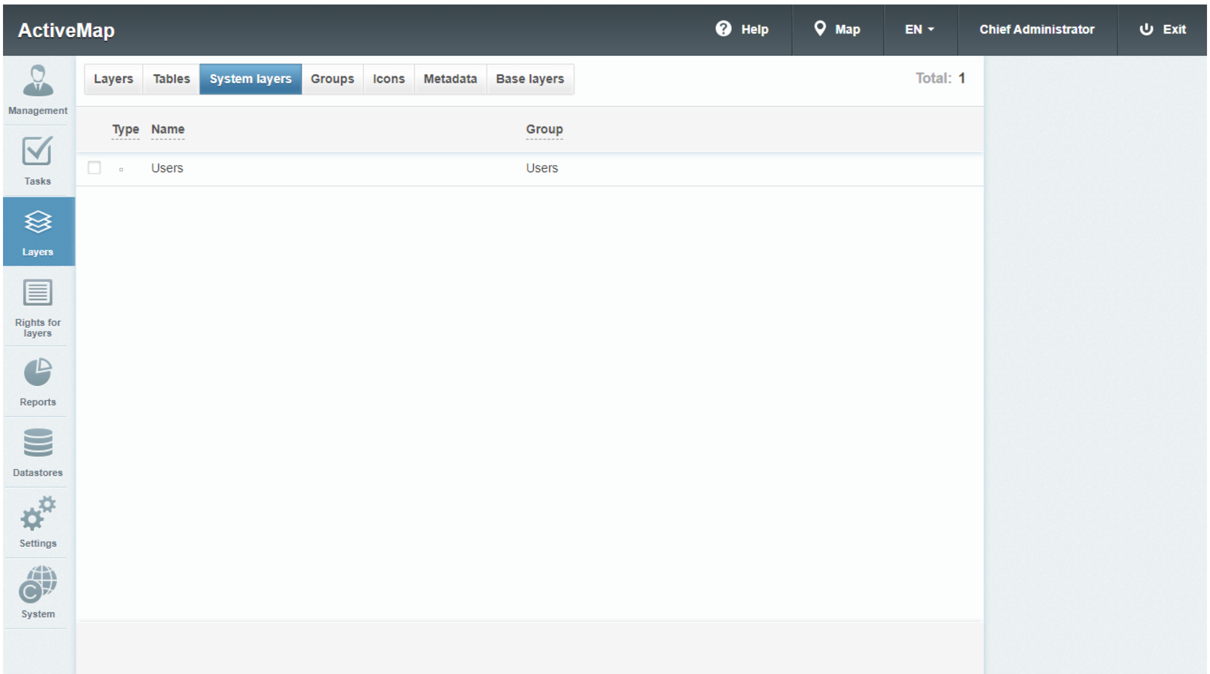


Fig. 2.88: “System layers” tab

Only the Chief Administrator can edit the “Users” system layer. Other roles, if they have rights to this layer, can only grant permissions to other users within their cluster or organization.

The Chief Administrator can set a custom color palette and layer legend elements for the system layer, as well as define default permissions. To do this, press  on the right side of the layer row or double-click on the row. The “Main” tab will open, similar to the form for creating a regular layer, except for the possibility of adding attribute fields.

Users in this layer are divided into groups based on the activity interval - the time when the system last received their coordinates. Users in these groups have their own icon color.

The Chief Administrator can configure the following fields of the system layer (Fig. 2.89):

- “Name” - the name of the layer.
- “Group” - the group of layers in which the system layer is located.
- “Activity intervals of the last coordinates transmitted by users” - here you can set the appropriate time intervals. By default, they are divided into three intervals:

- Active - coordinates received no later than 15 minutes ago (green color);
- More than 15 minutes ago - coordinates received from 15 to 60 minutes ago (yellow icon);
- More than an hour - coordinates received more than an hour ago (red icon).

- "Group name for users outside of defined intervals" - for the users whose coordinates were last transmitted before the latest time interval (by default, before a day).
- "Group name for users with no information about their location" - name for users whose geolocation is disabled.

You can set own color for each parameter.

You can also set your own activity intervals. To delete an existing interval, press  to the right of the interval. To create a new interval, press the "Add interval" button at the bottom of the window, fill in the field "Name of interval in the interface" and set the time interval and color of the icon.

After all the changes have been made, click the 

button .

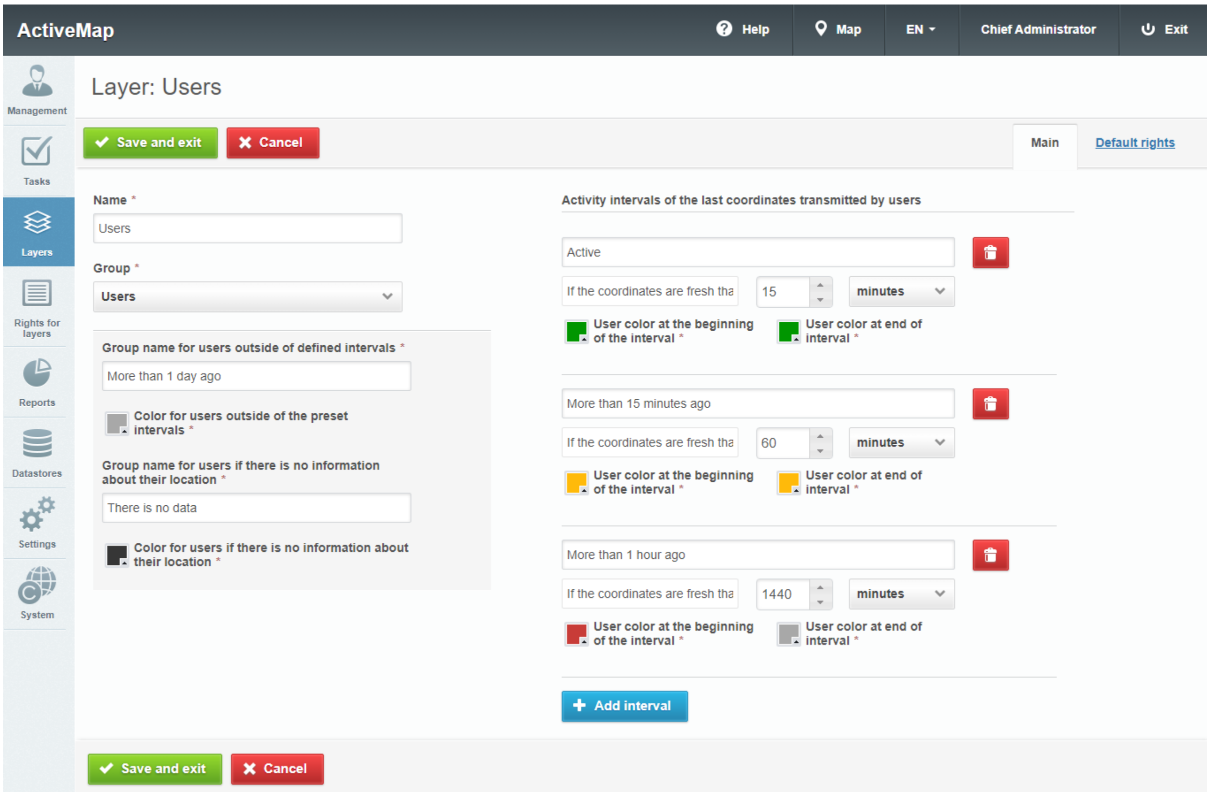


Fig. 2.89: Editing the display of the "Users" system layer

In the "Default rights" tab you can set the rights to view/edit/manage, as well as to use the layer as a layer with service objects for different user roles in different organizations (Fig. 2.90).

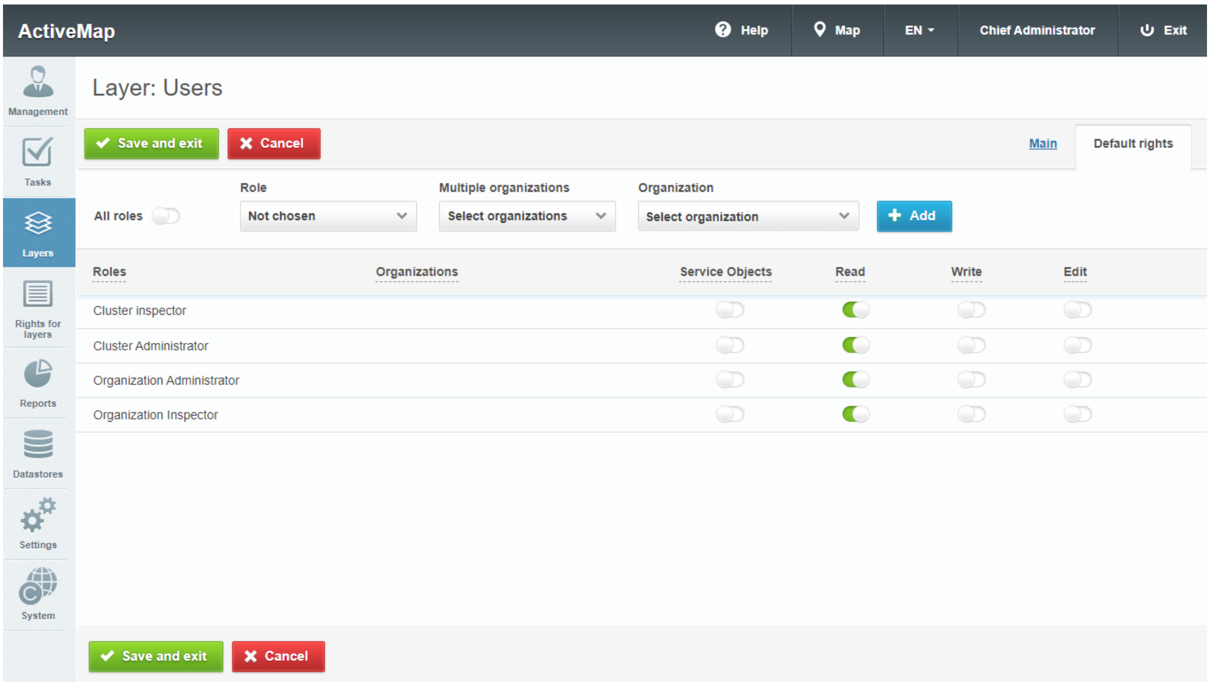


Fig. 2.90: The “Default Rights” tab for the “Users” layer

2.3.3.3.3 “Groups” tab

Groups are needed to combine layers by thematic or other defined criteria. When you switch to the “Groups” tab in the administration area, a table appears with the following headings (Fig. 2.91):

- “Ordinal number” - place in the list of layer groups on the main page of ActiveMap Web, occupied by the group;
- “System group” - whether the group is system (by default, the system group is the “User Monitoring” group containing system layers);
- “Name” - name of the group;
- “Cluster of organizations” - belonging of the group to the cluster of organizations;
- “Layers” - number of layers in the group.

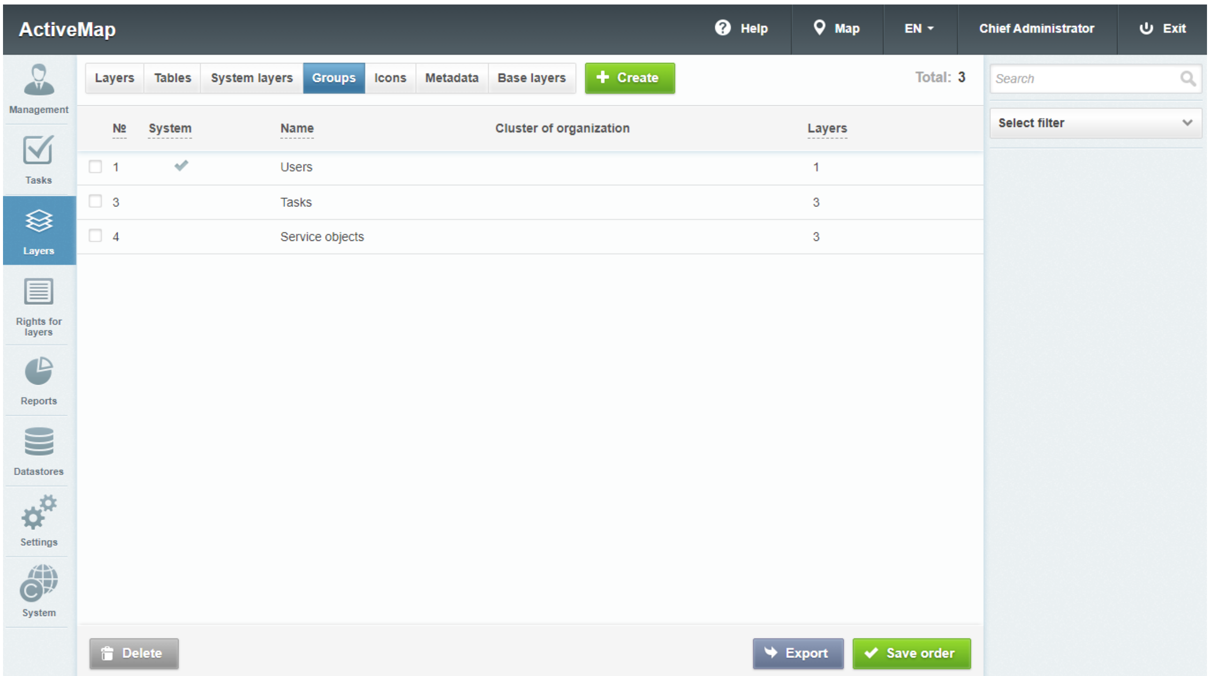


Fig. 2.91: "Groups" tab

In the "Groups" tab, the administrator has access to the "Save order" button . It is used when it is necessary to sort groups alphabetically (or in ascending/descending order of layers) and save the resulting order in the system. Clicking the button automatically changes the sequential numbers (in the "No." column) for the sorted groups.

To rearrange groups, you need to click on a certain group with the left mouse button and, without releasing the button, move it to the desired line and click . When switching to the "Groups" tab, the administrator can use the search bar, as well as tools for creating new groups and editing/deleting existing ones.

Also in the "Groups" tab, you can save information about groups to your computer. To do this, click the  button and select a directory to save the Excel file. This file will contain a table with the names of groups and the number of layers in each group.

Adding a new group

To add a new group to the system, click 

at the top of the window. A form will open in which the user can enter the name of the new group.

Editing a group

When editing a group in the administrative area, a new window opens with the following tabs: "Main" and "Layers". In the "Main" tab the administrator can edit name of the group. When switching to the "Layers" tab, the administrator can view information about the layers belonging to the group (sequential number, name and system name).

To swap layers, simply click on a layer name with the left mouse button and without releasing the button, move the layer to the desired row.

Deleting a group

To delete a group, click  on the right side of the corresponding row. To delete several groups at once, select the corresponding rows with checkboxes and click the 

button at the bottom of the screen. For more information about deleting system elements, see the section *Deleting an element* (page 26).

Searching group

When switching to the "Groups" tab, the administrator can use the search bar to search for groups by their name.

2.3.3.3.4 "Icons" tab

When switching to the "Icons" tab, you can see a table with the following columns: icon and name (Fig. 2.92). Icons can be used when creating styles, as well as when adding clustering to point layers (more details on clustering in the section *Editing layer information* (page 78)).

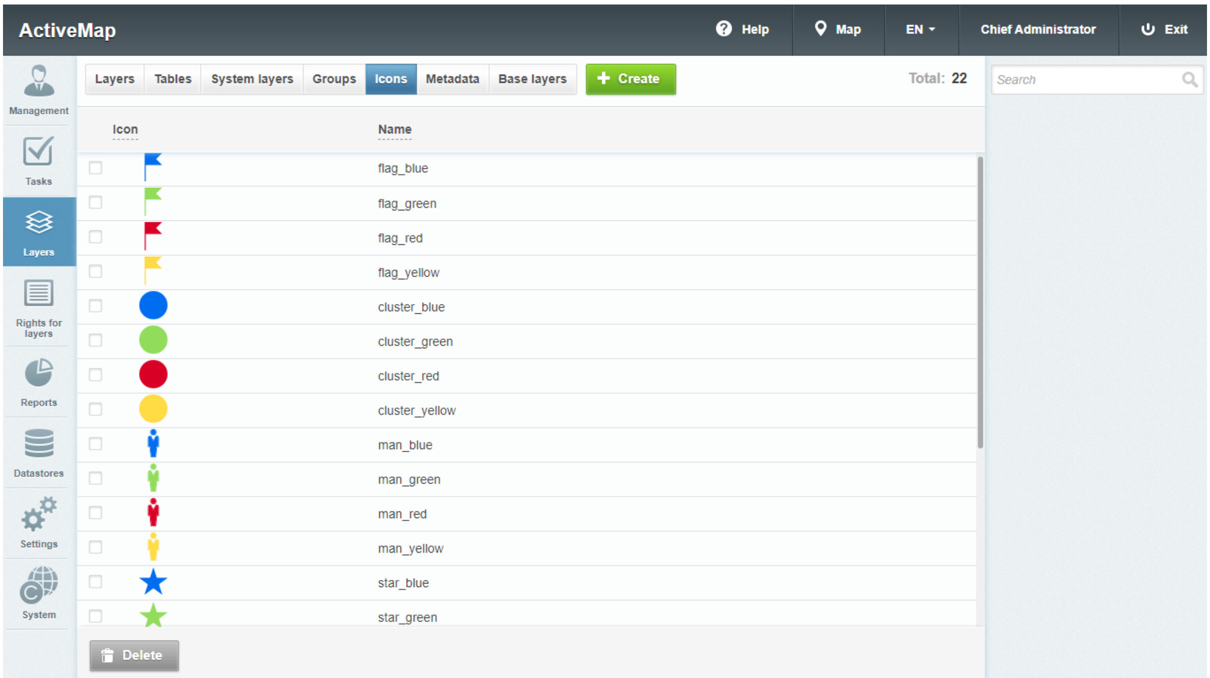


Fig. 2.92: “Icons” tab

In the “Icons” tab, there is a search bar, as well as tools for adding new icons and editing/deleting existing ones.

Adding icons

To add a new icon, click 

at the top of the window. A window will open where you need to enter the icon’s name and upload the image by clicking on the corresponding upload form.

Icon editing

When clicking on  (or double-clicking the row with the selected icon), a form opens in the administration window (with the same fields as the form for adding an icon) where you can fill/change the fields with information about the selected icon.

Deleting an icon

To delete an icon, click on the right side of the corresponding row. To delete multiple icons at once, select the corresponding rows with checkboxes and click the Delete button at the bottom of the screen. For more information about deleting system elements, see the section *Deleting an element* (page 26).

Search for an icon

The administrator can use the search bar to search for images by their names.

Getting a link

To get a link to an icon, hover over it, right-click, and select "Copy image URL" or "Copy link to image" depending on the browser used. The obtained link can be used when creating an advanced layer style with icons.

2.3.3.3.5 "Metadata" tab

In the "Metadata" tab, the administrator can view the custom fields that are displayed in the "Additional" tab when creating or editing a layer, as well as in the information window in the client part of the site. When switching to the "Metadata" tab, the administrator is provided with a table with the following columns:

- "Name" – name of the custom field;
- "Field type" – input data type (string, integer, fraction, list, condition, date);
- "Default value" - data that is initially specified in additional field;
- "Mandatory" – mandatory flag for filling in this field;
- "Visible" - the flag for displaying the field in the "Metadata" tab when creating or editing a layer, as well as in the information window in the client side of the site.

In the "Fields" tab, the administrator has access to a search bar as well as tools for adding new fields and editing/removing existing ones.

Adding layer metadata

In the “Metadata” tab, the administrator can add a new field for entering additional information about the created layer. To do this, click on 

at the top of the window. A field creation window will open, in which you should fill in the suggested fields (Fig. 2.93).

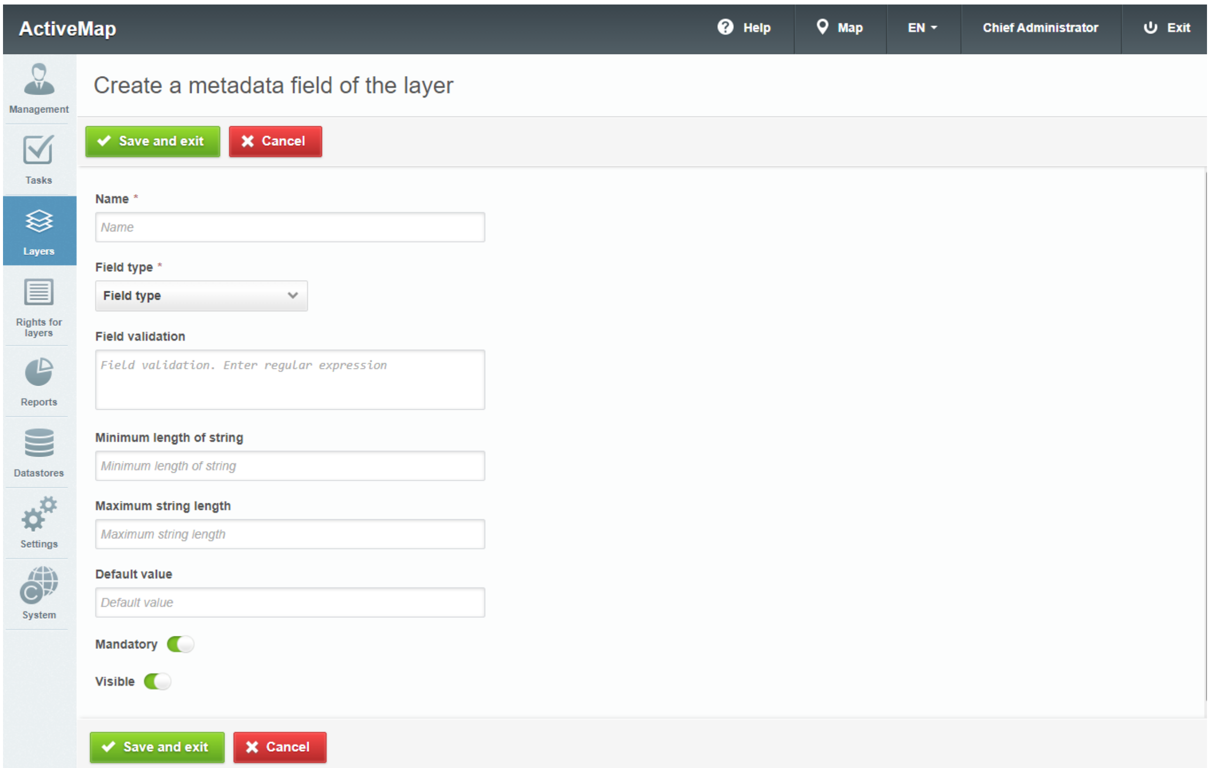


Fig. 2.93: Adding metadata

Editing layer metadata

To edit the information, click on  or double-click on the row with the name of the selected field. A form similar to the creation form will open, in which the administrator can modify the information about the additional fields of interest.

Deleting metadata

To delete a field, click on  in the right part of the corresponding row. To delete multiple fields at the same time, select the corresponding rows by checking their boxes and press the 

button at the bottom of the screen. For more detailed information about deleting system elements, see the section *Deleting an element* (page 26).

Metadata search

In the "Metadata" tab, the administrator can use the search bar to search for additional fields by their names. In addition, there is a filter located under the search bar, which can be used to search by criteria such as "Field Type", "Required Field" and "Visible".

2.3.3.3.6 "Base layers" tab

A base layer (basemap) is a layer that is the main or primary one in a particular map. Users visualize tasks, service objects, and thematic layers above the basemap, as well as use it for navigation through a map and getting general information about the area of interest. When switching to the "Base layers" tab, the administrator is provided with a table of basemaps with the following columns (Fig. 2.94):

- "Code" – an identifier automatically created by the system when adding a new basemap.
- "Name" – the title of the basemap displayed in the system.
- "Main" – the marked base map will be displayed when opening the ActiveMap Web start window, as well as on maps in the ActiveMap system's mobile applications and in task creation.
- "Space image" – the marked base map will be interpreted as a satellite image (raster image).

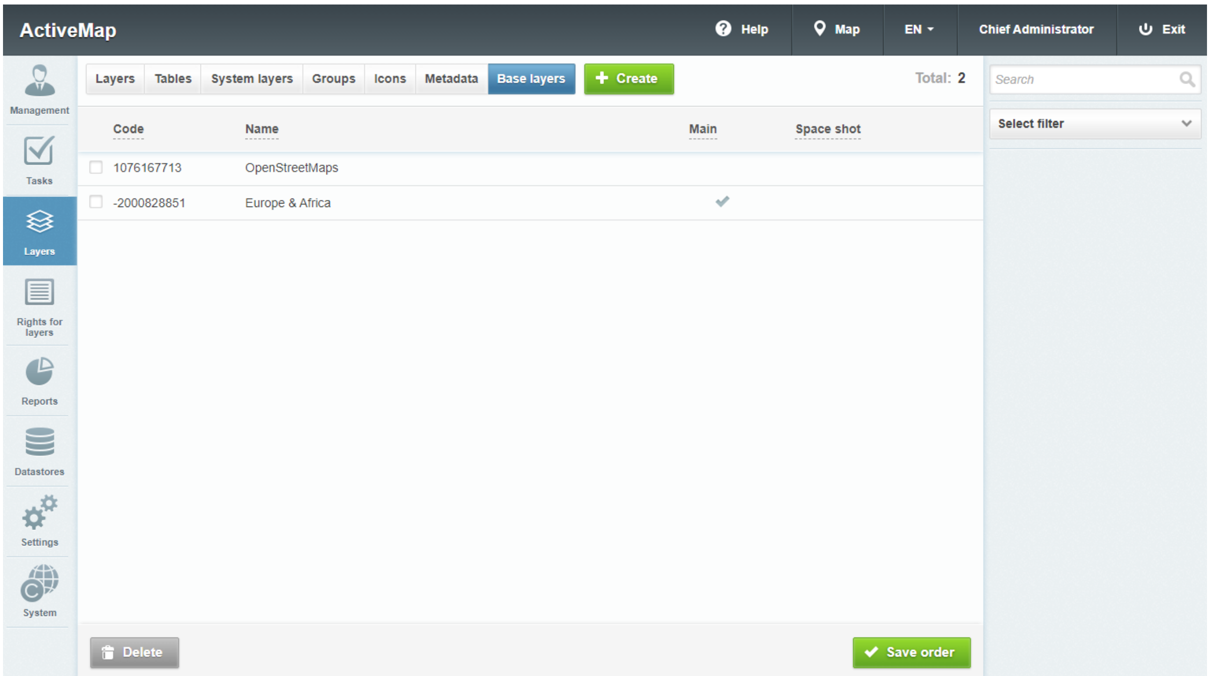


Fig. 2.94: "Base layers" tab

Adding a basemap

To add a new basemap, click on 

at the top of the window. A window will open where you have to fill the following fields (Fig. 2.95):

- "Name" – name of the basemap displayed in the system.
- "Main base layer" toggle switch - makes basemap the main one, i.e. it will be displayed when opening the start window of ActiveMap Web, as well as on maps in mobile applications of ActiveMap and when creating tasks.
- "Space image" toggle switch - marks the basemap as a satellite image.
- "Class name" – selects the class that defines the mechanism for accessing the basemap.
- "Url/key" – depending on the selected class, it may contain a link to access basemap data or access keys (API key) for rights-protected third-party organizations.
- "Options" - other map parameters (for example, copyright, possible display scales of the basemap, etc.). When listing multiple parameters separated by commas, they are enclosed in curly braces { }.
- "Custom class" - a map defined outside of existing map classes (for example, a combined map from several existing classes).

Examples of class names, keys and parameters can be found in the *3. Examples of baselayer settings and parameters* (page 130) section.

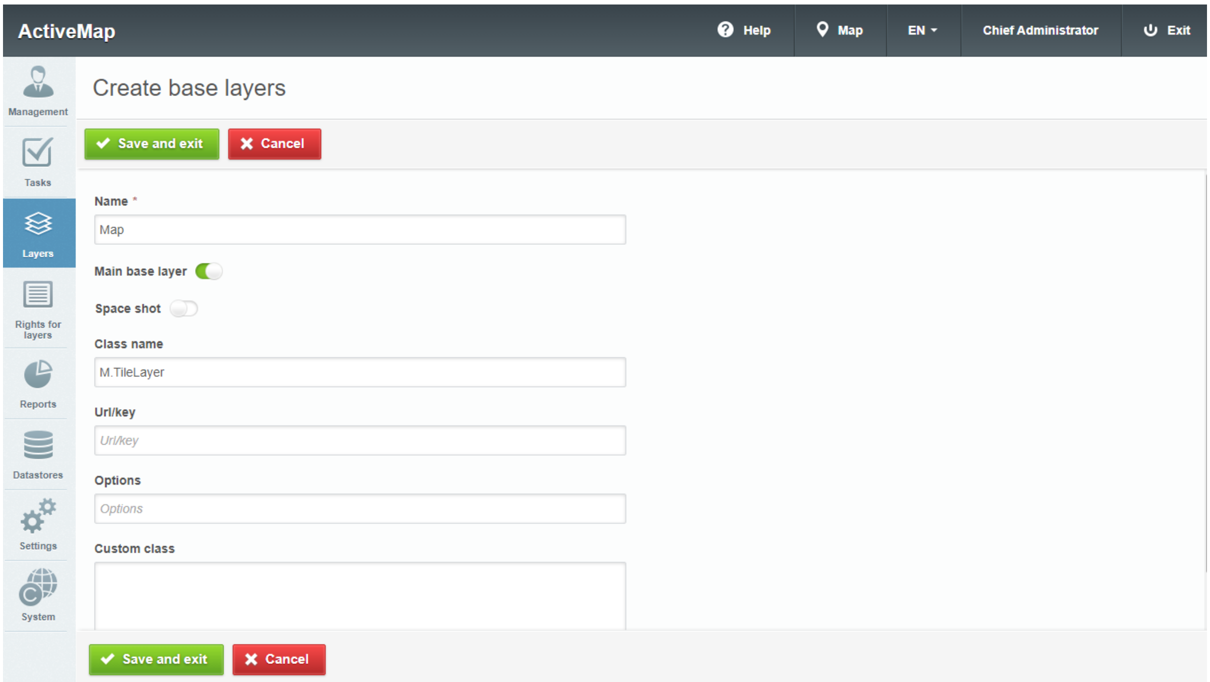


Fig. 2.95: Adding a basemap

Editing basemap

To edit the parameters of a basemap, click on in the right part of the row of the selected base map. A form similar to the creation form will open, in which the administrator can modify the information about the base map.

Deleting basemap

To delete a base map, click on in the right part of the corresponding row. To delete multiple base maps simultaneously, select the corresponding rows by checking their boxes and press the 

button at the bottom of the screen. For more detailed information about deleting system elements, see the section *Deleting an element* (page 26).

Searching basemap

To search for a base map, the administrator can use the search bar to search by title. Under the search bar there is a filter, which can be used to quickly find the base layer by selecting the “Main” option in the filter, or the satellite image by selecting the “Satellite” option. In addition, if you first select “Main” or “Satellite” and then uncheck the box next to the option, all base maps that are not the main base map or satellite image, respectively, will be displayed in the results.

2.3.3.4 “Rights for layers” block

Access control is the process of granting users the necessary permissions to access system layers. Users can have the following rights: read, write and edit.

The read right allows the user to see the layer on the control panel in the main part of the site. The write right allows to add new objects to the layer, as well as edit and delete old ones. The edit right allows to change the layer structure, styles, etc.

To search for rights, the administrator can use the search string or the filter panel.

2.3.3.4.1 "Access control" tab

In the "Access control" tab, the administrator can view the list of rights, available to the users of the system (Fig. 2.96). When switching to this tab, a table with the following columns becomes available:

- "User" - user names (logins are specified in brackets).
- "Group" - group to which the layer belongs.
- "Layer" - name of the layer for which access is defined.
- "Service Objects" - toggle switch that the administrator uses to indicate whether the selected user will have the right to use the layer as a service layer. The same layer can be used by some users as a service layer and as a normal layer by others.
- "Read" - toggle switch that the administrator uses to indicate whether the selected user will have the right to view the layer.
- "Write" - toggle switch that the administrator uses to indicate whether the selected user will have the right to edit the layer.
- "Edit" - toggle switch that the administrator uses to indicate whether the selected user will have the right to manage the layer.

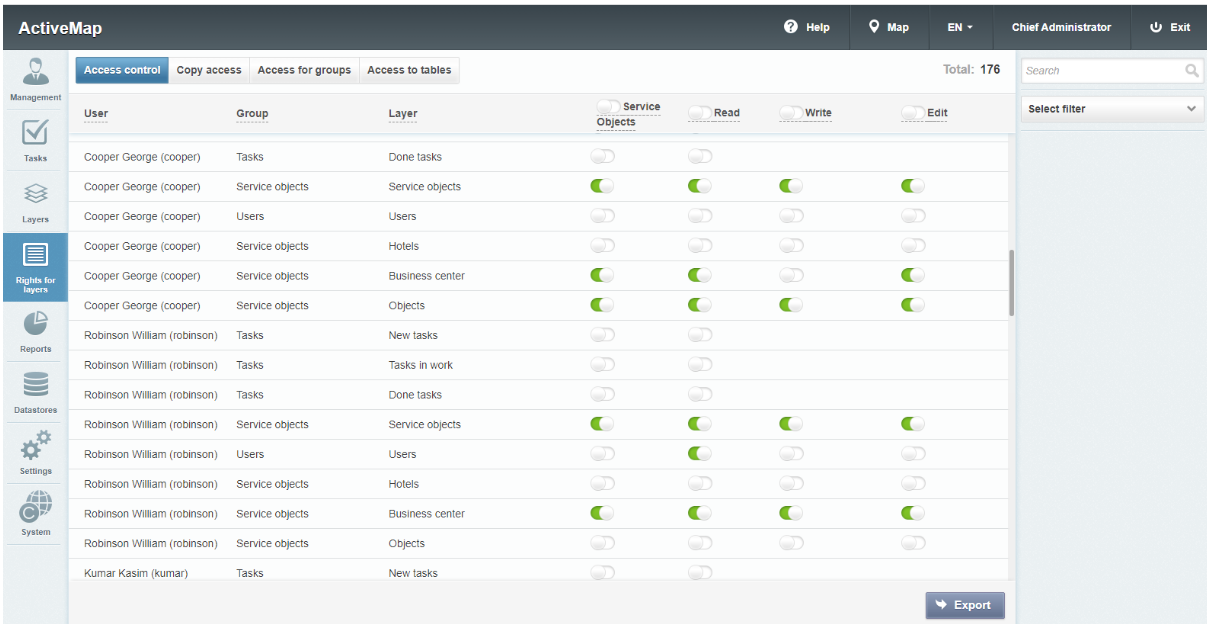


Fig. 2.96: "Access control" tab

When enabling the toggle switch in the column header, the right to read/write/edit will be granted to all users currently displayed in the administration area. Thus, the administrator can use a filter to select users by any parameter and grant them all rights at the same time. Similarly, permissions can be revoked by enabling the toggle switch in the layer row for a specific layer, or by enabling the toggle switch in the column header for user categories. After enabling the toggle switch in the column header, the system will prompt to confirm the action.

To sort rows alphabetically by “User”, “Group” or “Layer” parameters, click on the header of the corresponding column. To reverse the sorting direction, click on the header again.

The “New tasks”, “Tasks in progress”, and “Executed tasks” layer rows do not have the “Write” and “Edit” toggle switches. This is explained by the fact that the system enters objects into these layers on the basis of tasks, and users are not allowed to enter objects.

Clicking on 

button opens a window for selecting a directory for saving the accesses.xlsx Excel file. The structure of this file repeats the structure of the table in the current tab. Field sorting is not preserved during export, but if a filter was applied before export, only selected rows are exported.

2.3.3.4.2 “Copy access” tab

In the “Copy accesss” tab, the administrator can copy user permissions (Fig. 2.97).

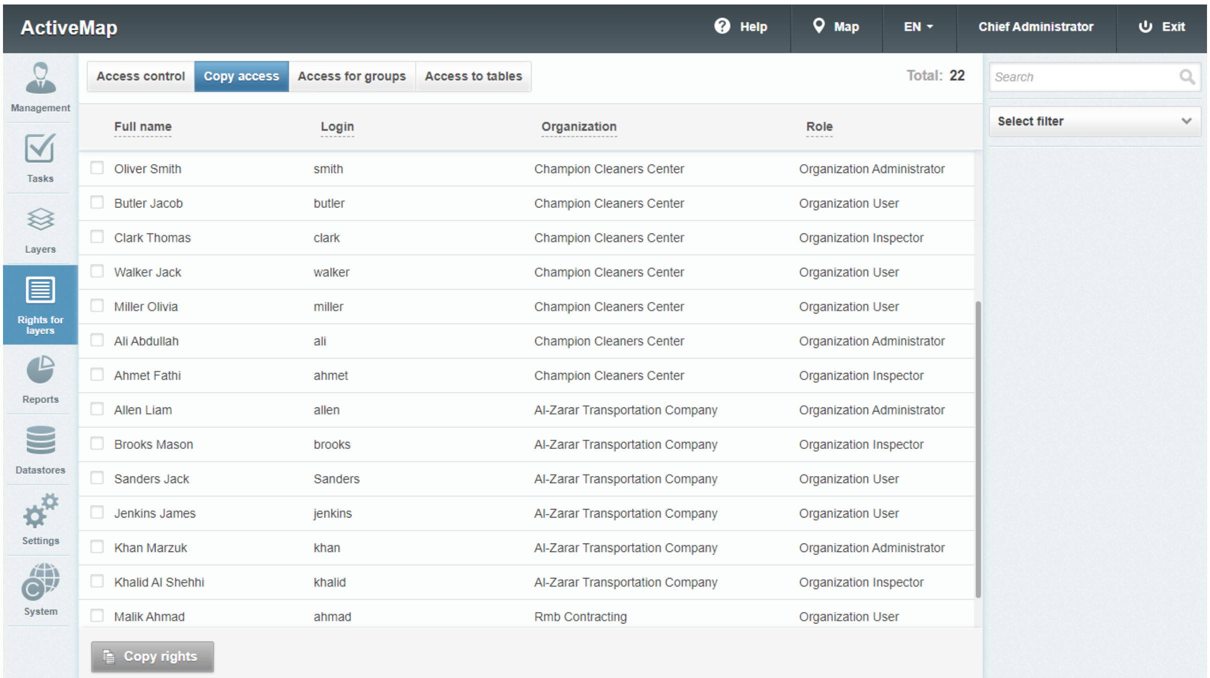


Fig. 2.97: “Copy access” tab

To do this, select a user from the list for which you need to copy the rights and click the 

button. Next in in the window that opens, select the user whose rights you want to copy (Fig. 2.98).

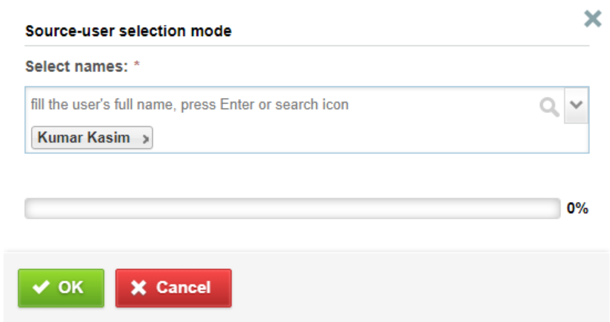


Fig. 2.98: User selection window for permissions source

2.3.3.4.3 "Access for groups" tab

In the "Access for groups" tab, the administrator can grant organizations the appropriate rights by switching the "Access" toggle switch in the line of the desired group (Fig. 2.99). The administrator can select a specific group, organization, user or group cluster with a filter for convenience.

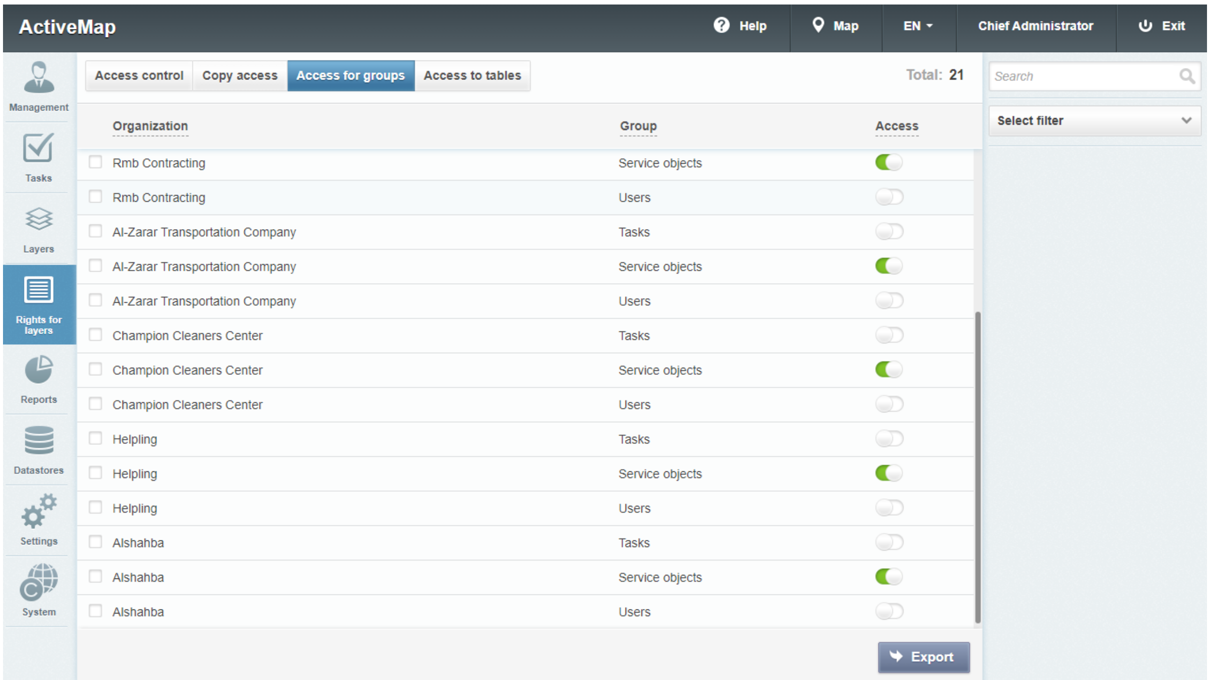
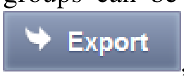


Fig. 2.99: "Access for groups" tab

The table of organizations with the permissions granted to them for groups can be saved to a computer. To do this, click the button 

, a window for selecting a directory for saving the groups.xlsx Excel file will open.

2.3.3.4.4 “Access to tables” tab

In the “Access to tables” tab, the administrator can grant users the rights to read, write and edit tables (reference tables, intervals, data tables) (Fig. 2.100). For convenience, it is possible to filter a specific organization, user, user cluster, cluster of tables with data and select users with read, write and edit permissions.

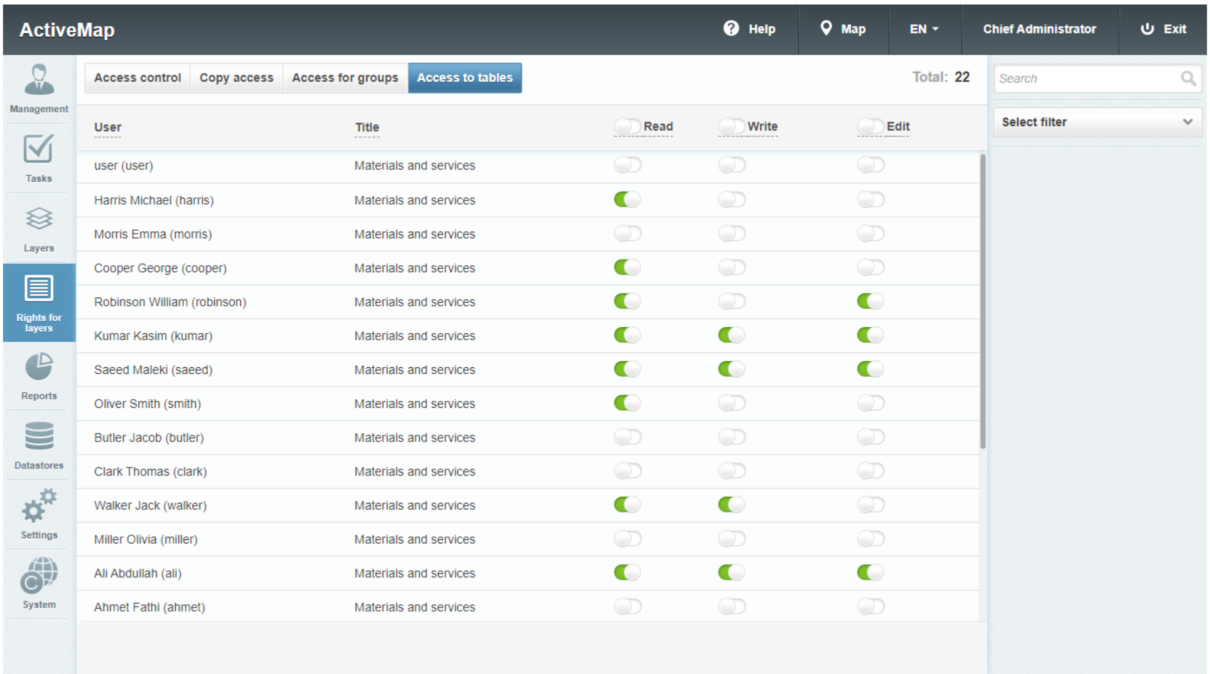


Fig. 2.100: “Access to tables” tab

2.3.3.5 “Reports” block

In the “Reports” block, report templates JasperReports[1] displayed in the system are managed (Fig. 2.101).

[1] https://ru.wikipedia.org/wiki/JasperReports

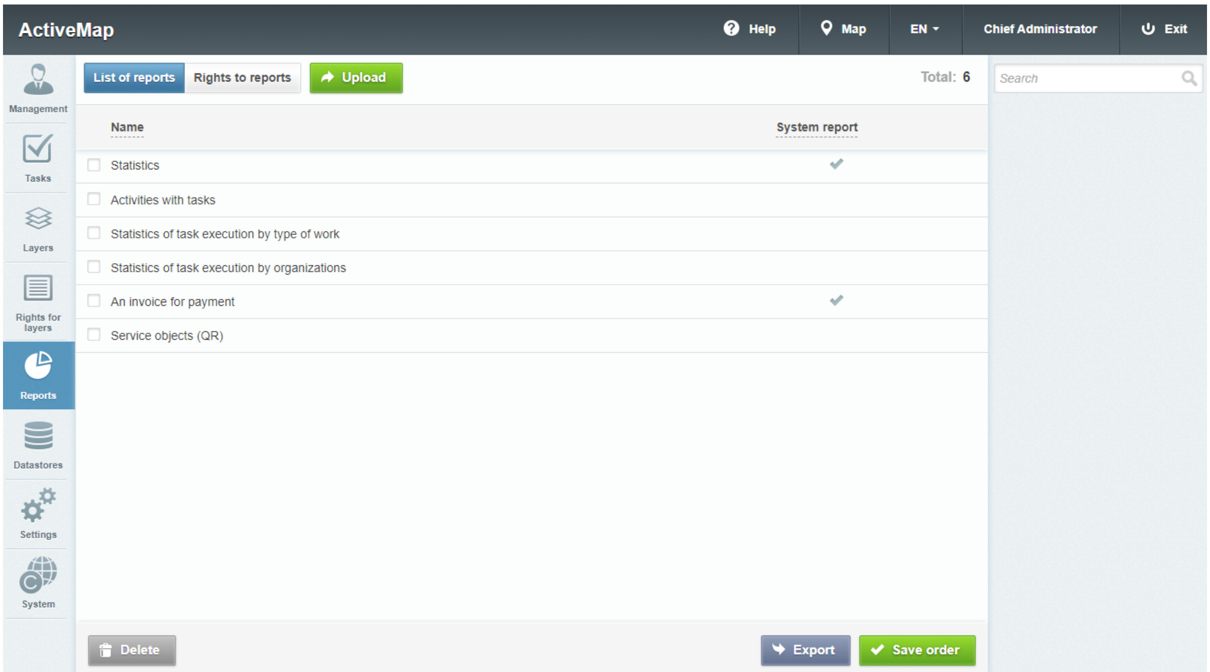
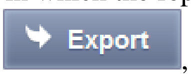


Fig. 2.101: "Reports" block

2.3.3.5.1 "List of reports" tab

In the "List of reports" tab, the administrator can view all system reports, upload new ones, and edit/delete existing ones.

In this tab you can also change and save the order in which the reports will be displayed in the system. Using the button 

, you can export the Excel file jreports.xlsx containing information about the reports and the fields they contain.

Uploading a report

To add a report to the system, click 

at the top of the window. A pop-up window will open, through which you can select a report from your computer. The files in jrxml format are accepted for upload.

After the report is successfully uploaded to the system, the report creation window will open (Fig. 2.102). Here in the "Main" tab you should fill in the following fields:

- "Name" – the name under which the report will be displayed in the system.
- "Data storage" - selection from the list of available databases.
- "Preferred report format" - selection of the format in which the report will be created by default (when creating the report, you can

choose another format - PDF, Word, RTF).

- “Report description” - the description that will accompany the report in the system.
- “System Report” toggle switch - marks the system reports.
- Report parameters:
- “Parameter name” - name of the parameter;
- “Mandatory” toggle switch - the parameter is mandatory to be filled in for report generation;
- “System” - toggle switch for internal use, the parameter will not be displayed in the generated report;
- “Combine with next in the period” - toggle switch combining parameters in the “from-to” period and automatically filling in parameters with a date type when selecting a standard period (today, yesterday, this week, etc.);
- “Parameter description” - description of the properties and usage of the parameter;
- group of parameters “Start date”, “Sign”, “Days”, “Hours”, “Minutes and seconds” - creating a default date displayed when filling in report parameters (it can be changed).

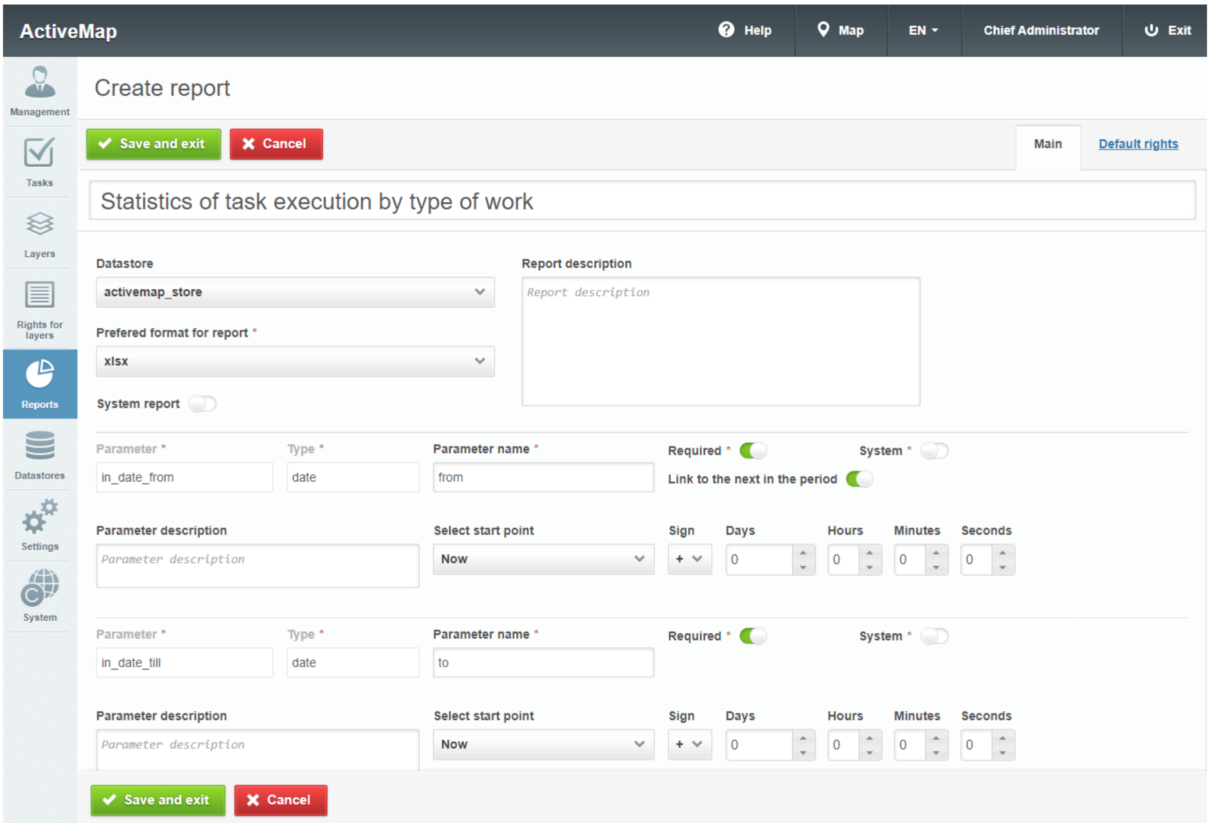


Fig. 2.102: Creating a report

In the “Default Rights” tab you can set the rights to view/manage the report. The same logic is implemented here as for granting default rights to layers (more details in *Create a new layer* (page 67)).

Report editing

Clicking  (or double-clicking on a row with a selected report) will open a form similar to the creation form, where the administrator can fill in/edit the fields with information about the selected report (Fig. 2.103). Additionally, when editing, the following buttons become available:

- allows to reload the original jrxml report file.

- allows to export the created report template in jrxml format.

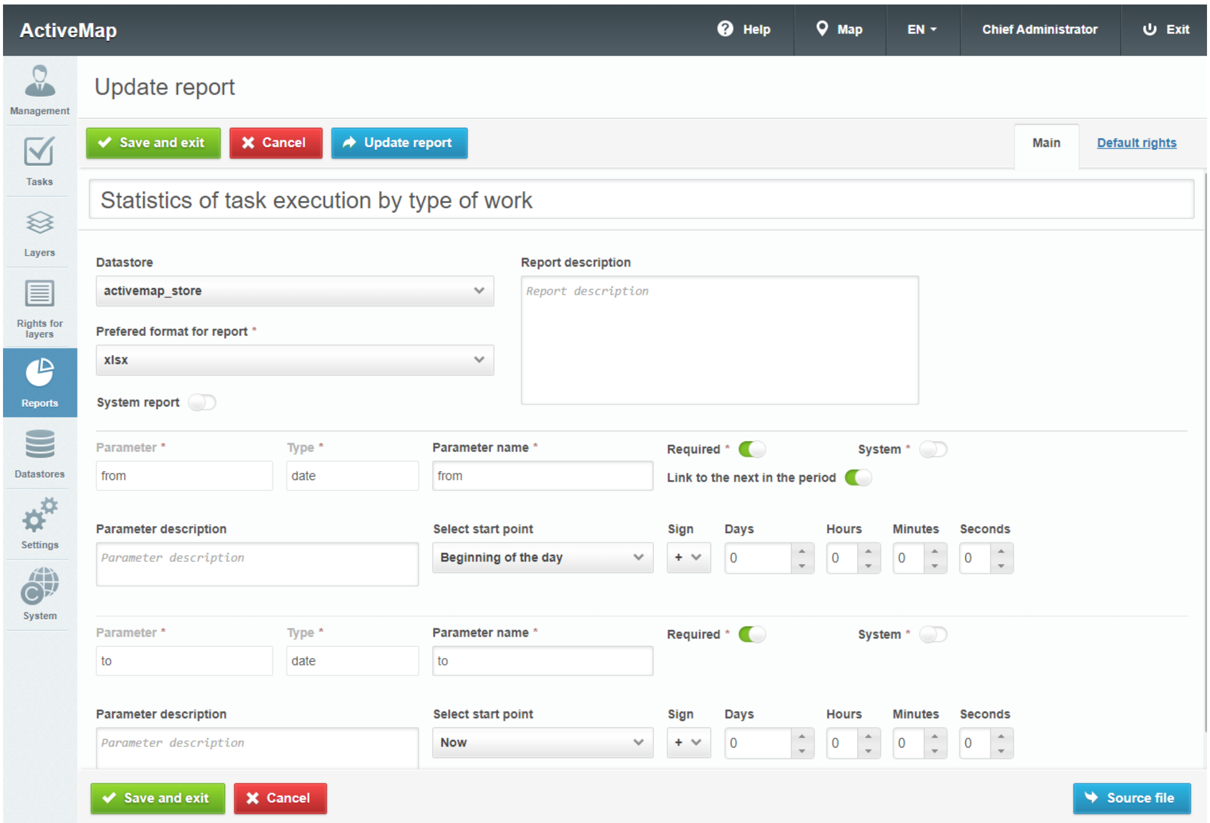


Fig. 2.103: Editing a report

Deleting a report

To delete a report, click on the right side of the corresponding row. To delete several reports at the same time, check the corresponding lines and click the **Delete** at the bottom of the screen. See *Deleting an element* (page 26) for more information about deleting system items.

Report search

In the "Report List" tab, the administrator can use the search bar to search for reports by their names.

2.3.3.5.2 "Rights to reports" tab

When switching to the "Rights to reports" tab in the administration area, the following columns appear:

- "User" - user's full name;
- "Report" - name of the report;
- "Read" - toggle switch indicating whether this report will be available to the selected user for viewing in the information window;
- "Edit" - toggle switch indicating whether this report will be available to the selected user for management.

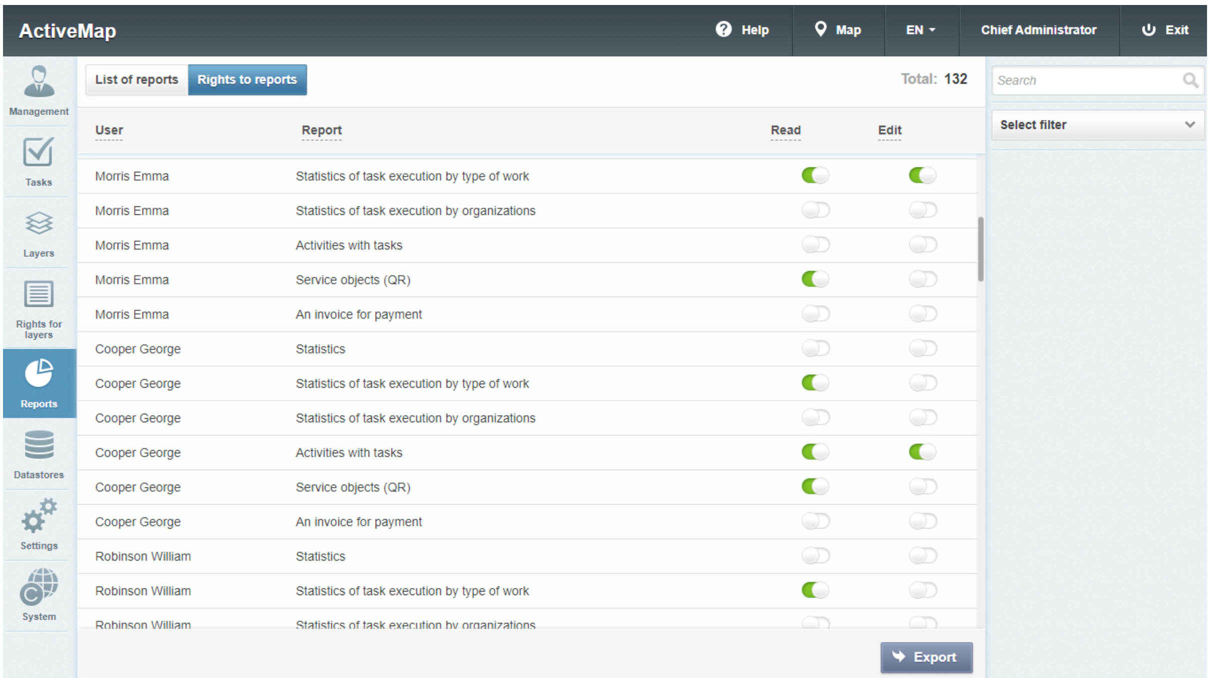


Fig. 2.104: "Rights to reports" tab

Using the  button you can export an Excel file accesses.xlsx containing information about users and their rights to reports.

Search for rights to reports

When switching to the “Rights to reports” tab, the administrator can use the search bar to search for reports by their names, as well as a filter selected from the drop-down list for searching by user full name, report name, main organization, user cluster, role, rights to view and delete reports.

2.3.3.6 “Datastores” block

In the “Datastores” block, the administrator can view detailed information about databases presented in a table with the following columns: name, host, database, by default (Fig. 2.105).

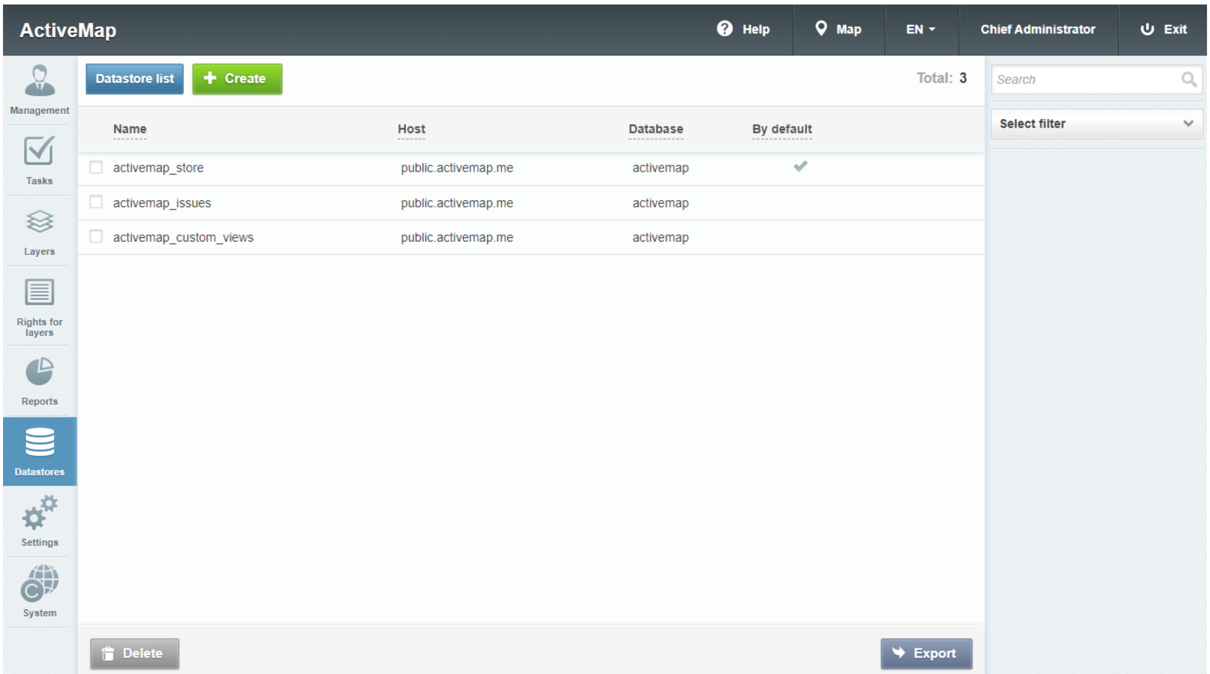


Fig. 2.105: “Datastores” block

If there is a checkmark next to the storage name in the “Default” box, it means that when you create or load a layer (report), the system automatically moves the layer (report) to the default storage (when you did not select a specific data store from the presented list).

To export data about datastores, click the  button. A window for selecting a directory to save the “datastores.xlsx” Excel file on the computer will open. The exported table will contain the following data: name, host, port, datastore, data schema.

2.3.3.6.1 Add a new datastore

To add a new datastore to the system, click  at the top of the window. A new window will open where you need to fill in the following fields (Fig. 2.106):

- “Name” - datastore name;
- “Host” - server address in the network;
- “Port” - port for database connection;
- “Login” - login for access to the datastore;
- “Password” - password for access to the datastore;
- “Database” - name of the database in which the datastore is created;
- “Data scheme” - element of the data storage structure.

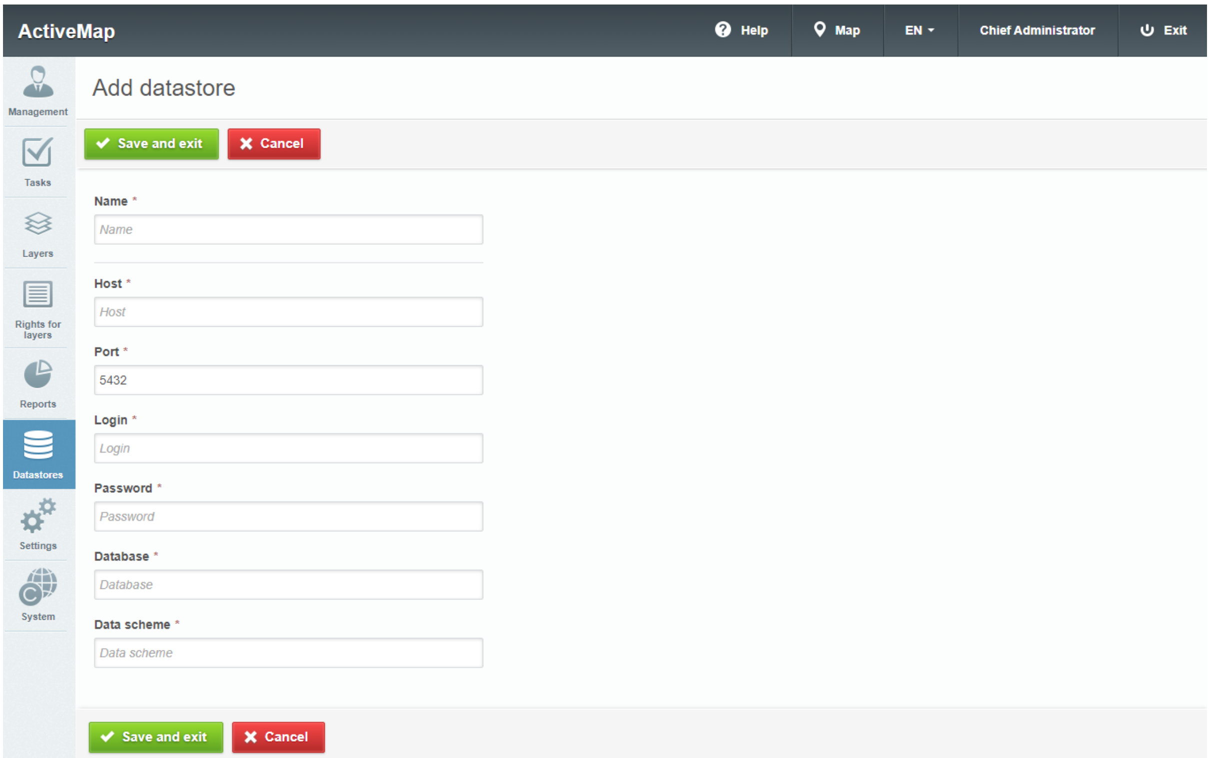


Fig. 2.106: Adding a new datastore

2.3.3.6.2 Datastore editing

To edit datastore information, click (or double-click the row with the selected data store). A form will appear in the administration area (with the same fields as in the add form), in which the administrator can fill in/change the fields of interest with information about the selected datastore. The administrator has access to all fields for editing, except for the "Name" field.

2.3.3.6.3 Deleting a datastore

To delete data store, click the button on the right side of the corresponding row. To delete several data stores at once, check the corresponding rows and click the button at the bottom of the screen. More information on deleting system elements can be found in the section *Deleting an element* (page 26).

2.3.3.6.4 Layer Publishing

To publish a layer in the system, hover over the row with the datastore name and click the "Available tables" button located on the right. A new window will open where the administrator can view the full list of available datastore layers, as well as their geometry types (Fig. 2.107).

In addition, in the opened window the administrator can view which layers are available for publishing and which ones are already published. For published layers, the "Published" column has a check mark, and to the right of the names of unpublished layers, there is a "Publish" button.

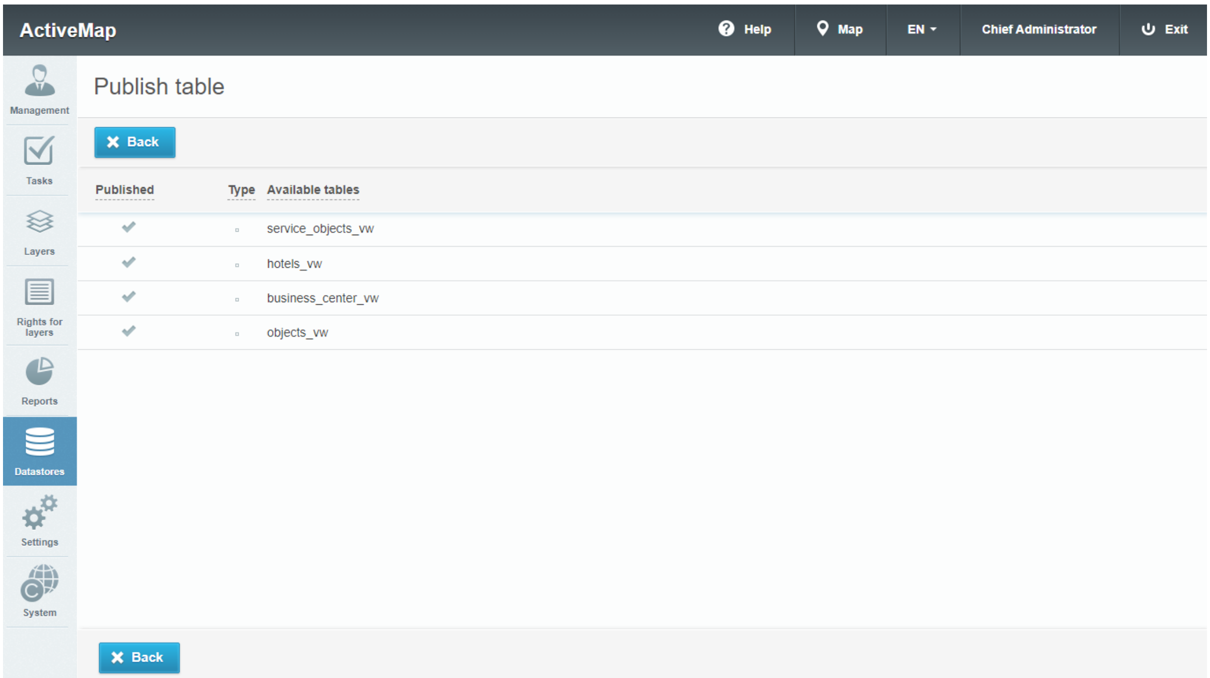


Fig. 2.107: Available tables in the datastore

Clicking "Publish" will take the administrator to the window for editing the selected layer. In this window, the administrator have to select the group in which the layer will be published, define its style, change its name, and, if necessary, add new attributes (in the "Attributes" tab) and additional fields (in the "Additional" tab).

To publish a layer in the system, fill in the required input fields and click 

. To cancel publication, click 

.

2.3.3.6.5 Searching for datastores

In the "Datastores" block, the administrator can use the search bar to search for a datastore by its name, database name or host name. In addition, the search can be performed using the "From infrastructure" filter, which allows to find datastores that work with the MapEditor program.

2.3.3.7 "Settings" block

Danger: The values of the existing settings have been verified by the developers during debugging. Changes in this block may cause the system to malfunction or stop working.

In the "Settings" block the administrator can configure various elements of the system (Fig. 2.108).

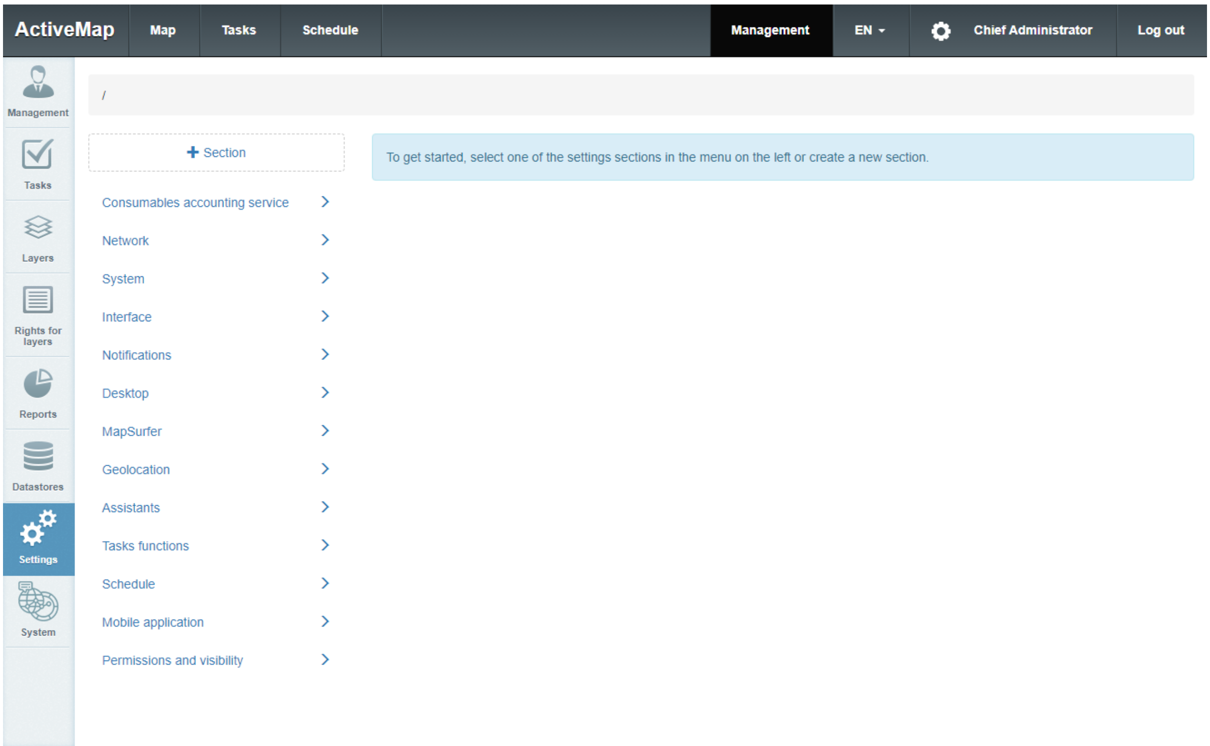


Fig. 2.108: "Settings" block

They are divided into thematic sections. Each section contains folders and subfolders containing settings and their values (Fig. 2.109).

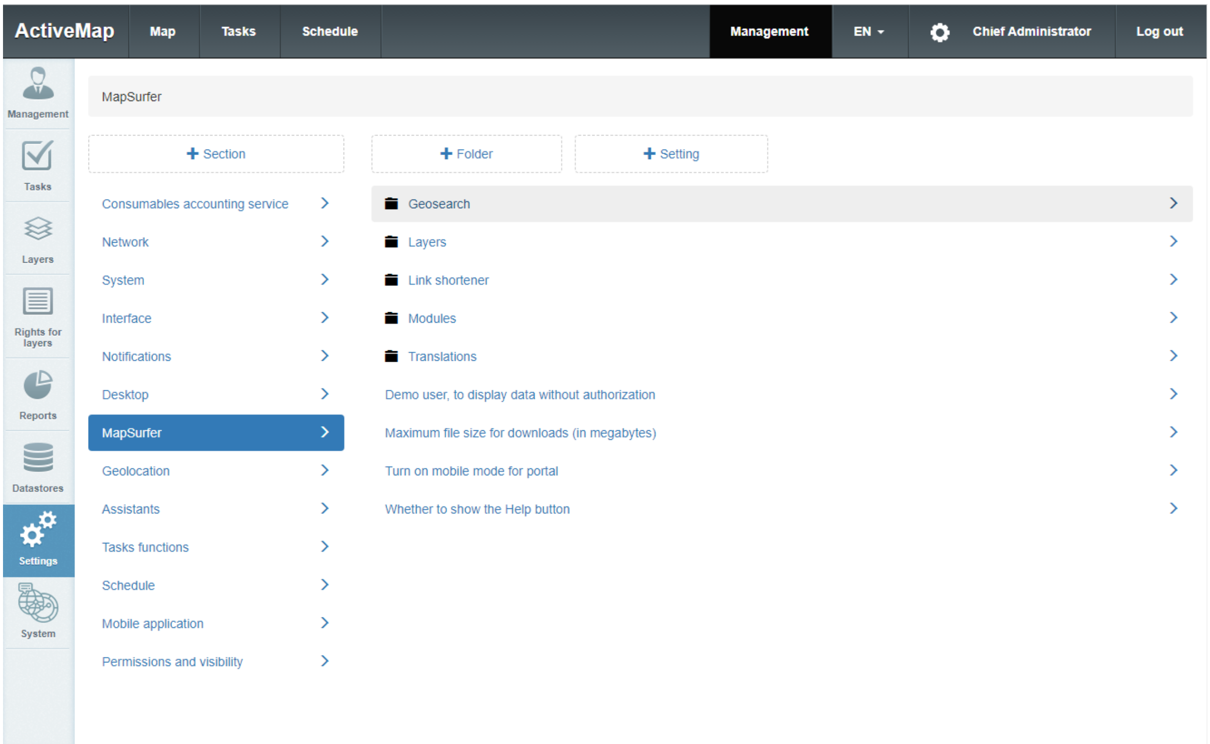


Fig. 2.109: Structure of the "Settings" block

Editing and deleting default settings values is not available.

In order to add a new setting to an element of the system, the administrator needs to select the appropriate section, then click the "+Settings" button. A form will open with fields to fill in (Fig. 2.110):

- "Key" - name of the setting in Latin alphabet, which will be used in the system;
- "Name" - name of the setting, which will be displayed in the interface;
- "Type" - data type (string, integer number, logical value, real number).

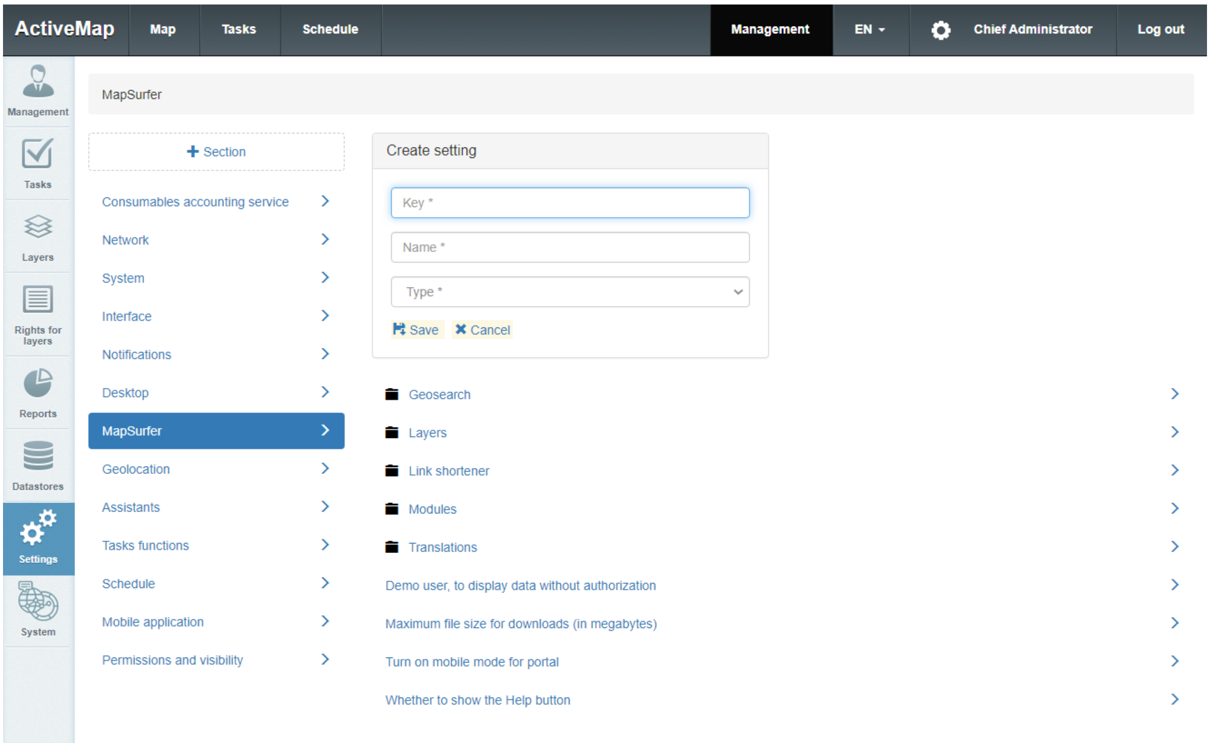


Fig. 2.110: Creating the setting

To set a new value for the setting, select the setting and click "+Value". A window will open with fields to be filled in (Fig. 2.111):

- "Value" - the name that the setting will be equal to in the system (depends on the data type specified when creating the setting);
- "Organization" - organizations to which this setting will be applied;
- "User" - users to whom the setting will be applied;
- "Role" - user roles to which the setting will be applied;
- "State" - states of the task to which the setting will be applied.

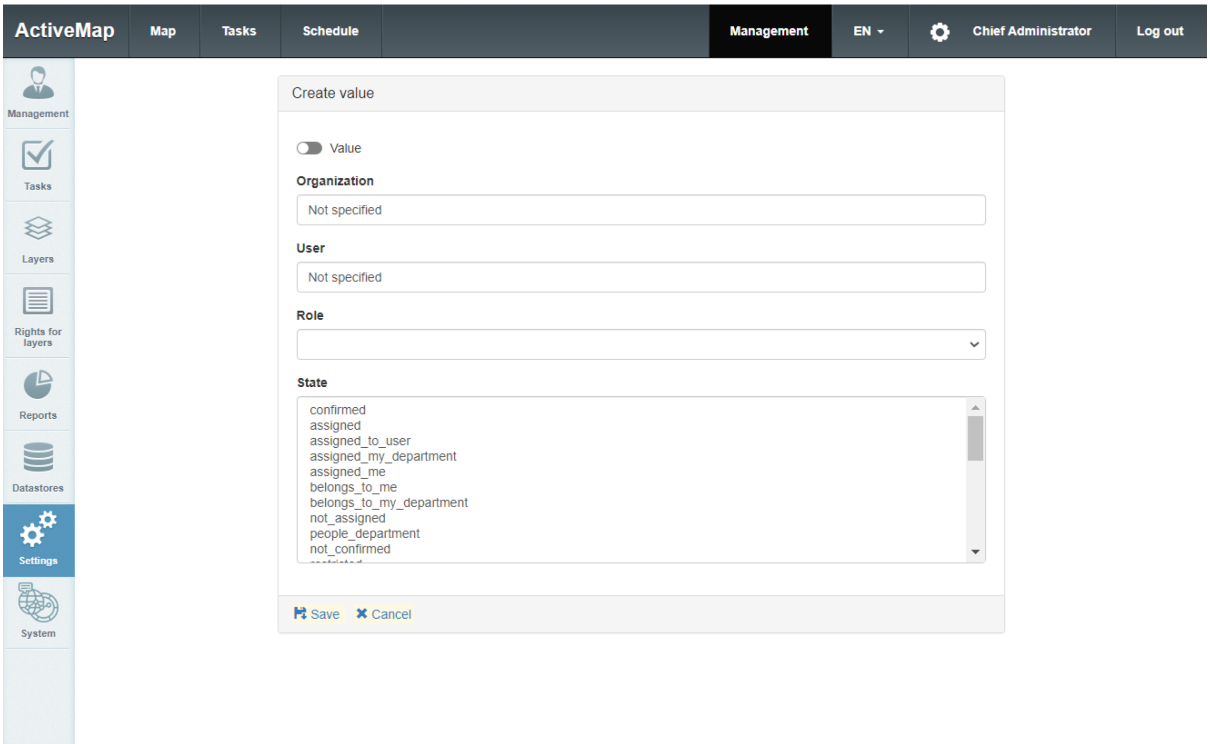


Fig. 2.111: Adding a value

> **Attention:** The setting can be specified either for a particular user or for a role in the system. If the “Organization”, “User” and “Role” fields are not filled in, the setting will be available to all users of the system.

To edit the added value, click . In the window that opens, make the necessary changes and click “Save”. To delete the added value, click . In the dialog box that appears, confirm or cancel the deletion.

2.3.3.8 “System” block

This block contains custom settings that the administrator can apply to the system.

2.3.3.8.1 "Global" tab

In this tab you can change the title of the system, add your logo and website icon. Here you can also change the visible area (the part of the map that is loaded when the web application is launched) by selecting the desired boundaries and clicking "Apply" (Fig. 2.112).

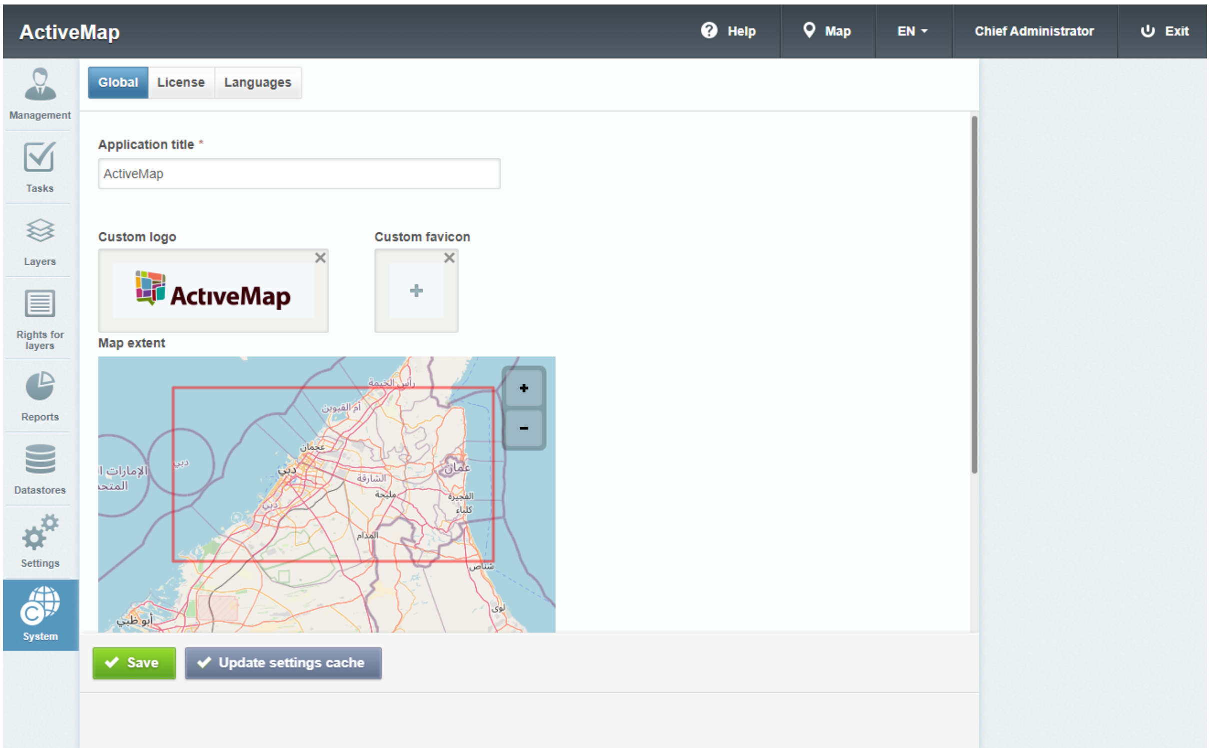


Fig. 2.112: Global system settings

Click 

to save your changes. Clicking 

starts the process of updating the internal cache of the web application to download the settings from Cerebellum.

2.3.3.8.2 "License" tab

Once the first user with the "Administrator" role has access to the system, the license activation procedure should be performed. Information about license activation requirement will be displayed in the form of a pop-up window on the administration panel (Fig. 2.113).

Fig. 2.113: Pop-up window "License is not active"

If the license is not activated, you cannot create users, and an appropriate message is displayed if you try to save data.

To activate the license, the administrator should go to the "System" block and select the "License" tab or follow the link in the pop-up window "License is not active", enter the license key obtained in advance from the service provider and click Send (Fig. 2.114).

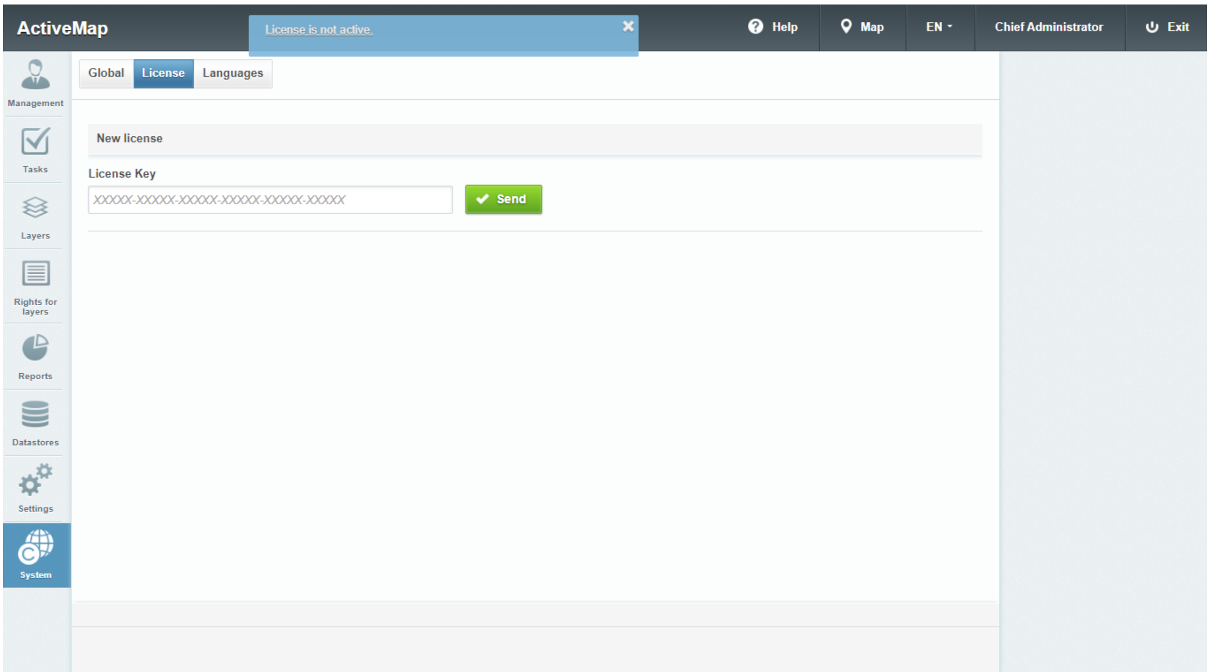


Fig. 2.114: License key entry field

The window displays information about the current license. If the license key is correct, when you click Activate Users, the system will prompt you to enter the number of users required for activation (Fig. 2.115).

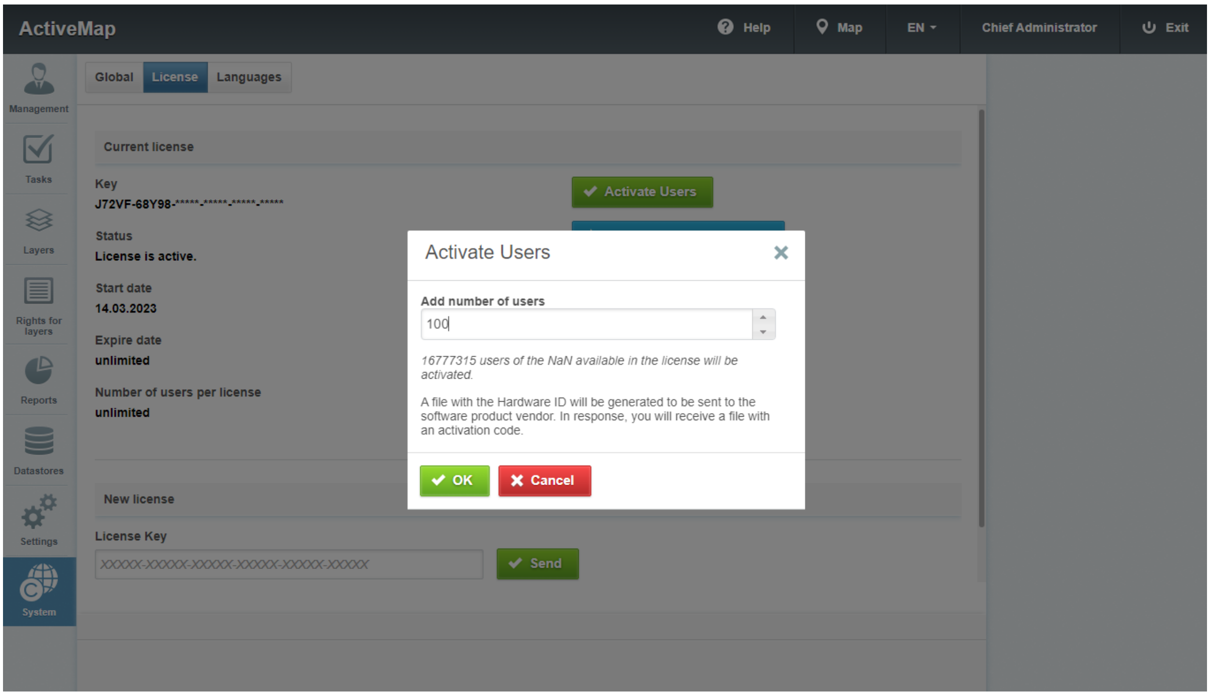


Fig. 2.115: "Activate Users" window

You should save the "Hardware Code" file, which contains encrypted information about the server characteristics and the license key (Fig. 2.116).

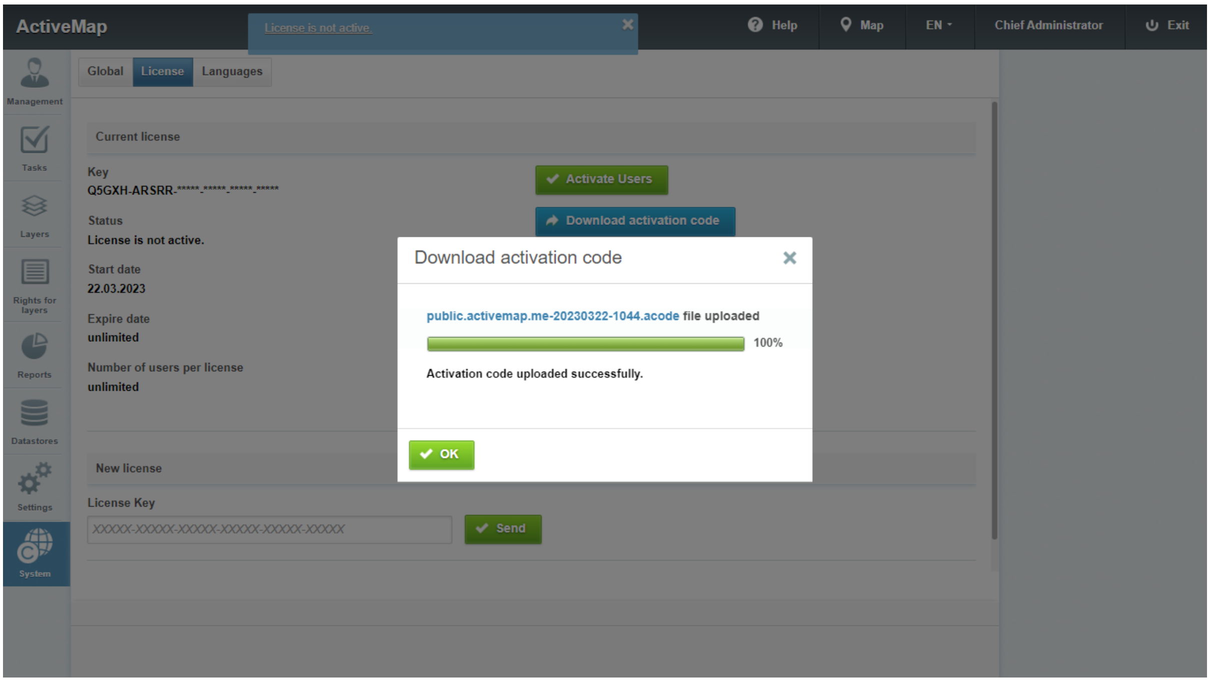


Fig. 2.116: Saving the hardware code

This file should be transferred to the service provider for activation by sending a corresponding request to the e-mail. The email should include: name of the organization, required number of user licenses, server domain name where license key will be activated. Service provider verifies the received information and that the requested number of users does not exceed the value specified in the license. If the data is correct, the service provider will send a file with activation code, valid for the server specified in the email. The received file should be uploaded to the "License" tab by clicking on Download activation code. After successful license activation the system will display the following data: status, validity period, maximum allowed number of users, number of activated users in the system (Fig. 2.117).

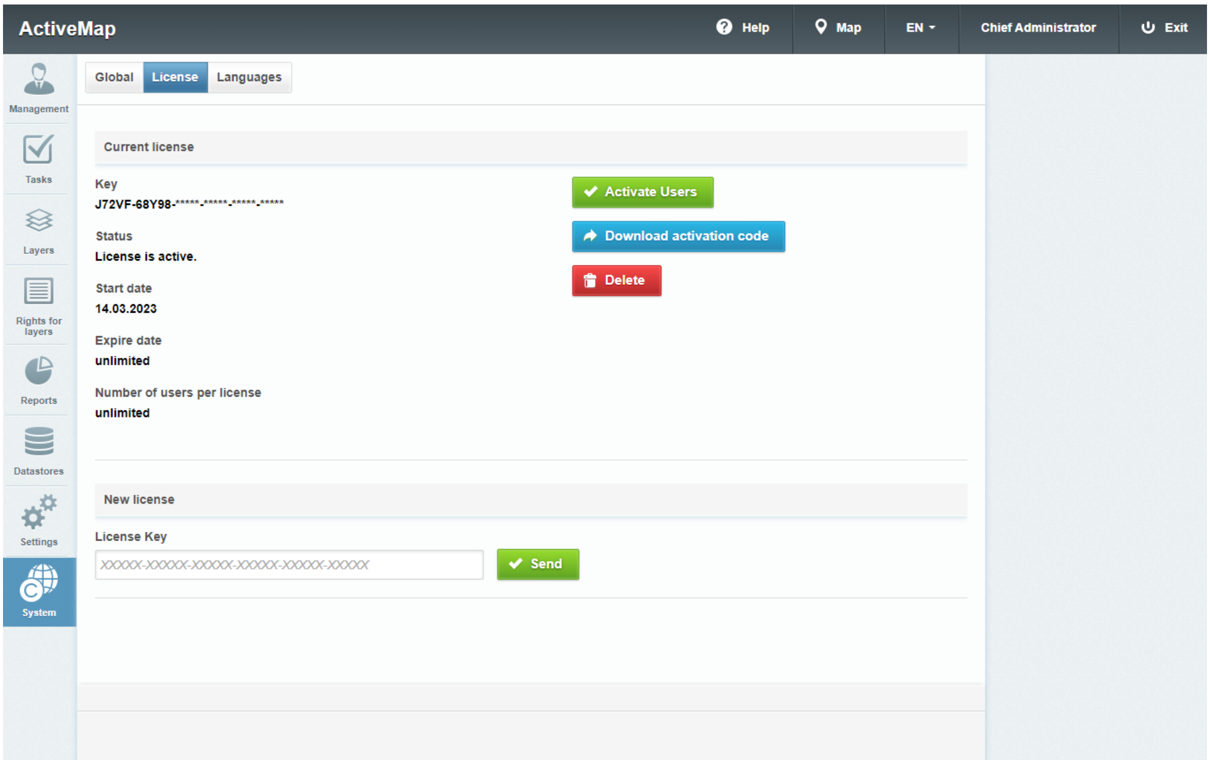


Fig. 2.117: Information about the current license

If necessary, the administrator can request additional licenses for users by following the same steps. This process can be repeated until the total number of users exceeds the allowed number of licenses for this server. An attempt to activate this license on another server will not be possible, since the activation server stores information that this license key has already been used.

If it is necessary to switch to another license (perpetual or unlimited in number of users), the administrator must purchase a new license key and enter it into the system. Then load the activation code using both the old and the new hardware code. The system checks the activation code against both hardware codes. If the activation code matches the new hardware code, the old files are deleted and the new activation code is applied.

To terminate the license on a given server, the administrator should click

. A deletion confirmation message will appear (Fig. 2.118).

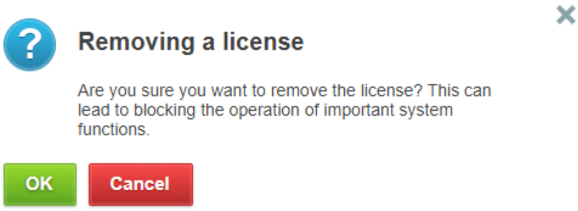


Fig. 2.118: Deletion confirmation message

2.3.3.8.3 "Languages" tab

This tab contains a list of available interface languages (Fig. 2.119). If necessary, you can activate the language by turning on the toggle switch in the line. The activated language will be displayed in the drop-down list on the user panel. You can also change the order in which languages appear in the list. To do this, drag the line above or below and press

.

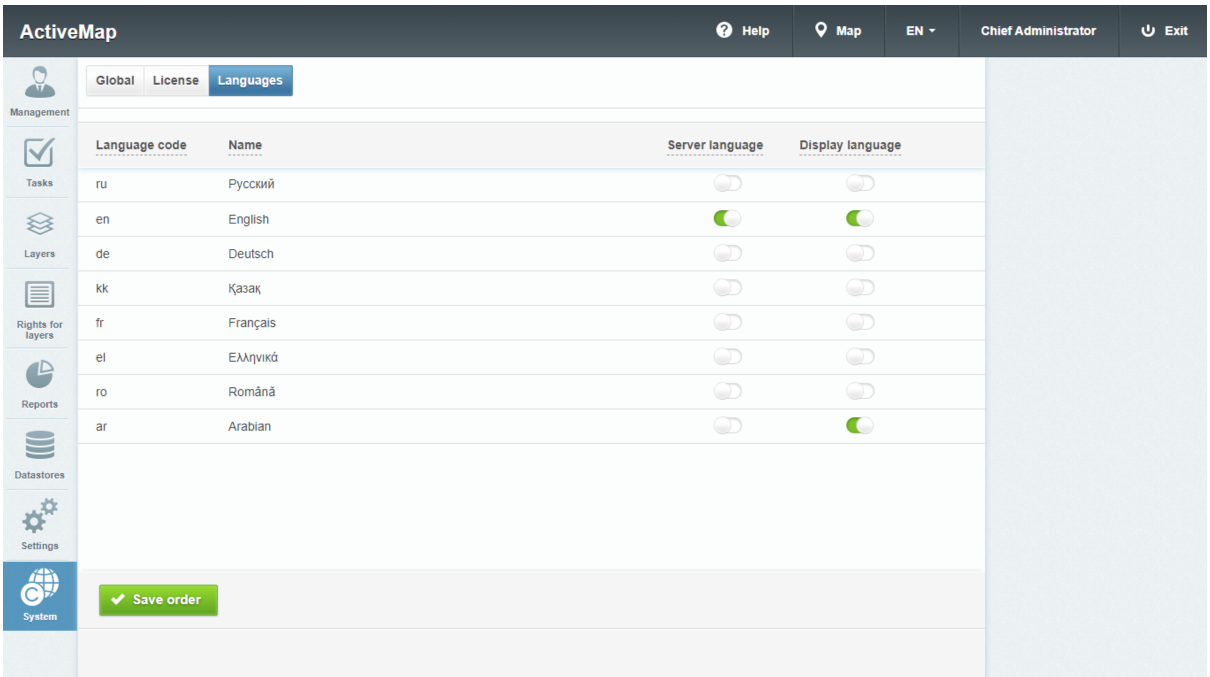


Fig. 2.119: List of available interface languages

2.4 Exit the program

To exit the program, click “Exit” in the upper right corner of the window and close the browser tab.

CHAPTER

THREE

GLOSSARY

Applied software suite is a set of interconnected programs designed to solve problems of a certain class of a particular subject area and interact with the user.

Attribute data are values describing features of objects. Attribute data types: integer, real, text, date, date and time, geometry.

Basemap is the dominant or underlying layer in a given map that provides geographical context to the map and other dataset layers above it. Users visualize tasks, service objects, and thematic layers above the basemap, as well as use it for navigation through a map and getting general information about the area of interest.

Chief inspector is an employee responsible for managing tasks in the System.

Client Organization is an association of users who make their requests via the mobile application, monitor their status, are capable of evaluating the work performed. User rights for operating the System are restricted.

Cluster is an association of several organizations for the purpose of enabling the in-process control of the performance of departments.

Cluster administrator is an employee whose job responsibilities include the cluster management as follows: control of organizations and users within his/her cluster, access right distribution to users within his/her cluster to layers and reports, and the task management within his/her cluster.

Cluster inspector is an employee responsible for managing tasks within his/her cluster.

Clusterization is the representation of raster layer objects located nearby by a single label on a map.

Contract is an entity for accounting and planning the task accomplishment by organizations under contractual obligations.

Custom fields are attribute fields which can be customized in the system versus features of a project underway, and be referenced to certain work items.

Data table is a structured database of same-type objects within the bank of spatial data.

File label (sticker) is a textual mark in a picture.

Invitation (an invite link) is a link containing information on the server address, login, and password of a user to simplify the process of authorization in the mobile application.

Layer is a visual representation of geographical data in the environment of any digital map.

Layer group is a set of layers grouped according to thematic or other specified criteria.

LDAP (Lightweight Directory Access Protocol) is an open, vendor-neutral, industry standard application protocol for accessing and maintaining distributed directory information services over an Internet Protocol (IP) network.

Legend is a set of symbols and explanations on a map.

License is a file containing information on the acceptable quantity of users, validity period, and allowing to link the server software of the System to the equipment.

Organization administrator is an employee whose job responsibilities include the management of his/her organization as follows: the creation of users, the provision of access to layers and reports within his/her company, and the task management within his/her company.

Organization inspector is an employee responsible for managing tasks within his/her company.

Organization user is an employee who uses the System to accomplish assigned tasks.

Raster layer represents data in the form of geographically-referenced images as well as fragments of raster images displayed in the same projection and prepared for each level of map detail.

Reference table is a systematic data table intended for facilitating users to handle attribute information on objects.

Service objects are layers containing objects of interest of the user organization due to their relation to business activity of the involved organization.

Schedule is a tool that enable to automatically create and assign template tasks at a certain time with a specified periodicity.

The System administrator is an employee responsible for configuring the System: managing clusters, organizations, users of all roles, reference tables for tasks (work types, stages, priorities, custom fields, stickers), as well as the distribution of access rights to layers and reports.

Thematic layer is a spatial data bank layer which objects are interrelated by the same topic.

Timelapse-video is a video file comprising a series of pictures took via a video camera during a long time period.

User tags is an entity allowing to group users against a specified attribute (e.g., the phone model).

User type is a user characteristic (a human being or a vehicle) to determine the user mapping settings versus the type selected.

Vector image is a representation of graphical objects and images based on the use of geometric primitives such as points, lines and polygons.

CHAPTER

FOUR

ATTACHMENTS

4.1 1. Plugin script examples

Upload files to a layer object

```
if after.getServiceObjectLayerId() is not None and after.getServiceObjectId()␣
↪is not None:
    attach_list = []
    if len(after.getPhotos()) > 0:
        body_photo = list(map(lambda attach_name: {
            'path': f"/department_files/photos/{attach_name.getName().replace(
↪'_', '/')}",
            'fileName': attach_name.getName().replace('/', '_'),
            'isUrl': True
        }
        , after.getPhotos()))
        for photo in after.getPhotos():
            photo_location = photo.getOriginLocation() if photo.
↪getOriginLocation() is not None else photo.getAttachmentLocation()
            if photo_location is not None and model.getLocation() is None:
                geom = {'coordinates': [(photo_location[0], photo_
↪location[1])], 'type': 'MultiPoint'}

        if model.getLocation() is not None:
            geom = {'coordinates': [(model.getLocation()[0], model.
↪getLocation()[1])], 'type': 'MultiPoint'}

    if len(after.getVideos()) > 0:
        for item in after.getVideos():
            attach_list.append(item.getName())
        attach_path = 'video'

    if len(after.getSounds()) > 0:
        for item in after.getSounds():
            attach_list.append(item.getName())
        attach_path = 'sounds'

    if len(after.getFiles()) > 0:
        for item in after.getFiles():
```

(continues on next page)

(continued from previous page)

```
            attach_list.append(item.getName())
        attach_path = 'dif_files'

    body_files = list(map(lambda attach_name: {
        'path': f"/department_files/{attach_path}/{attach_name.replace('_', '/
↪')}",
        'fileName': attach_name,
        'isUrl': True
    }
    , attach_list))

    req = patch(f"/layers/{after.getServiceObjectLayerId()}/features/{after.
↪getServiceObjectId()}/files")
    req.props({'photos': body_photo, 'files': body_files})

    return [
        req,
        patch(f"/layers/{after.getServiceObjectLayerId()}/features/{after.
↪getServiceObjectId()}").prop('geometry', geom)
        ]
```

Checking the number of photos

```
if after.get('photo_count') is not None and after.get('photo_count') !=␣
↪before.get('photo_count') and subject.getId() != after.getUser().getId():
    return invalid("\nOnly the task creator can change the 'Number of Angles'␣
↪field.\n"
                "\nPlease return the previous value.")

if len(after.getPhotos()) is not None and after.get('photo_count') is not␣
↪None and after.getStatus().getId() != before.getStatus().getId():
    if len(after.getPhotos()) < int(after.get('photo_count')) and after.
↪getStatus().getId() == 4:
        send_photo_count = int(after.get('photo_count')) - len(after.
↪getPhotos())
        return invalid(f"Not enough photos to change the step. You need to␣
↪add more {send_photo_count}")
```

4.2 2. Examples of advanced layer styles

You can find more information about creating geocss styles at https://docs.geoserver.org/stable/en/user/styling/workshop/css/css.html.

** Example of a point layer style using standard icons (circles) for categories**

```
/* @title Offices */
[amenity = 'bank'] {
 mark: symbol('circle');
```

(continues on next page)

(continued from previous page)

```
}
[amenity = 'bank']
 :mark{
  fill:#68904D;
  stroke:black;
  stroke-width:1;
  size:18;
}


/* @title ATMs */
  [amenity = 'atm'] {
 mark: symbol('circle');
}
[amenity = 'atm']
:mark{
  fill:#EE9B01;
  stroke:#000000;
  stroke-width:1;
  size:9;
}
```

Where:

```
/* @title Offices */ - category name, which will be displayed in the legend.
[amenity = 'bank'] - the field to filter by and the value of the field.
mark: symbol('circle') - icon shape (circle).
fill:#68904D - icon fill color. You can use the name or the hex color code.
stroke: black/#000000 - color of the icon stroke. You can use the name or hex␣
↪color code (black = #000000).
stroke-width:1 - icon stroke width in pixels.
size:18 - icon size in pixels.
```

Example of a point layer style using icons for categories

```
 /* @title Local stores */
[ shop = 'convenience' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/78/view);
}
/* @title Supermarkets */
[ shop = 'supermarket' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/79/view);
}
/* @title Clothing stores */
```

(continues on next page)

(continued from previous page)

```
[ shop = 'clothes' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/80/view);
}
/* @title Shoe Stores */
[ shop = 'shoes' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/81/view);
}
/* @title Pet Shops */
[ shop = 'pet' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/82/view);
}
/* @title Computer and electronics stores */
[ shop = 'electronics' or shop = 'computer' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/83/view);
}
/* @title Car parts stores */
[ shop = 'car_parts' ] {
   mark-opacity: 1;
   mark-rotation: 0;
   mark-size: 28;
   mark: url(https://public.activemap.ru/dictionary/icons/84/view);
}
```

Where:

```
/* @title Local stores */ - category name to be displayed in the legend.
[shop = 'convenience'] - the field to filter by and the value of the field.
mark-opacity: 1 - icon transparency (can be changed from 0 - full␣
↪transparency to 1 - full opacity).
mark-rotation: 0 - angle of icon rotation in degrees.
mark-size: 28 - icon size in pixels.
url(https://public.activemap.ru/dictionary/icons/78/view) - link to the icon.␣
↪You can get it by going to the "Layers" block, the "Icons" tab, right-
↪clicking on the icon and selecting "Copy image URL" (:ref:`icon_url`).
```

** Example of a linear layer style with labels and line color information from the data**

```
* {
  stroke: [stroke_color];
  stroke-dashoffset: 0;
  stroke-linecap: butt;
  stroke-width: 4;
  label: [naimen];
  font-family: Arial;
  font-weight: bold;
  font-fill: black;
  font-size: 12;
  halo-color: white;
  halo-radius: 2;
  -gt-label-follow-line: true;
  -gt-label-max-angle-delta: 60;
  -gt-label-max-displacement: 400;
  -gt-label-repeat: 300;
  }
```

Where:

```
stroke: [stroke_color] - color of the line stroke. In this case it is taken
from the value of the specified field (stroke_color) and is not displayed
in the legend.
stroke-dashoffset: 0 - offset of the stroke from its initial position in
pixels.
stroke-linecap: round - parameter defining the shape of line ends (round -
rounded corners, butt - cut at a right angle immediately after the end of
the line, square - cut at a right angle after a distance equal to half the
stroke-width).
stroke-width: 4 - line width in pixels.
label: [naimen] - name of the field whose values are used to label objects.
font-family: Arial - font family for labeling objects.
font-weight: bold - font weight (thickness of label characters).
font-fill: black - font color. You can use name or hex color code (black =
#000000).
font-size: 10 - font size in pixels.
halo-color: white - color of the caption stroke. You can use name or hex
color code (black = #000000).
halo-radius: 1 - radius of the label stroke in pixels.
-gt-label-follow-line: - following the contours of linear object labels.
-gt-label-max-angle-delta: 90 - maximum bending angle of the caption in
degrees.
-gt-label-max-displacement: 400 - maximum displacement of the label in pixels.
-gt-label-repeat: 150 - repetition of object's caption through the specified
number of pixels.
```

Example of the road network linear layer style with captions and different line types for categories

```
  * {
  label: [name];
```

(continues on next page)

(continued from previous page)

```
  font-family: Arial;
  font-weight: bold;
  font-fill: black;
  font-size: 10;
  halo-color: white;
  halo-radius: 1;
  -gt-label-follow-line: true;
  -gt-label-max-angle-delta: 90;
  -gt-label-max-displacement: 400;
  -gt-label-repeat: 150;
  }

/* @title Motorways */
[stylegroup = 'motorway'] {
stroke: #d1386f, #db798f;
stroke-width: 8px, 6px;
stroke-linecap: round;
z-index: 8, 9;
}
/* @title Main Roads */
[stylegroup = 'mainroad'] {
stroke: #be9239, #f8ce8c;
stroke-width: 6px, 4px;
stroke-linecap: round;
z-index: 6, 7;
}
/* @title Streets */
[stylegroup = 'minorroad'] {
stroke: #d9d6d0, #fefefe;
stroke-width: 4px, 3px;
stroke-linecap: round;
z-index: 4, 5;
}
/* @title Alleys */
[stylegroup = 'service'] {
stroke: #d9d6d0, #fefefe;
stroke-width: 3px, 2px;
stroke-linecap: round;
z-index: 2, 3;
}
/* @title Pedestrian zones */
[stylegroup = 'noauto'] {
stroke: #f99589;
stroke-width: 3px;
stroke-dasharray: 5 2;
z-index: 1;
}
/* @title Others */
[stylegroup = 'other'] {
```

(continues on next page)

(continued from previous page)

```
stroke: #d9d6d0;
stroke-width: 2px;
z-index: 0;
}
```

Where:

```
 1. General parameters determined for the entire layer:

 label: [name] - name of the field whose values are used to label objects.
 font-family: Arial - font family for labeling objects.
 font-weight: bold - weight of the font (the thickness of the caption␣
↪characters).
 font-fill: black - font color. You can use name or hex color code (black =
↪#000000).
 font-size: 10 - font size in pixels.
 halo-color: white - stroke color of the caption. You can use name or hex␣
↪color code (black = #000000).
 halo-radius: 1 - radius of the signature stroke in pixels.
 -gt-label-follow-line: - follow line feature labels.
 -gt-label-max-angle-delta: 90 - maximum label bend angle in degrees.
 -gt-label-max-displacement: 400 - maximum label offset in pixels.
 -gt-label-repeat: 150 - repeats the label of the object after a given number␣
↪of pixels.

2. Parameters for individual categories:

Simple line:

/* @title Others */ - category name to be displayed in the legend.
[stylegroup = 'other']- field that will be filtered and field value.
stroke: #d9d6d0 - color of lines. You can use name or hex color code (black =
↪#000000).
stroke-width: 2px - line width in pixels.
z-index: 0 - the order in which the category is shown relative to other layer␣
↪categories (starts with 0, objects with z-index: 0 will be displayed below␣
↪all other objects with larger index values).

Dotted line:

/* @title Pedestrian zones */ - category name to be displayed in the legend.
[stylegroup = 'noauto'] - the field that will be filtered and the value of␣
↪the field.
stroke: #f99589 - color of the lines. You can use name or hex color code␣
↪(black = #000000).
stroke-width: 3px - line width.
stroke-dasharray: 5 2 - length of strokes (5) and spaces (2) in pixels.
z-index: 1 - the order in which the category is shown relative to other layer␣
↪categories.
```

(continues on next page)

(continued from previous page)

```
Stroke line:

/* @title Motorway */ - category name to be displayed in the legend.
[stylegroup = 'motorway'] - the field that will be filtered and the value of␣
↪the field.
stroke: #d1386f, #db798f - colors of strokes for lines. You can use name or␣
↪hex color code (black = #000000).
stroke-width: 8px, 6px - line width in pixels.
stroke-linecap: round - parameter defining the shape of the line ends (round -
↪ rounded corners, butt - right angle break right after the line ends,␣
↪square - right angle break after half of the stroke-width).
z-index: 8, 9 - order of category showing relative to other layer categories␣
↪and lines within one category when imitating style with stroke-width.
```

For lines in CSS there is no concept of "fill", only "stroke". Thus, unlike points and polygons, it is not possible to style the "edge" of a line. However, this effect can be achieved by drawing each line twice: once with a certain width and again with a slightly smaller width. This creates the illusion of fill and stroke. The style uses CSS support for "multi-valued properties" with two colors and widths. In this case, the highways are colored first with a dark red line (#d1386f) 8 pixels wide and then a thinner pink line (#db798f) 5 pixels wide. Since each line is drawn twice, the render order determined by the z-index parameter is important. The wider line must have a smaller index value so as not to overlap the thinner line.

** Example of an area layer style with fill by range**

```
*{
    fill-opacity:0.7;
    stroke:#254911;
    stroke-width:1;
  font-family: "Times New Roman";
  font-style: "normal";
  font-weight: "bold";
  font-size:10;
  font-fill:#000000;
  label-anchor: 0.5 0;
  label: [name];
  label-geometry: [centroid(the_geom)];
  -gt-label-max-displacement: 40;
  -gt-label-auto-wrap: 70;

}

/* @title Population < 20000 people */
[population_num < 20000] {
  fill:  #BDD880;}

/* @title Population between 20000 and 50000*/
 [population_num > 20000 and population_num < 50000]{
  fill:  #FFEB84;}
```

(continues on next page)

(continued from previous page)

```
/* @title Population between 50000 and 100000*/
 [population_num > 50000 and population_num < 100000]{
  fill:  #FDBA7B;}

/* @title Population > 100000*/
 [population_num > 100000]{
  fill:  #F8696B;}
```

Where:

```
1. General parameters determined for the entire layer:

fill-opacity:0.7 - transparency of the polygon fill (ranges from 0 to 1).
stroke:#254911 - polygon stroke color. You can use the color name or␣
↪hexadecimal code.
stroke-width:1 - polygon stroke width in pixels.
font-family: "Times New Roman" - font family for labeling objects.
font-style: "normal" - font style (regular, italic or italic).
font-weight: "bold" - weight of the font (weight of the caption characters).
font-size:10 - font size.
font-fill:#000000 - color of signature symbols. It is allowed to use the␣
↪color name or hexadecimal code (black = #000000).
label-anchor: 0.5 0 - Anchor point that determines the placement of the label␣
↪relative to the centroid of the polygon. In this case, the label is offset␣
↪50% horizontally from the polygon's centroid and centered vertically.
label: [name] - name of the field whose values are used to label objects.
label-geometry: [centroid(the_geom)] - relative location of the label␣
↪(location relative to the centroid).
-gt-label-max-displacement: 40 - maximum offset of the label in pixels␣
↪relative to the centroid of the polygon.
-gt-label-auto-wrap: 70 Breaks the label into lines if its length exceeds the␣
↪specified value in pixels.

2. Parameters for individual ranges:

/* @title Population < 20000 */*/ - range name to be displayed in the legend.
[population_num < 20000] - field to filter by and the value of the field.
fill: #BDD880 - the color of the polygon fill for the specified range. It is␣
↪allowed to use name or hex color code.
```

An example of an area layer style with hatching by category

```
/* @title Forests */
  [natural = 'wood'] *{
  fill: symbol('shape://times');
  fill-size: 22px;
  stroke: darkgreen;
  }
  :fill {
```

(continues on next page)

(continued from previous page)

```
  stroke: green;
  size: 8;
 }

  /* @title Grasslands */
  [natural = 'grassland'] *{
  fill: symbol('shape://plus');
  fill-size: 12px;
  stroke: darkbrown;
  }
  :fill {
  stroke: brown;
  size: 8;
 }
```

Where:

```
/* @title Forests */*/*// - name of the category that will be displayed in␣
↪the legend.
[natural = 'wood'] - field to filter by and the value of the field.
fill: symbol('shape://times') - fill polygon with symbols, that will create a␣
↪shifting effect.
fill-size: 22px - size of symbols to fill in pixels.
stroke: darkgreen - color of polygons stroke.
:fill {
  stroke: green; - color of the characters stroke.
  size: 8; - symbols stroke thickness.
}
```

4.3 3. Examples of baselayer settings and parameters

Yandex

```
Class name - M.Yandex;

Keys:
map - scheme,
satellite - satellite,
hybrid - hybrid (satellite + scheme),
publicMap - people's map,
publicMapHybrid - hybrid (satellite + people's map);

Map parameters - traffic: true|false (enable/disable traffic events layer).
```

OpenStreetMaps

```
Class name - M.TileLayer.OpenStreetMap.
```

Dynamically created

M.TileLayer

```
Class name - M.TileLayer;
url - http://{s}.domain/path/{x}/{y}/{z}.png;

Parameters:
minZoom: 0 - minimum zoom;
maxZoom: 18 - maximal zoom;
tileSize: 256 - tile size;
subdomains: 'abc' - subdomains;
errorTileUrl: '' - url of the tile with an error;
attribution: '' - description of copyright holders;
opacity: 1 - transparency;
scheme: '' - type xyz or tms;
zoomOffset: 0 - zoom shift;
crs: M.CRS.EPSG900913 - projection.
```

M.TileLayer.WMS

```
Class name - M.TileLayer.WMS;
url - http://domain/path;

Parameters:
minZoom: 0 - minimum zoom;
maxZoom: 18 - maximal zoom;
tileSize: 256 - tile size;
errorTileUrl: '' - url of the tile with an error;
attribution: '' - description of the copyright holders;
opacity: 1 - transparency;
zoomOffset: 0 - zoom shift;
crs: M.CRS.EPSG900913 - projection;
version: ''1.1.1'' - WMS version;
layers: '' - list of layers;
styles: '' - list of styles;
format: '' - image/jpeg' - image format;
transparent: '' - transparency.

Class name - M.TileLayer.WMS;
 url - http://domain/path;
```

INDEX

R

S

T

U

V

W