



NextGIS Mobile documentation

Release 2.5

NextGIS team

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INTRODUCTION

1.1 About NextGIS Mobile

NextGIS Mobile is a mobile GIS (Geographic Information System) for *Android* OS.

NextGIS Mobile allows to:

- create and display a multi-layered map;
- perform map navigation (panning, zooming in and out);
- add vector data in *GeoJSON* format;
- add raster data as a tile cache;
- add online tile sources (*XYZ* and *TMS*);
- add raster and vector layers from nextgis.com¹ and *NextGIS Web*²;
- create and modify vector *geodata* (geometries and attributes);
- browse the attributes of selected geometry through identify dialog;
- modify vector layer attributes with customizable input forms;
- share vector geodata using standard Android tools;
- record the tracks and manage their display parameters, remove selected or all tracks;
- display device coordinates, velocity, altitude on the map, as well as a source of geographical coordinates and amount of satellites used for georeferencing (when *GPS* is in use);
- collect *geodata* and transmit it to [nextgis.com](https://my.nextgis.com)³ or *NextGIS Web*⁴ in background mode (when internet connection is on).

NextGIS Mobile is open source (license *GPL v3* (c. 92)).

Some icons used in NextGIS Mobile are from:

¹ <https://my.nextgis.com/signup/?next=/webgis/>

² <http://nextgis.com/nextgis-web/>

³ <https://my.nextgis.com/signup/?next=/webgis/>

⁴ <http://nextgis.com/nextgis-web/>

- [Icons8.com](http://icons8.com)⁵ distributed on CC BY-ND 3.0⁶;
- romannurik.github.io⁷ - CC BY 3.0⁸.

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This documentation describes NextGIS Mobile 2.5.

1.2 Hardware and software requirements

To launch NextGIS Mobile you need a device (smartphone, tablet, etc.) with *Android* 2.3 or higher.

To be able to use all NextGIS Mobile features the device should have the following hardware:

- *GPS* and/or *GLONASS* sensor;
- digital compass;
- cellular module;
- rear camera.

Note: If any of these items are missing from the device, the related functions will not be available.

NextGIS Mobile does not impose specific system requirements. However, the amount of system memory and storage space can limit the size of uploaded geodata.

⁵ <http://icons8.com/android-icons>

⁶ <http://creativecommons.org/licenses/by-nd/3.0/>

⁷ <http://romannurik.github.io/AndroidAssetStudio/icons-launcher.html>

⁸ <http://creativecommons.org/licenses/by/3.0/>

INSTALLATION

NextGIS Mobile can be installed:

- using an APK file [nextgismobile.apk](http://nextgis.com/nextgis-mobile/)⁹;
- from [Google Play](https://play.google.com/store/apps/details?id=com.nextgis.mobile)¹⁰.

To install “NextGIS Mobile” from the APK file first allow installation of apps from unknown sources (“Settings” -> “Privacy” -> “Unknown sources”). After installation you can deactivate this option.

To install application from Google Play launch Google Play app, enter “NextGIS Mobile” in the search bar and install the application.

To launch NextGIS Mobile use a shortcut created automatically during its setup (see [Fig. 2.1](#)).

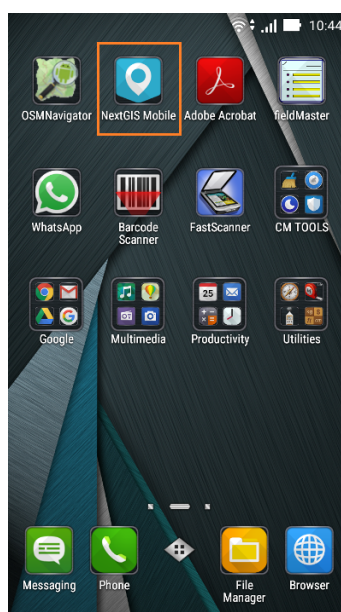


Рис.2.1: Application shortcuts.
NextGIS Mobile shortcut is highlighted by the orange rectangle.

⁹ <http://nextgis.com/nextgis-mobile/>

¹⁰ <https://play.google.com/store/apps/details?id=com.nextgis.mobile>

USER INTERFACE (UI)

There are 4 major elements of NextGIS Mobile UI:

- Main screen
- Layers tree panel
- Features table
- Settings dialogue

UI is designed in accordance with [Google Material design](https://material.io/design/introduction)¹¹ guidelines.

3.1 Main screen

Main screen is shown on [Fig. 3.1](#).

The number of buttons in top toolbar depends on your device screen size. If the buttons don't fit into the toolbar they are moved to the contextual menu (item 5 in [Fig. 3.1](#)).

Top toolbar contains the following buttons:

- Show my location
- Load or refresh geodata
- Start new track
- Settings
- Help

Status info panel (item 9 in [Fig. 3.1](#)) can be shown at the bottom of the Main screen (if it is activated in the Settings - Map - Show status info panel). Status info panel shows (if there is the fixed location):

- Device coordinates (latitude and longitude);
- Positioning signal source (mobile networks/Wi-Fi or satellite) and number of captured satellites (if positioning is carried out with help of [GPS/GLONASS](#));
- Device altitude (meters);
- Device speed (kmph)

¹¹ <http://www.google.com/design/spec/material-design/introduction.html>

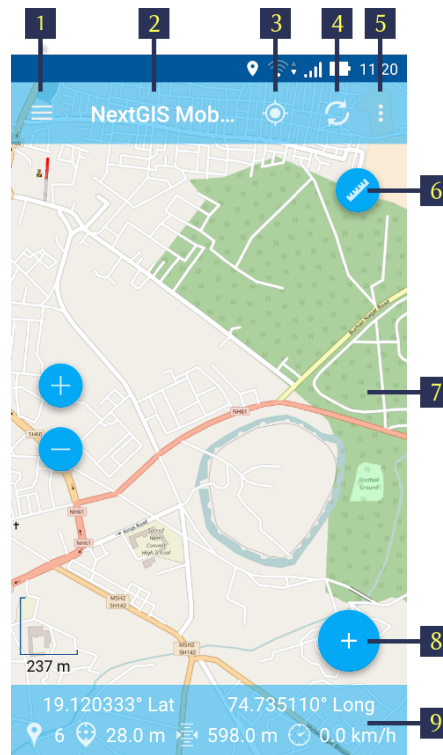


Рис.3.1: Main screen.

The numbers indicate: 1 - Layers tree panel icon; 2 - Application title; 3 - “Show my location” button; 4 - “Load/Refresh geodata” button; 5 - Contextual menu icon; 6 - Measuring button; 7 - Map screen; 8 - Main actions button; 9 - Status info panel.

Depending on the size of the screen Status info panel can occupy one or two rows.

A map (item 7 in Fig. 3.1) is a set of raster and vector layers. The order and the visibility of layers are under control of layers tree (*Layers tree* (c. 5)).

After a long hold of your finger on the vector layer’s geometry the map window turns to the select mode.

3.2 Layers tree

Layers tree panel is designed to display the content of a map and to control visibility and hierarchy of map layers. Additional operations with layers are available from a separate layer contextual menu. Layers tree panel is shown on Fig. 3.2.

To change the hierarchy of map layers long-press the layer which is to be moved up or down. Layers tree panel will switch to Edit mode. Keep pressing and move the selected layer to its new position.

For turning layer visibility on/off tap on Layer visibility button (item 3 in Fig. 3.2).

“Add geodata” button (item 4 in Fig. 3.2) allows you to create vector layers and import vector and raster layers from Android local storage, [QuickMapServices](#)

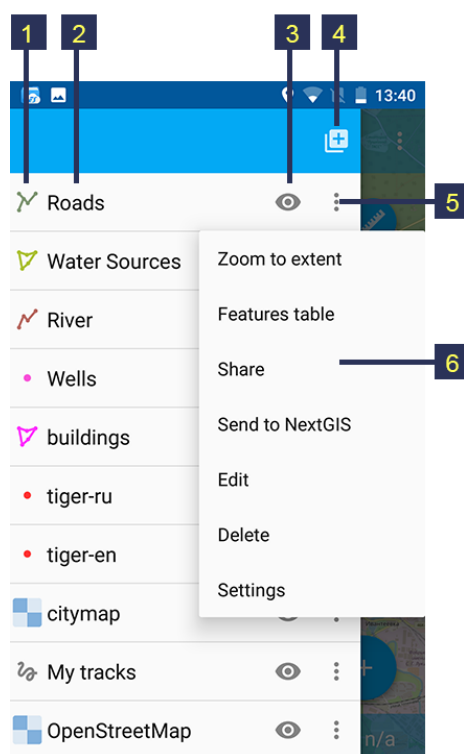


Рис.3.2: Layers tree panel.

The numbers indicate: 1 - Layer type; 2 - Layer name; 3 - Layer visibility button; 4 - Add geodata; 5 - Layer contextual menu icon; 6 - Layer contextual menu items.

[catalog](#)¹², [nextgis.com](#)¹³ or [NextGIS Web](#)¹⁴. This button contains the next menu (Fig. 3.3):

- Create layer;
- Open local;
- Add geoservice;
- Add from NextGIS.

By using “Open local” menu item you can upload *geodata* from local storage in one of the following formats:

- *GeoJSON* file;
- ZIP file with cached tiles;
- *.ngrc file
- *.ngfp file.

More information about geodata upload can be found in “*Adding layers* (c. 14)” section.

Layer contextual menu depends on layer’s type (whether it is vector or raster layer). When you tap the Contextual menu button (item 5 in Fig. 3.2) contextual menu items pop up as shown by item 6 in Fig. 3.2

¹² <https://qms.nextgis.com/>

¹³ <https://my.nextgis.com/signup/?next=/webgis/>

¹⁴ <http://nextgis.com/nextgis-web/>

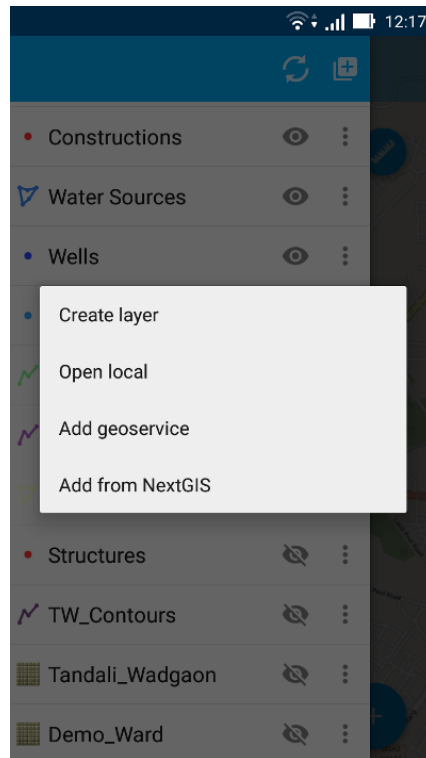


Рис.3.3: Add geodata dialogue.

- Zoom to extent
- Features table
- Share
- Send to NextGIS
- Edit
- Delete
- Settings

Warning: By pressing “Delete” you not only remove layer from the map but also erase all its data from the local storage.

3.3 Features table

Features table is designed to show and manage the contents of each vector layer in table format.

To open Features table activate Layers tree panel and tap on the Contextual menu button next to the vector layer name (item 5 in Fig. 3.2). This will pop up the contextual menu items as shown by item 6 in Fig. 3.2. There you need to select “Features table”. Depending on the screen size the panel could occupy the whole screen or just the right side (in this case there is a map with a highlighted geometry of the current attributes on the left side).

Features table opens as shown in Fig. 3.4 below.

ID	drinking	Available
1	1	Full_Year
8	1	Full_Year
9	1	Full_Year
10	1	Full_Year
13	1	Full_Year
14		
6	1	Full_Year
3	1	Full_Year
4	1	Full_Year
5	1	Full_Year
2	1	Full_Year
16		
11	1	Full_Year
12	1	Full_Year
7	1	Full_Year
15		

Рис.3.4: Features Table.

If you tap any record (row) in the table, the Features table toolbar appears at the bottom of the screen. This toolbar allows to manage features as shown below in Fig. 3.5.

You can open the standard Features table editing form as shown in Fig. 5.6 by selecting “Open Features table editing form” (see item 8 in Fig. 3.5)

Warning: If you tap on “Delete” button (see item 7 in Fig. 3.5), the system will delete the selected feature immediately. You will be able to undo the removal, but if undo action is not applied in 5 seconds after removal, the feature gets deleted permanently.

3.4 Settings dialogue

Depending on the screen size Settings dialogue can fit into one or two panels. Settings dialogue is shown on Fig. 3.6 (one panel mode).

There are following Settings on the main panel:

- General
- Map
- Location
- My tracks

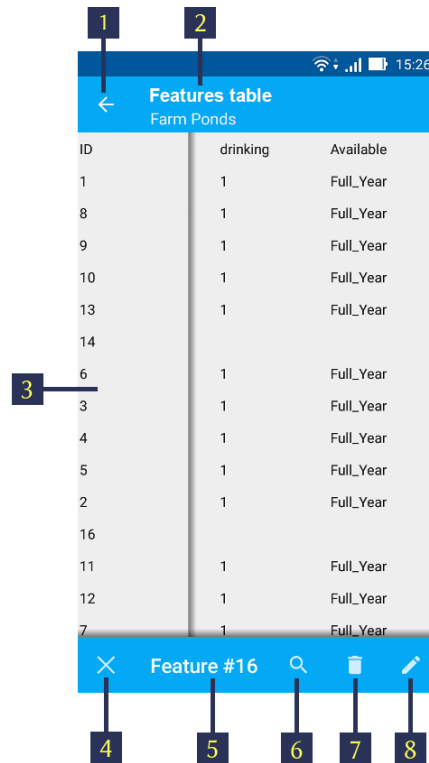


Рис.3.5: Features table toolbar.

The numbers indicate: 1 - Close Features table; 2 - Layer name; 3 - Features attributes; 4 - Close toolbar; 5 - Selected feature ID; 6 - Show selected feature on the map; 7 - Delete selected feature; 8 - Open Features table editing form.

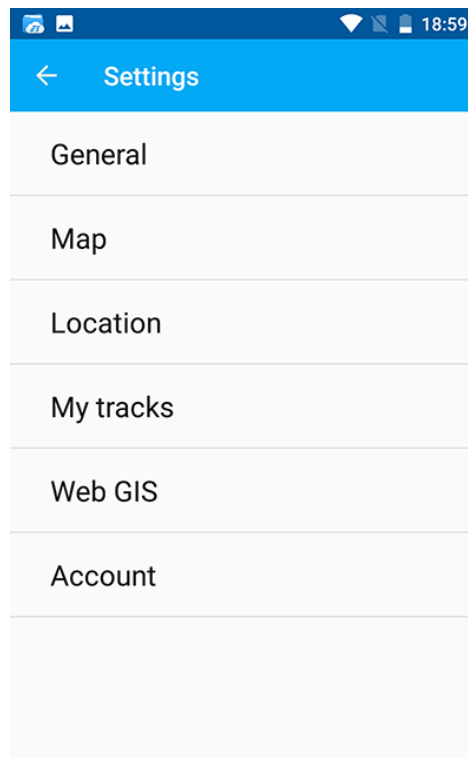


Рис.3.6: Settings.

- Web GIS
- Account

“General” settings allow to change basic settings of the map (see [Fig. 3.7](#)).

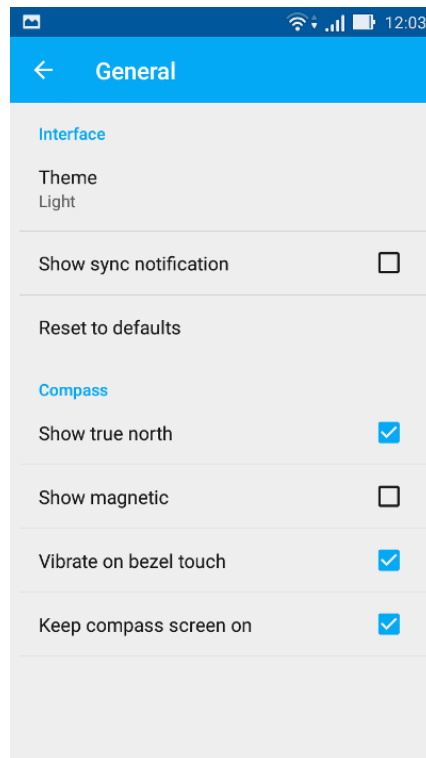


Рис.3.7: General settings.

Here you can select the theme (Light or Dark) and tune up compass settings.

“Map” settings allow to change basic settings of the map (see [Fig. 3.8](#)).

Map settings include:

- Show/hide Status info panel
- The way current location displays (show current location, show marker, how marker & accuracy radius)
- Show mini compass
- Do not turn off the screen when map displays - works only on the map screen
- Show/hide zoom control buttons
- Show scale ruler
- Show measuring button
- Coordinates format (for coordinates in Status bar and other dialogs and screens)
- Decimal places
- Map background (light, dark, neutral)

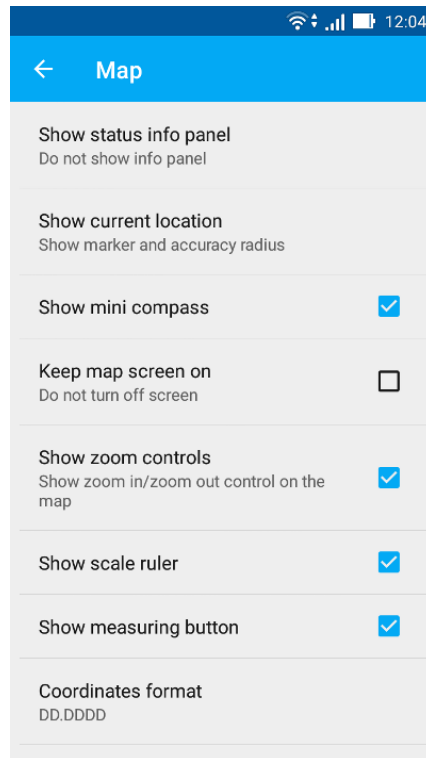


Рис.3.8: Map settings.

- Map path (here you can specify a path where map and layers data will be stored)

Note: For devices with several SD cards and Android 4.4 and higher, map path not on the main SD card can only be specified in the application home directory and its subdirectories (for example: Android/data/com.nextgis.mobile). This is also true for some devices without root access. Read-only folders won't show up in path selection dialog.

“Location” settings offer a few location specific settings (see [Fig. 3.9](#)).

Location settings include:

- Coordinate source (mobile networks/Wi-Fi + [GPS](#), Other networks or only GPS)
- Minimum update time
- Minimum update distance
- Count of GPS fixes

“Tracks” settings are similar to the location settings, but they are applied only for track recording.

Note: If you set value of the minimum update distance at more than 5 m, the operating system will start to smooth the track (remove outliers).

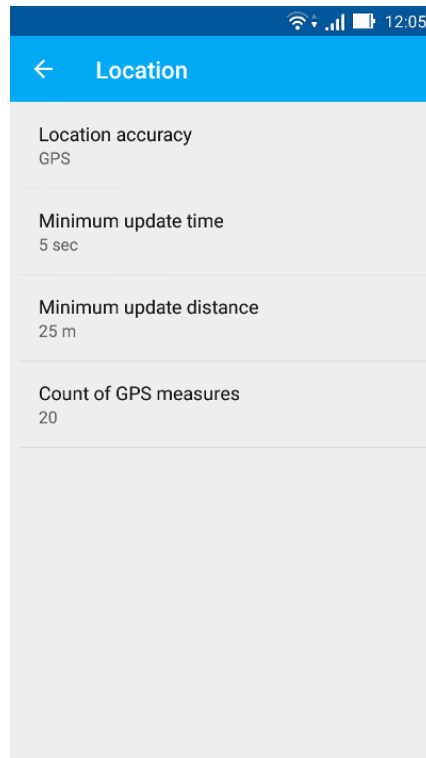


Рис.3.9: Location settings.

3.5 Useful features

From the Main screen itself you can access a couple of features useful in the field.

3.5.1 Show my location

To know your current location, just tap on the “Show my location” button (see item 3 in [Fig. 3.1](#) above). This will show your current location on the map screen with a marker. If your Status info panel (see item 9 in [Fig. 3.1](#) above) is switched on via appropriate Map settings (see [Fig. 3.8](#)) you’ll also be able to view the relevant information there.

Note: Your “Location” settings must be switched ON in your Android mobile settings.

3.5.2 Measure distance and area

It is possible to measure the distance between two points directly on the map screen. Just tap on the Measuring button on Map screen (see item 6 in [Fig. 3.1](#) above). Tap on your starting point (a new point in Edit mode will appear on the screen). Then tap on your finishing point (a second point in Edit mode and line between the points will appear on the screen). The distance between two points will be shown in Top toolbar. See [Fig. 3.10](#) below for illustration.

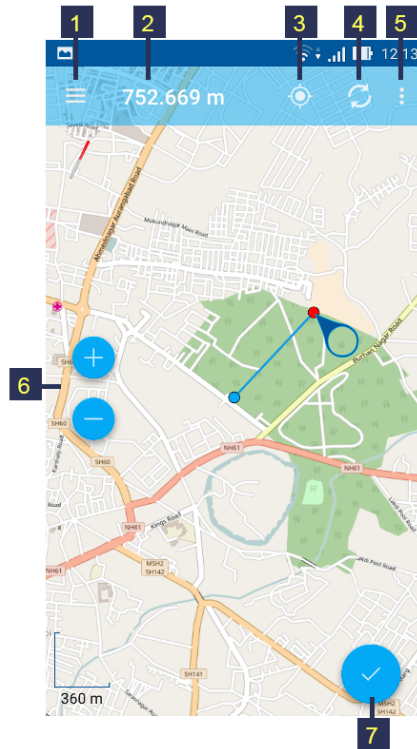


Рис.3.10: Measure distance.

The numbers indicate: 1 - Layers tree panel icon; 2 - Measured distance; 3 - “Show my location” button; 4 - “Load/Refresh geodata” button; 5 - Contextual menu icon; 6 - Zoom controls; 7 - Exit Measuring mode.

Position of any point may be edited by tapping on it and dragging it to the correct location.

You can add additional points to measure distance of angled lines and smooth curves, as well as measure areas of the formed polygons.

To exit Measure mode tap the blue tick button in the corner of the screen (see item 7 in [Fig. 3.10](#)).

Note: To use this feature “Show measuring button” checkbox must be switched ON in Map settings (see [Fig. 3.8](#)).

ADDING LAYERS

NextGIS Mobile allows to create new empty vector layers or import vector and raster layers from Android local storage, [QuickMapServices catalog](#)¹⁵, [nextgis.com](#)¹⁶ or [NextGIS Web](#)¹⁷. The supported data types are:

- *GeoJSON*;
- XYZ/TMS tile cache in ZIP-archive;
- tile cache in *.ngrc format;
- custom forms in *.ngfp format.

4.1 Creating new vector layer

Here are the steps to create an empty vector layer:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.1](#). Select “Create layer”.
2. In the opened dialogue enter the parameters of new vector layer (see [Fig. 4.2](#))

The standard form for the creation of new vector layer contains the following parameters:

1. Layer name - enter the name of layer which will be displayed in the layers tree.
2. Geometry type - select layer geometry type (point, linestring, polygon, multipoint, multilinestring, multipolygon).
3. Fields - list of fields which can be added, edited or deleted. These are attribute values of the layer.

You can add as many attributes for a new vector layer as you like. To add a new attribute tap on “+” button next to “Fields”. This will open a new dialogue for creation of each new field (see [Fig. 4.3](#)).

Dialog for creation of a new field contains the following parameters:

¹⁵ <https://qms.nextgis.com/>

¹⁶ <https://my.nextgis.com/signup/?next=/webgis/>

¹⁷ <http://nextgis.com/nextgis-web/>

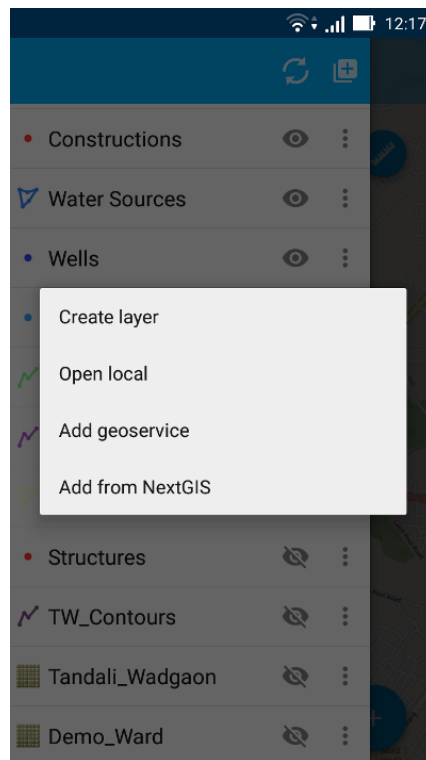


Рис.4.1: Add geodata dialogue.

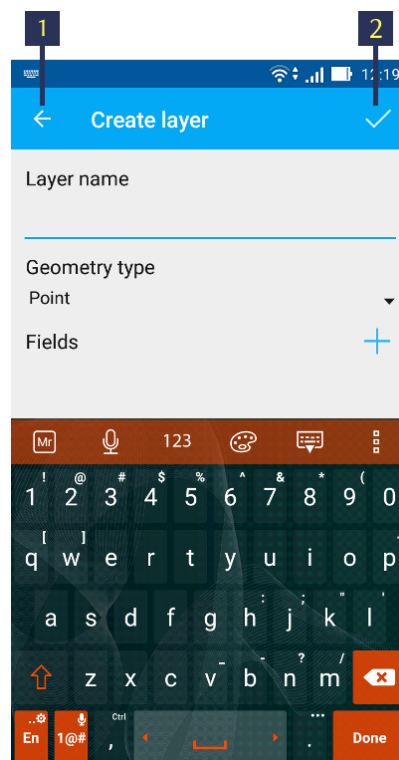


Рис.4.2: Parameters of the new vector layer.

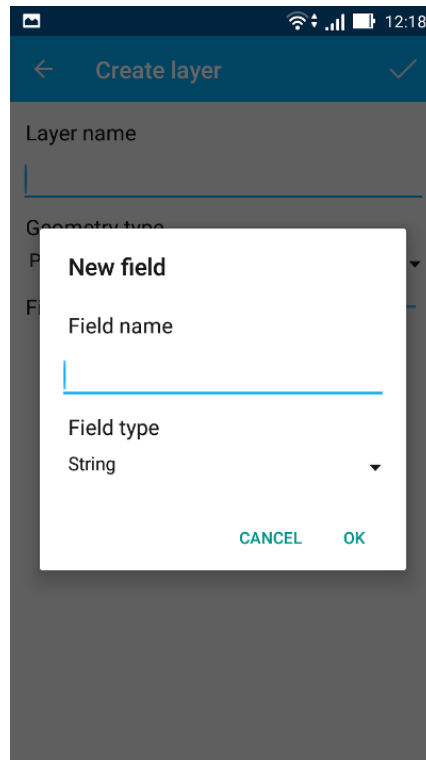


Рис.4.3: Dialog for creation of a new field.

1. Field name - enter the name of the field.

Note: The field name can only be entered in Latin characters (letters and numbers!) without spaces. It should also differ from SQL reserved keywords.

2. Field type - select field type from one of the following types: string, integer, real, date&time, date, time.

4.2 Creating vector layer from GeoJSON data

NextGIS Mobile allows to create a vector layer by importing an existing GeoJSON file. To open data in GeoJSON format:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.1](#). Select “Open local”.
2. Select GeoJSON file from your mobile device storage (see [Fig. 4.4](#)). For example, tap on the file “Roads.geojson” to import the “Roads” vector data file.
3. When the file is selected Layer settings dialogue opens. Here you can specify a new vector layer name or keep the name as it is, e.g. “Roads” (see [Fig. 4.5](#)).
4. Pressing “Create” button starts data processing for creation of a new layer.

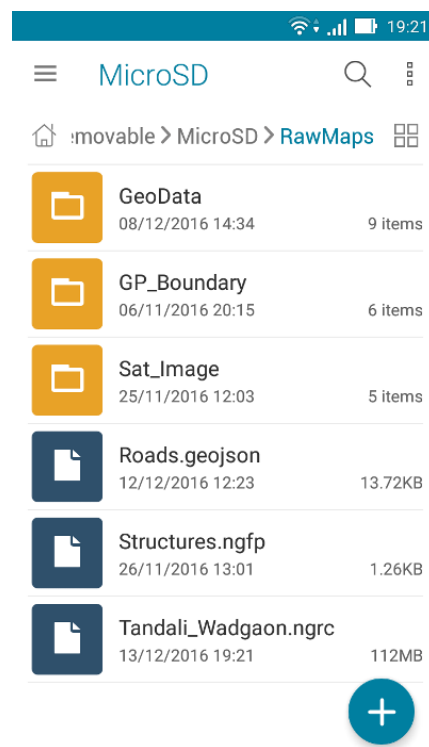


Рис.4.4: Android local storage.

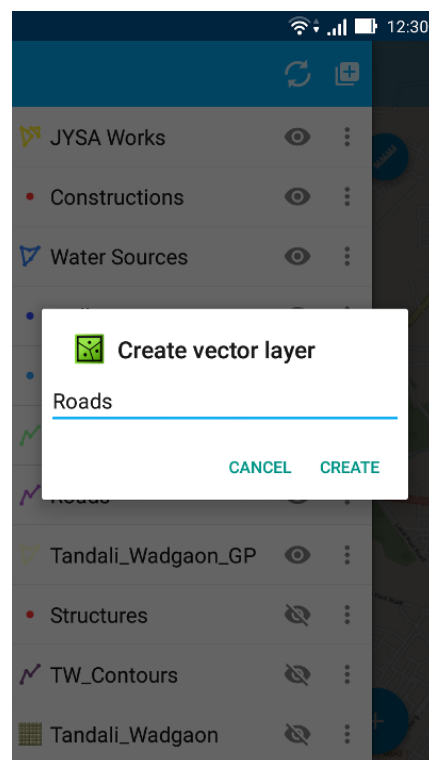


Рис.4.5: Layer settings dialogue.

Note: In case of GeoJSON file importing the new layer will always be a vector layer!

You can check if the new layer was created successfully in the layers tree panel. The newly created layer will be shown up in the layers tree (see Fig. 4.6). The “Roads” layer is marked in orange rectangle.

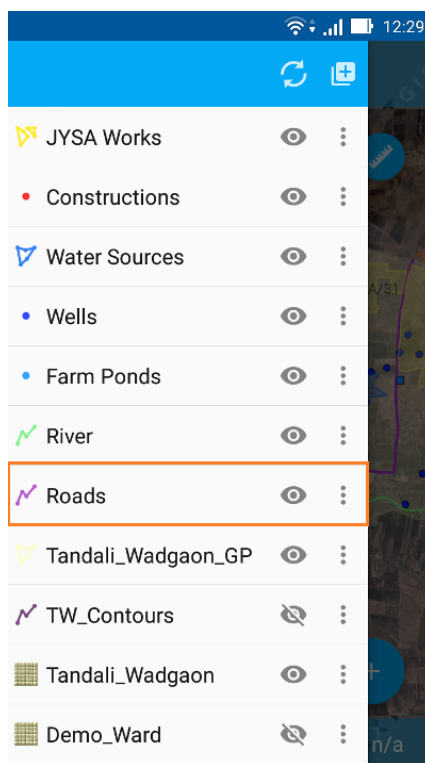


Рис.4.6: Layers tree panel.

GeoJSON: format requirements

- *Coordinate system* of input geometries can be WGS 84 (EPSG:4326) or Web Mercator (EPSG:3857) only. If input file has different coordinate system you will see a warning message about unsupported coordinate system.
- All geometries in the file must be of the same type. If input file contains varying types of geometry in the output you will have a file with geometries type that coincides with the type of first record, i.e. geometry of first entry will determine the type of layer geometry.
- Text strings must be encoded in UTF-8 format.

Note: You can read more about GeoJSON format in its [specification](http://geojson.org/)¹⁸. GeoJSON is based on JSON format (see [RFC 4627](https://www.ietf.org/rfc/rfc4627.txt)¹⁹).

You can only use standard attributes form (not custom *.ngfp form) for editing GeoJSON layer.

¹⁸ <http://geojson.org/>

¹⁹ <https://www.ietf.org/rfc/rfc4627.txt>

The standard attributes form contains only following three fields:

1. Text field for entering characters or digits.
2. Dialogue for entering date & time.
3. "Add pictures" button.

A sample standard attributes form is shown below in Fig. 4.7.

Рис.4.7: Standard attributes form.

The numbers indicate: 1 - Back to previous screen; 2 - Apply changes; 3 - Add pictures.

You can further perform standard edit operations like Add, Modify or Delete operations for this layer. For more information about GeoJSON layer editing see *Editing a geometry* (c. 46).

4.3 Creating vector layer from Custom forms (NGFP)

NextGIS Mobile allows to create a vector layer by importing an existing NGFP file.

NGFP files can be generated using [NextGIS FormBuilder](http://nextgis.com/nextgis-formbuilder/)²⁰. NGFP is a *GeoJSON* file with additional information (JSON) which is packaged in zip archive and has .ngfp extension.

NGFP file allows to use custom (not standard) attributes forms optimized for attributes viewing and editing. Custom form may contain special controls for editing, such as dropdown lists, radio buttons or linked lists.

Follow these steps to open NGFP file in NextGIS Mobile:

²⁰ <http://nextgis.com/nextgis-formbuilder/>

Рис.4.8: Custom attributes form.

The numbers indicate: 1 - Back to previous screen; 2 - Apply changes; 3 - Settings; 4 - Text or Integer; 5 - Dropdown list; 6 - Date & Time; 7 - Radio buttons.

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.1](#). Select “Open local”.
2. Select NGFP file from your mobile device storage (see [Fig. 4.9](#)). For example, tap on the file “Structures.ngfp” to import the “Structures” form.
3. When the file is selected Layer settings dialogue opens. Here you can specify a new vector layer name or keep the name as it is, e.g. “Structures” (see [Fig. 4.10](#)):
4. Pressing “Create” button starts data processing for creation of a new vector layer.

You can check if the new layer was created successfully in the layers tree panel. The newly created layer will be shown up in the layers tree in the layers tree (see [Fig. 4.6](#)). The “Structures” layer is shown in orange rectangle.

You can further perform standard edit operations like Add, Modify or Delete operations for this vector layer. For more information about NGFP layer editing see [Editing a geometry](#) (c. 46).

4.4 Creating raster layer from Tile cache (XYZ/TMS)

NextGIS Mobile allows to create a raster layer by importing tile cache.

Tile cache is a zip-archive with folders and tiles stored in accordance with a tiling

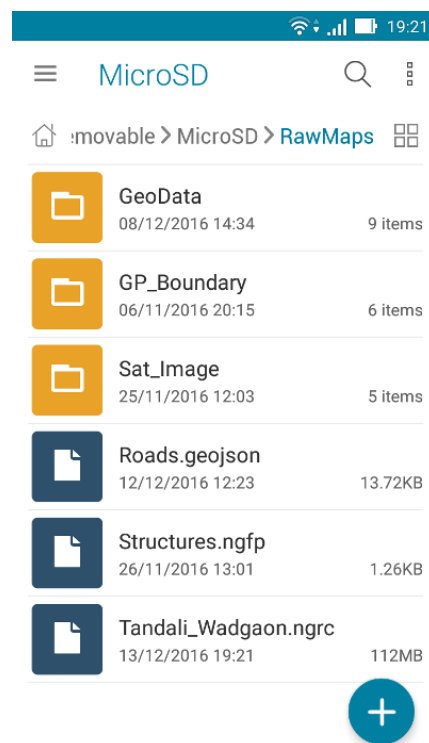


Рис.4.9: Android local storage.

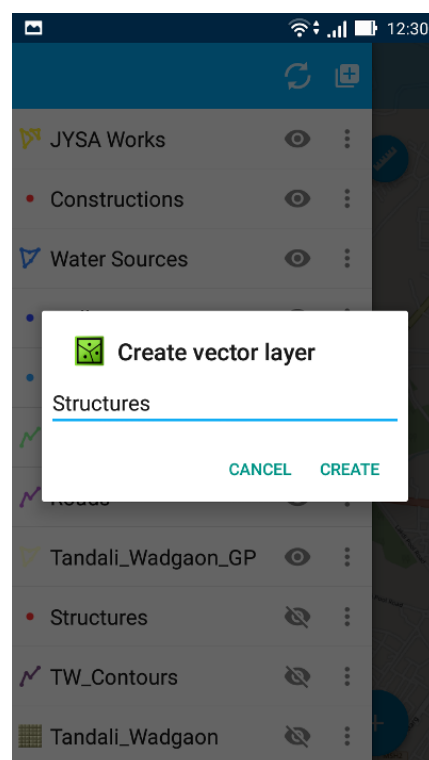


Рис.4.10: Layer settings dialogue.

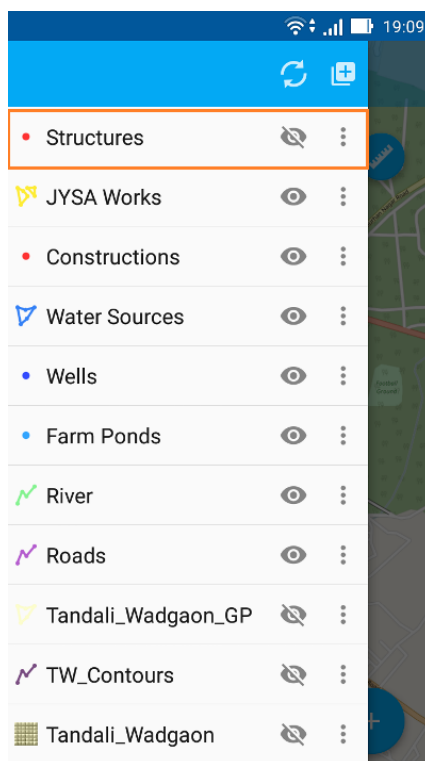


Рис.4.11: Layers tree panel.

scheme (for example, folder_z/folder_x/y.png). Folders of level Z can be located in the root or in a folder in the root folder (name of the folder doesn't matter, but there have to be only one folder). Deeper nesting of level Z folders is not allowed.

Tile cache can be created with the extension module [NextGIS QGIS - QTiles](#)²¹. Resulted archive can be uploaded to any available folder in your mobile device storage.

Follow these steps to open zip-archive with tile cache:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on "Add geodata" button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.1](#). Select "Open local".
2. Select zip-archive from your mobile device storage (see [Fig. 4.12](#)). For example, tap on the file "mapnik.zip" to import the tile cache:
3. When zip-archive is selected a layer settings dialog opens (see [Fig. 4.13](#)):

Here you can select tile layer type (tile structure system) - XYZ (OSM) or TMS (OSGeo) (see [Fig. 4.14](#)) and in-memory cache size (see [Fig. 4.15](#)):

4. Pressing "Create" button starts data processing for creation of a new raster layer (see [Fig. 4.16](#)).

You can check if the new raster layer was created successfully in the Layers tree panel. The newly created raster layer will be shown up in the layers tree first in the Layers tree (see [Fig. 4.17](#)).

²¹ <http://plugins.qgis.org/plugins/qtiles/>

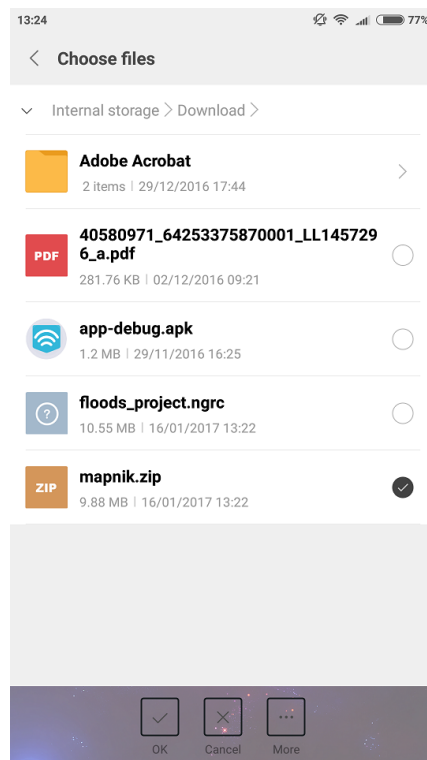


Рис.4.12: Android local storage.

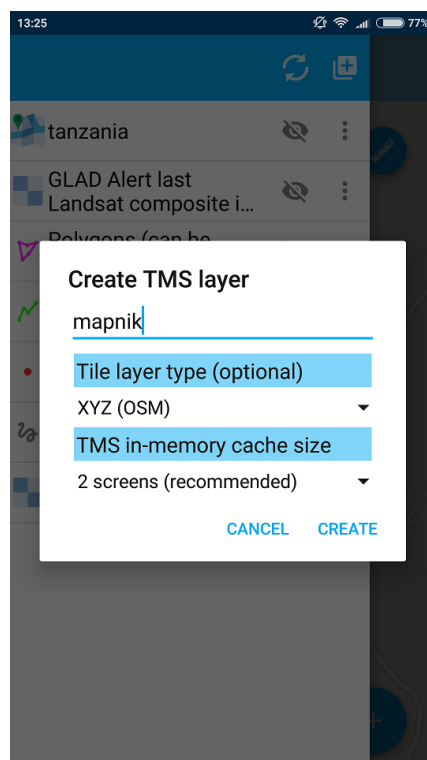


Рис.4.13: Tile layer settings dialog.

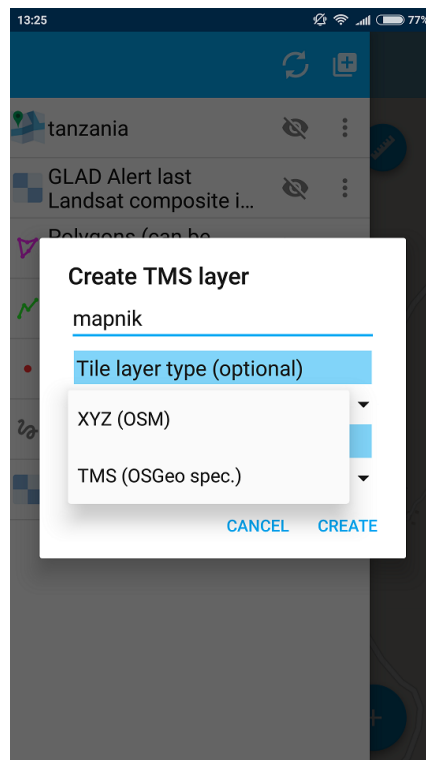


Рис.4.14: Tile structure settings dialog.

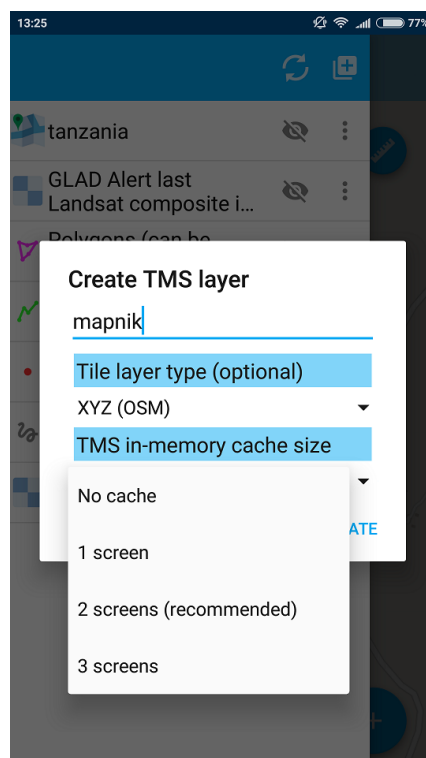


Рис.4.15: Cache size settings dialog.

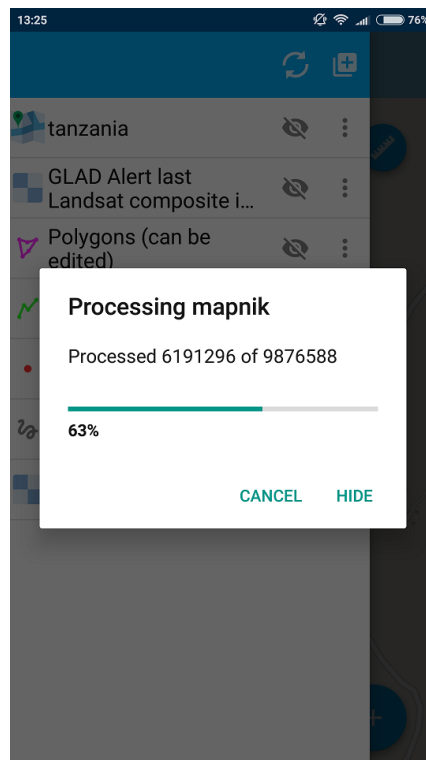


Рис.4.16: Data processing for creation of a new layer from tiles.

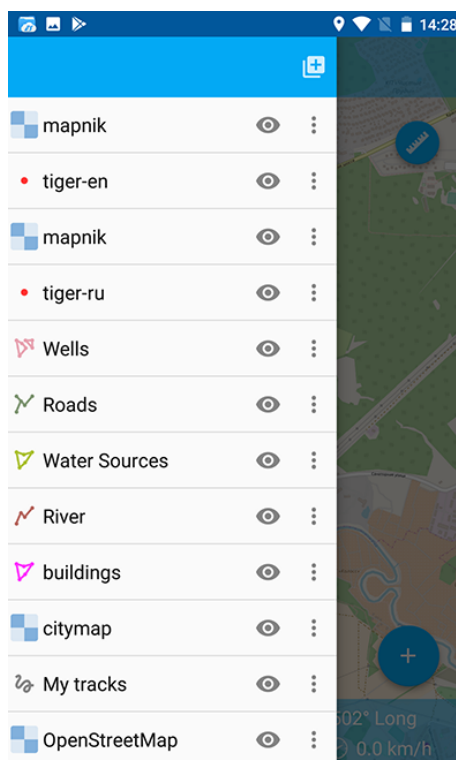


Рис.4.17: Layers tree panel.

4.5 Creating raster layer from Tile cache (NGRC)

NextGIS Mobile also allows to create a raster layer by importing tile cache in *.ngrc format. NGRC files can be created from virtually any geodata in QGIS using our QTiles plugin.

Follow these steps to import tile cache in *.ngrc format :

1. Open Layers tree panel (item 1 in Fig. 3.1). Then tap on “Add geodata” button (item 4 in Fig. 3.2). The dialogue will open as shown in Fig. 4.1. Select “Open local”.
2. Select *.ngrc file from your mobile device storage (see Fig. 4.18). For example, tap on the file “Tandali_Wadgaon.ngrc” to import the “Tandali Wadgaon” tile cache prepared using satellite raster image.

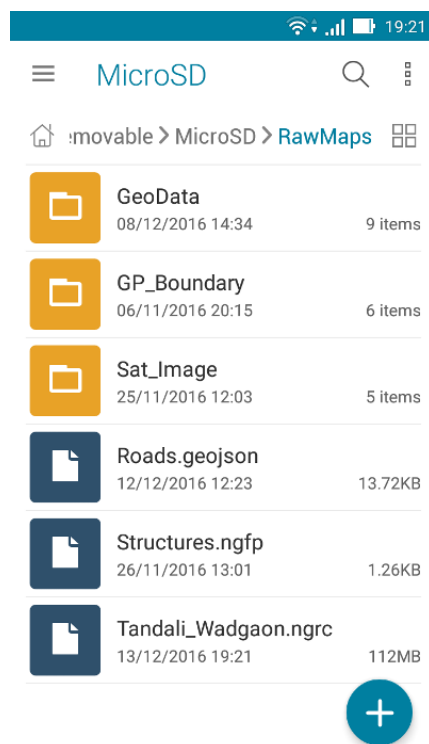


Рис.4.18: Android local storage.

3. NextGIS Mobile will start data processing for creation of a new raster layer. You can check if the new layer was created successfully in the Layers tree panel. The newly created layer will be shown up in the layers tree in the layers tree as shown in (see Fig. 4.19). The “Tandali_Wadgaon” layer is shown in orange rectangle.

4.6 Creating raster layer from external geoservice

NextGIS Mobile also supports creation of raster layers from external geoservices.

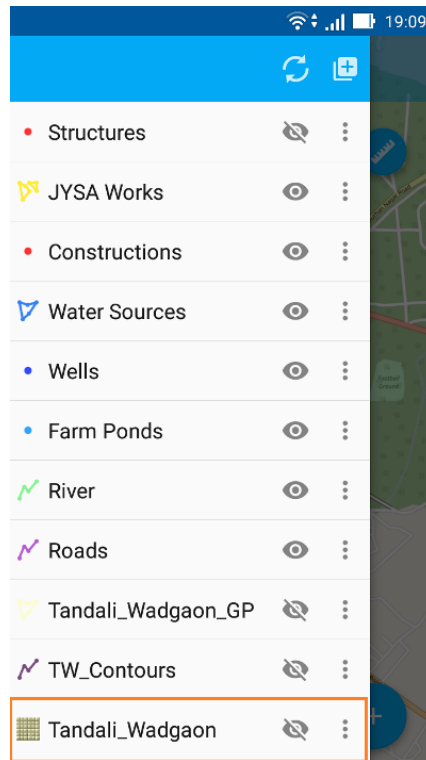


Рис.4.19: Layers tree panel.

Warning: You need to be **Online** while creating layer from external geoservice. It will consume your data pack & apply standard Internet charges from your Internet service provider.

4.6.1 Creating raster layer from QuickMapServices tile service

Follow these steps to add raster layer from TMS services listed in [QuickMapServices catalog](#)²²:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.1](#). Select “Add geoservice” and the dialogue will open as shown in [Fig. 4.20](#) below.
2. Select a geoservice you want to add and tap “Add” to create raster layer from that service. The newly created layer will be shown up in the layers tree in Layers tree.

4.6.2 Creating raster layer from private tile service

If you want to add tile service not listed in [QuickMapServices catalog](#)²³ you can do it by following these steps:

²² <https://qms.nextgis.com/>

²³ <https://qms.nextgis.com/>

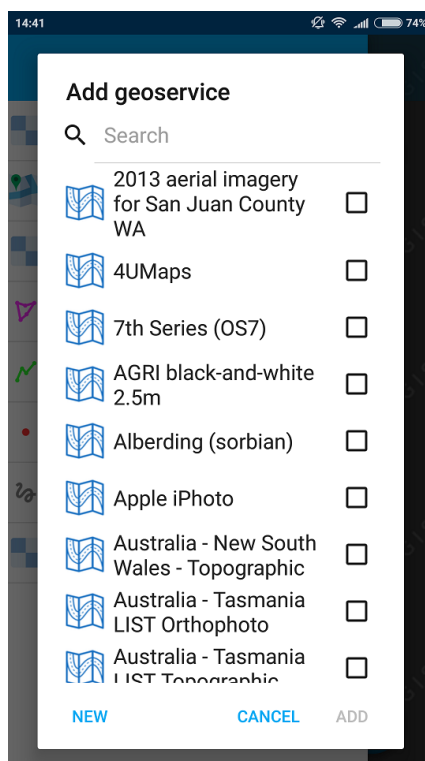


Рис.4.20: Add Geoservice dialogue.

1. Tap “New” in above Fig. 4.20. It will open up “Create” dialogue for a new TMS service as shown in Fig. 4.21 below.
2. Specify Layer name & Layer URL. Layer URL should specify location of X value (number of tile by horizontal), Y (number of tile by vertical) and Z (zoom level). These values are specified using wildcard code for X - **{x}**, for Y - **{y}**, for Z - **{z}**. Additionally you can specify subdomains (e.g. for subdomains a.tileopenstreetmap.org, b.tileopenstreetmap.org, c.tileopenstreetmap.org the address will look like this: **{a,b,c}.tile.openstreetmap.org**).

Note: NextGIS Mobile requests tiles from each URL (subdomain) in 2 streams. So from URL like {a,b,c}.tile.openstreetmap.org tiles will be downloaded in 6 streams.

3. You can also specify Tile layer type (XYZ (OSM) and TMS (OSGeo) standards are supported), TMS in-memory cache size (none, 1, 2 or 3 screens) and credentials (Login & Password) if authentication is required for accessing tiles.

Note: Only [Basic access authentication](http://en.wikipedia.org/wiki/Basic_access_authentication)²⁴ is currently supported.

4. Tap “Create” to create new raster layer from that TMS service. The newly created layer will be shown up in the layers tree in Layers tree.

²⁴ http://en.wikipedia.org/wiki/Basic_access_authentication

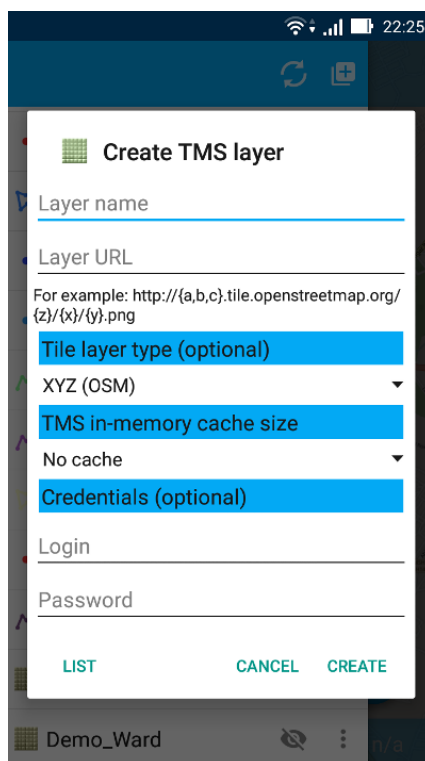


Рис.4.21: Create TMS service dialogue.

4.6.3 Caching of tile service data

You can work **Offline** with raster layers created from external geoservices. In order to do it you need to download tiles for your area of interest to your device before going into the field:

1. Make sure raster layer you need in the field is added to Map screen and is visible. Then open the map extent you want to download tiles for.
2. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then find raster layer in Layers tree and tap Layer contextual menu icon (item 5 in [Fig. 3.2](#)).
3. Tap “Download tiles” button in Layer contextual menu as shown in [Fig. 4.22](#) below.
4. A new dialogue will open as shown in [Fig. 4.23](#). Select zoom levels you need and tap “Start” button.

Note: The lower selected zoom levels, the smaller number of tiles for an area of interest will have to be downloaded and the faster they will be downloaded. You can track downloading progress in Android Status Bar. Notifications for NextGIS Mobile app should be switched ON in System Settings.

Warning: If number of tiles to download for selected zoom levels is more than 6000 tiles for each zoom level, only first 6000 tiles for each zoom level will be downloaded. The rest will not be downloaded due to danger of memory overflow.

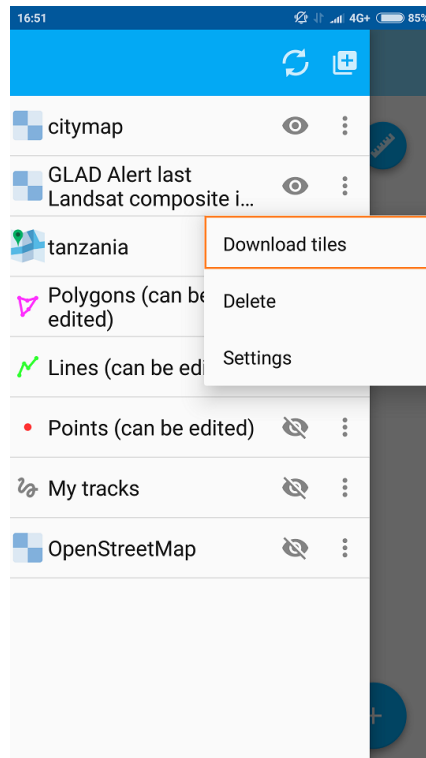


Рис.4.22: Download tiles button.

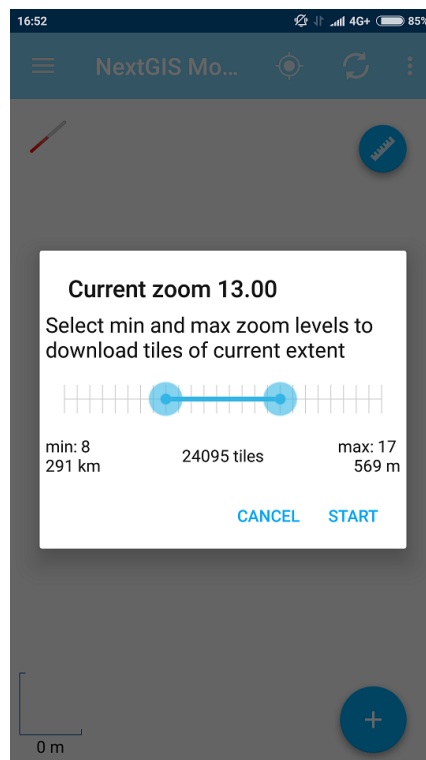


Рис.4.23: Select zoom levels dialogue.

4.7 Geodata uploading and web-maps creation using geodata from your Web GIS

NextGIS Mobile supports uploading of geodata from Web GIS created at nextgis.com cloud service.

For geodata uploading sign in not as a guest, but with rights for data creation, in your Web GIS. You can learn more about geodata uploading in [Raster layer](#)²⁵ and [Vector layer](#)²⁶.

4.7.1 Geodata addition from Web GIS

To add files/geodata from Web GIS to NextGIS:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)). Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)). The dialogue will open as shown in [Fig. 4.24](#). Select “Add from Web GIS”.

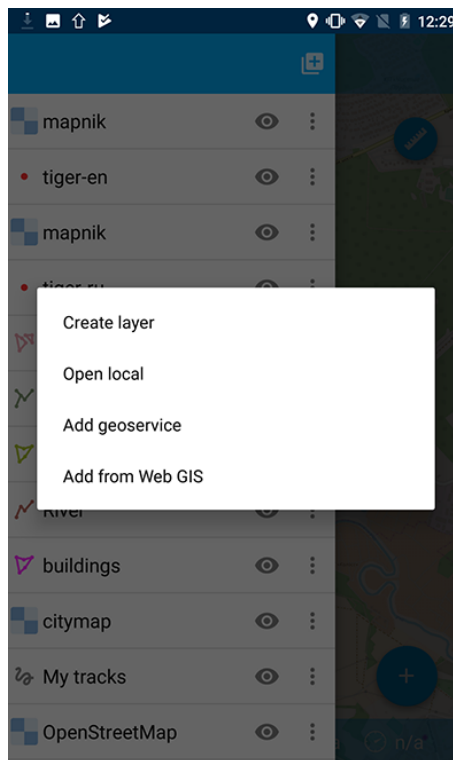


Рис.4.24: Addition from Web GIS.

2. In opened dialogue select “Add Web GIS” and tap “Add” button (see [Fig. 4.25](#)):
3. Then fill up your Web GIS domain’s name and password for Web GIS in the form for Web GIS adding and tap “Sign in” button (see [Fig. 4.26](#)):
4. After Web GIS adding select the account with your Web GIS domain’s name and tap “Add” button (see [Fig. 4.27](#)):

²⁵ http://docs.nextgis.com/docs_ngcom/source/data_upload.html#ngcom-raster-layer

²⁶ http://docs.nextgis.com/docs_ngcom/source/data_upload.html#ngcom-vector-layer

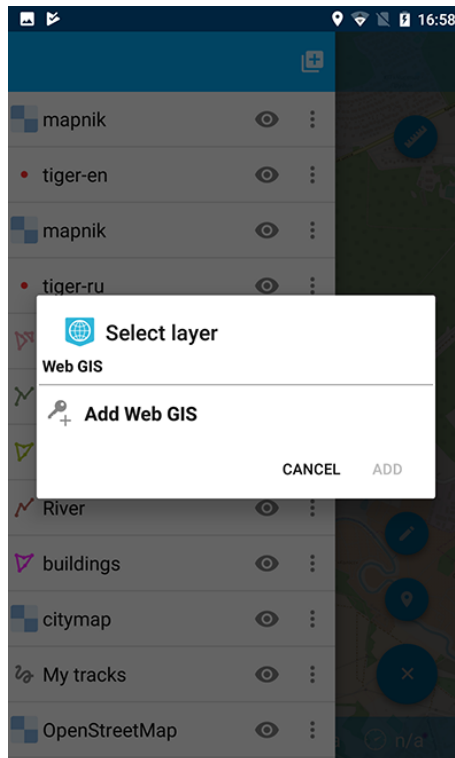


Рис.4.25: Addition of an account.

Do you have GIS? Sign up at my.nextgis.com to get your own one!

Web GIS name .nextgis.com

administrator

Password

Have your own NGW server?
[Click here!](#)

Рис.4.26: Web GIS adding dialog.

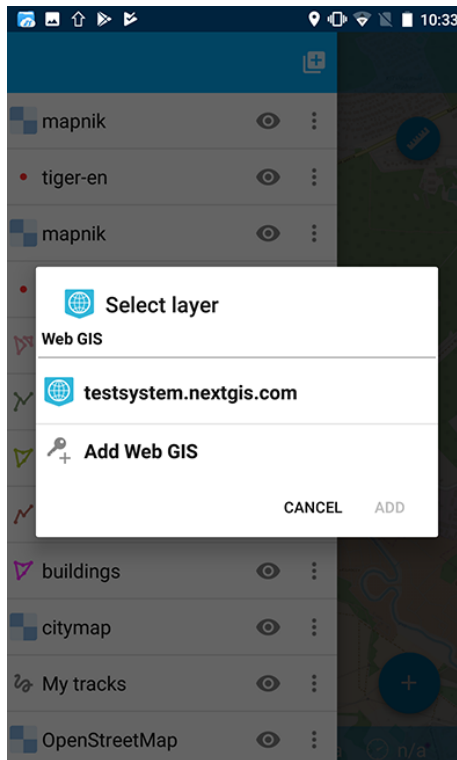


Рис.4.27: Web GIS account selection dialog.

5. The dialog of layer selection for importing geodata from your Web GIS to NextGIS Mobile will open (see [Fig. 4.28](#)):

If Web GIS layer has a style, there is a possibility to choose not only vector data, but also raster data for importing. Vector data are downloading to the mobile device and can be used offline. Raster data can be used only online. A vector layer can be added/imported either as vector or as raster data. Tick off the type for the layer in the right side of the screen (see [Fig. 4.29](#)):

Tap the button in the upper right corner of the screen to create a new group of data in your Web GIS. Specify a name for the group and tap “OK”. In the case of the success you will see it in your Web GIS window (see [Fig. 4.30](#)):

6. After the layer selection for importing from your Web GIS to NextGIS Mobile, tap “Add” button. The importing process will begin. The newly created layer will be shown up in the layers tree in Layers tree.

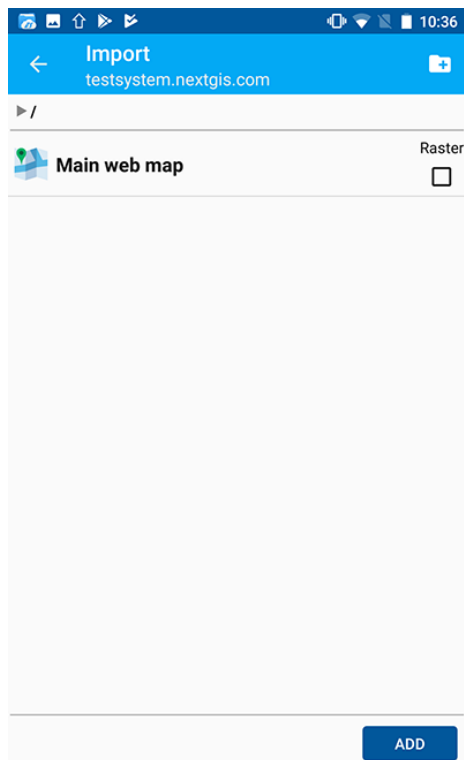


Рис.4.28: The dialog of layer selection for importing geodata from your Web GIS.

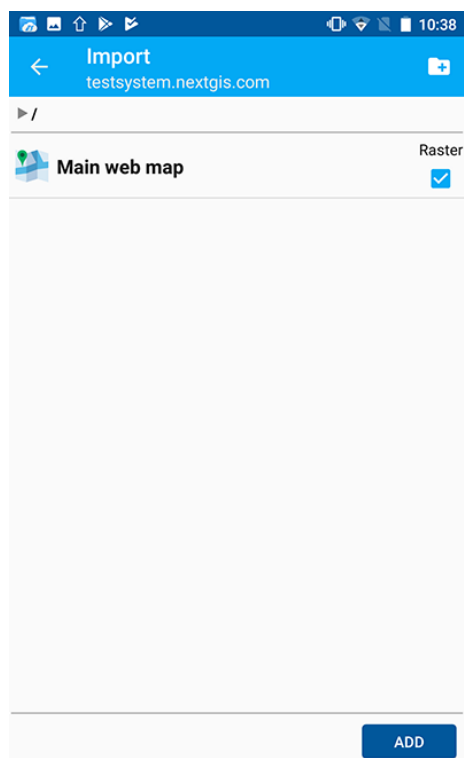


Рис.4.29: Layer type selection.

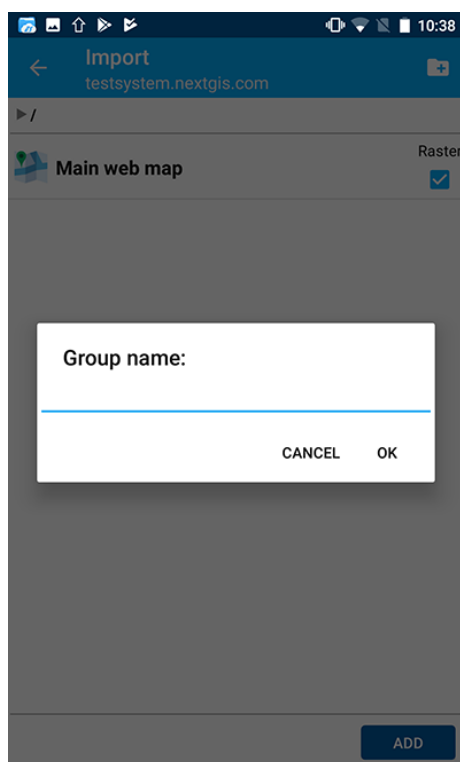


Рис.4.30: Adding of a new group.

EDITING LAYERS

NextGIS Mobile allows you to edit vector layers added to the map. While editing, you can:

- add new features;
- delete features;
- edit features.

5.1 Switching to Edit mode

There are several ways to switch to Edit mode.

1. The first way is Main actions button (the big blue button in the right bottom corner of map screen). Pressing Main actions button opens a menu of most common actions (see [Fig. 5.1](#)).

You need to tap the pencil button (item 6 in [Fig. 5.1](#)) to switch to Edit mode.

Then select a vector layer you want to edit in an opened dialog (see [Fig. 5.2](#)).

2. The second way to switch to Edit mode is to long-press the object on the Map. This will activate Edit mode for the layer which includes this object.
3. The third way is to open Layers tree panel (item 1 in [Fig. 3.1](#)) and tap on Layer contextual menu icon next to the vector layer name (item 5 in [Fig. 3.2](#)). This will open the contextual menu items (item 6 in [Fig. 3.2](#)). There you need to select “Edit”.

5.2 The Editing Toolbar

After switching to Edit mode using any of the methods described in [Switching to Edit mode](#) (c. 36) section Editing Toolbar is opened at the bottom of the map screen (see [Fig. 5.3](#)).

Note: This editing toolbar is common for all vector layers irrespective of the type of geometry they contain (point, line or polygon).

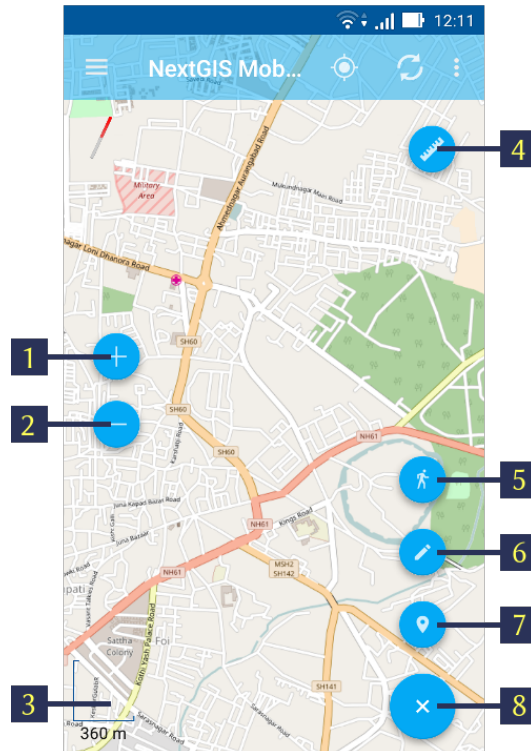


Рис.5.1: Common actions menu.

The numbers indicate: 1 - Zoom in; 2 - Zoom out; 3 - Scale ruler; 4 - Measure button; 5 - Add geometry by walk; 6 - Edit layers; 7 - Add current location; 8 - Close Common actions menu.

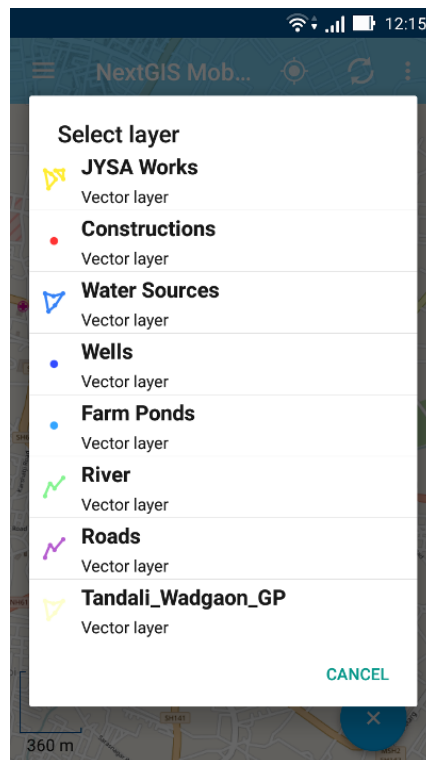


Рис.5.2: Select layer dialog.

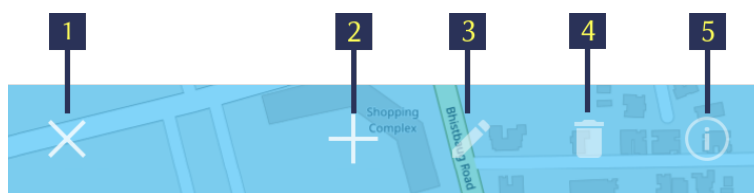


Рис.5.3: Editing Toolbar.

The numbers indicate: 1 - Quit Edit mode; 2 - Add new feature; 3 - Edit feature; 4 - Delete feature; 5 - Attributes info.

5.3 Adding features

To create a new feature first select a layer you want to add this feature to. Then switch to Edit mode using any of the methods described in [Switching to Edit mode](#) (c. 36) section.

After Editing Toolbar is opened tap “Add new feature” button (item 2 in [Fig. 5.3](#)).

Note: Type of geometry of a new feature should correspond to the type of geometry of the layer you want to add this feature to (e.g. you can only add a new point to a point/multipoint vector layer, a new line - to a line/multiline vector layer, etc.).

Note: If you want to start adding new features from scratch first you have to create an empty layer as described in [Creating new vector layer](#) (c. 14) section.

5.3.1 Adding a point

1. To create a new point first select a point/multipoint vector layer you want to add this feature to. Then switch to Edit mode using any of the methods described in [Switching to Edit mode](#) (c. 36) section.
2. Tap “Add new feature” button in Editing Toolbar (item 2 in [Fig. 5.3](#)).
3. In a point layer a new point will appear in the center of the screen highlighted in red. You can move this point anywhere on the map simply by dragging the circular handle attached to it. The red crosshair marker indicates the center of Map screen (see [Fig. 5.4](#)).
4. For adding a point to a multipoint layer execute steps 1-2 and then tap “Add point” (item 6 in [Fig. 5.5](#)). After that you can set point’s location as described above in the step 3.
5. After a geometry of new point is added you may set its attributes by tapping on the “floppy” button (item 5 in [Fig. 5.4](#) and [Fig. 5.5](#)). Pressing floppy icon will save a new point and open Attributes editing form (see [Fig. 5.6](#)).
6. When all the attributes are set tap “Apply changes” button (item 2 in [Fig. 5.6](#)) to save the attributes. If you tap “Back” button instead (item 1 in [Fig. 5.6](#)) the app will warn you of any unsaved changes. You can also attach photos to

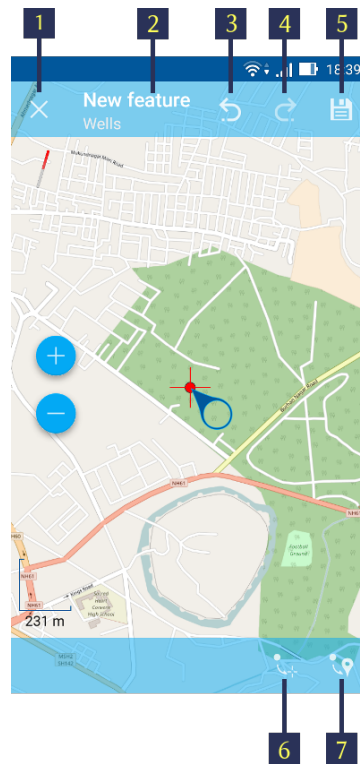


Рис.5.4: Adding a point to Point layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & Name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Move point to the center of Map screen; 7 - Move point to the current location.

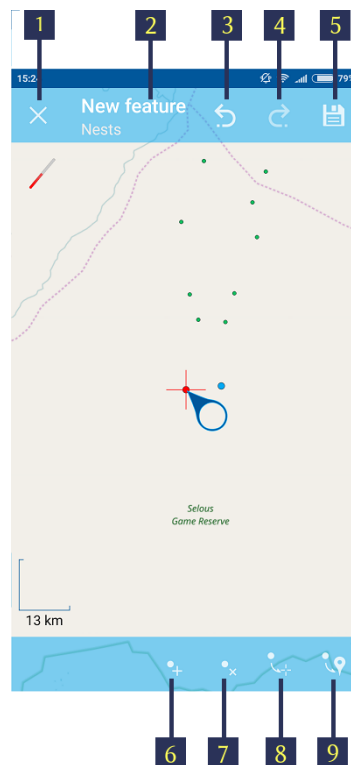


Рис.5.5: Adding a point to Multipoint layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & Name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add point; 7 - Delete point; 8 - Move point to the center of Map screen; 9 - Move point to the current location.

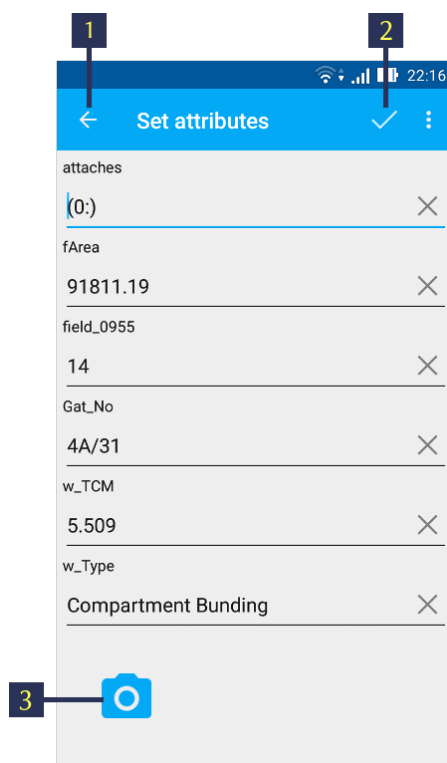


Рис.5.6: Attributes editing form.

The numbers indicate: 1 - Back to previous screen; 2 - Apply changes; 3 - Add photo.

each feature using “Add photo” button in Attributes editing form (item 3 in Fig. 5.6).

5.3.2 Adding a line

1. To create a new line first select a linestring/multilinestring vector layer you want to add this feature to. Then switch to Edit mode using any of the methods described in *Switching to Edit mode* (c. 36) section.
2. Tap “Add new feature” button in Editing Toolbar (item 2 in Fig. 5.3).
3. In a linestring layer a new line will appear in the center of the screen, with one of its vertices highlighted in red (see Fig. 5.7).

You can move the vertices anywhere on the map simply by dragging the circular handle attached to the selected vertex. If you tap on the vertex in the middle of the line, two new vertices will be created automatically. This way you can add as many vertices as you need and shape the line geometry any way you like, including smooth curves.

4. For adding a line to a multilinestring layer execute steps 1-2 and then tap “Add line” (item 6 in Fig. 5.8). After that you can set vertices’ location as described above in the step 3.
5. After a geometry of new line is added you may set its attributes by tapping on the “floppy” button (item 5 in Fig. 5.7 and Fig. 5.8). Pressing floppy icon will save a new line and open Attributes editing form (see Fig. 5.6).

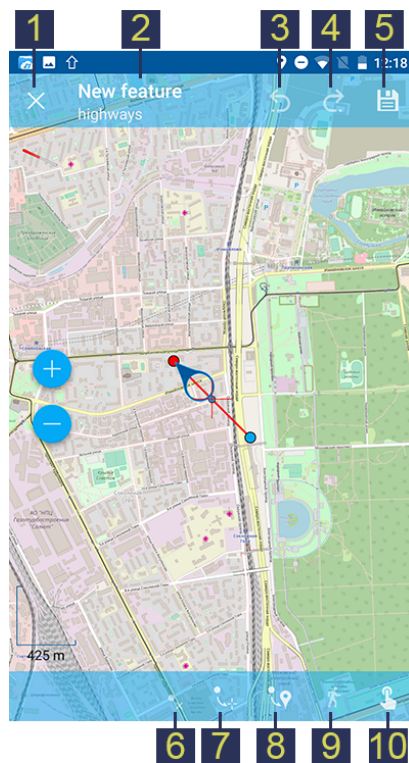


Рис.5.7: Adding a line to Linestring layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Delete vertex; 7 - Move vertex to the center of Map screen; 8 - Move vertex to the current location; 9 - Append geometry by walk; 10 - Edit by touch.

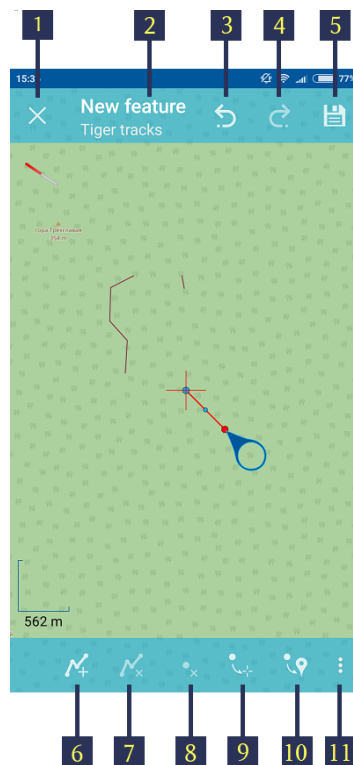


Рис.5.8: Adding a line to Multilinestring layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add line; 7 - Delete line; 8 - Delete vertex; 9 - Move vertex to the center of Map screen; 10 - Move vertex to the current location; 11 - Contextual menu with the rest of commands (Append geometry by walk, Append geometry by touch).

- When all the attributes are set tap “Apply changes” button (item 2 in Fig. 5.6) to save the attributes. If you tap “Back” button instead (item 1 in Fig. 5.6) the app will warn you of any unsaved changes. You can also attach photos to each feature using “Add photo” button in Attributes editing form (item 3 in Fig. 5.6).

5.3.3 Adding a polygon

- To create a new polygon first select a polygon/multipolygon vector layer you want to add this feature to. Then switch to Edit mode using any of the methods described in *Switching to Edit mode* (c. 36) section.
- Tap “Add new feature” button in Editing Toolbar (item 2 in Fig. 5.3).
- In a polygon layer a new polygon will appear in the center of the screen, with one of its vertices highlighted in red (see Fig. 5.9).

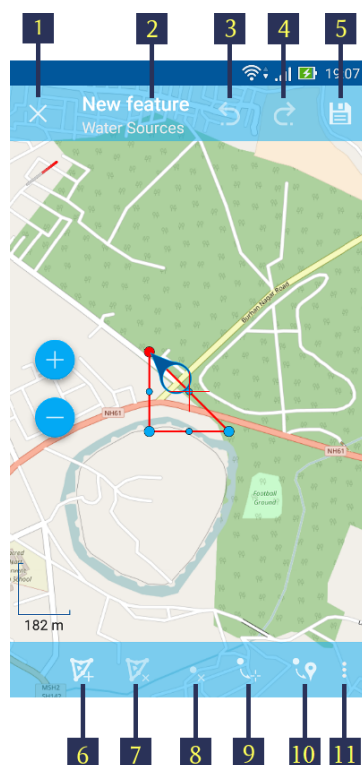


Рис.5.9: Adding a polygon to Polygon layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add hole; 7 - Delete hole; 8 - Delete vertex; 9 - Move vertex to the center of Map screen, 10 - Move vertex to the current location, 11 - Contextual menu with the rest of commands (Append geometry by walk, Append geometry by touch).

You can move the vertices anywhere on the map simply by dragging the circular handle attached to the selected vertex. If you tap on the vertex in the middle of the line, two new vertices will be created automatically. This way you can add as many vertices as you need and shape the polygon geometry any way you like, including smooth curves.

You can also create holes in polygons by tapping button “Add hole” (item 6 in Fig.

5.9 or item 8 in Fig. 5.10) and creating a hole geometry the same way you create polygon geometry.

Note: Hole geometry must be located INSIDE a polygon geometry otherwise the changes won't be saved!

4. For adding a polygon to a multipolygon layer execute steps 1-2 and then tap "Add polygon" (item 6 in Fig. 5.10). After that you can set vertices' location as described above in the step 3.

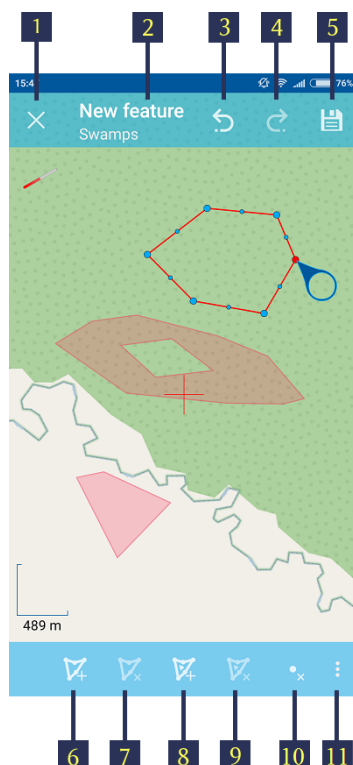


Рис.5.10: Adding a polygon to Multipolygon layer.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add polygon; 7 - Delete polygon; 8 - Add hole; 9 - Delete hole; 10 - Delete vertex; 11 - Contextual menu with the rest of commands (Move vertex to the center of Map screen, Move vertex to the current location, Append geometry by walk, Append geometry by touch).

5. After a geometry of new polygon is added you may set its attributes by tapping on the "floppy" button (item 5 in Fig. 5.9 and Fig. 5.10). Pressing floppy icon will save a new line and open Attributes editing form (see Fig. 5.6).
6. When all the attributes are set tap "Apply changes" button (item 2 in Fig. 5.6) to save the attributes. If you tap "Back" button instead (item 1 in Fig. 5.6) the app will warn you of any unsaved changes. You can also attach photos to each feature using "Add photo" button in Attributes editing form (item 3 in Fig. 5.6).

5.4 Adding current location

To add current location to a vector layer press Main actions button (item 8 in [Fig. 3.1](#)), and then press a pushpin icon (item 7 in [Fig. 5.1](#)). In an opened dialog select a layer you'd like to add current location to (only point/multipoint geometry will be displayed) (see [Fig. 5.11](#)). If there is only one point/multipoint layer available, it will be selected automatically.

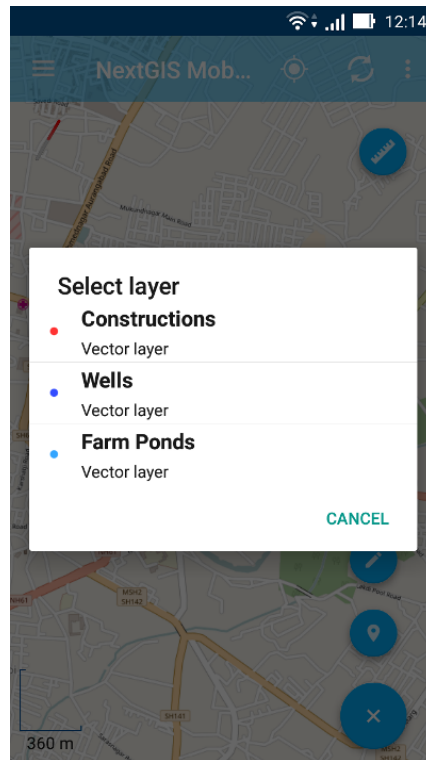


Рис.5.11: Select layer dialog.

Current location will be added to selected layer as a new point or a new multipoint consisting of 1 point.

You can then add attributes as described in [Adding a point](#) (c. 38) section.

Note: You can add current location to Point and Multipoint layers only!

5.5 Adding line or polygon by walk

To add line or polygon by walk to a vector layer press Main actions button, and then press a walking man icon (item 5 in [Fig. 5.1](#)). In an opened dialog select a layer you'd like to add a new feature to (only linestring/multilinestring and polygon/multipolygon layers will be displayed) (see [Fig. 5.12](#)).

Find more information about adding geometries in [Record tracks to vector layer](#) (c. 57) section.

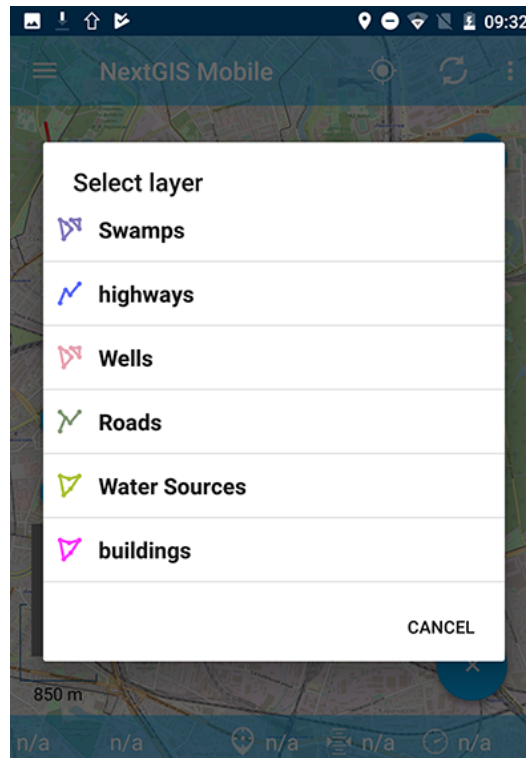


Рис.5.12: Select layer dialog.

Note: You can add tracks to either Linestring/Multilinestring or Polygon/Multipolygon layers!

5.6 Editing a geometry

To edit an existing layer first select that vector layer and switch to Edit mode using any of the 3 methods described in [Switching to Edit mode](#) (c. 36) section. The feature will turn its colour to **Blue**. Then tap on the pencil icon in Bottom toolbar (item 3 in [Fig. 5.3](#)). The feature will turn its colour to **Red** in edit mode.

5.6.1 Editing a point

To start editing a point first select the point/multipoint layer in the Layer tree and switch to Edit mode, then select a point by pressing on it. It will change its colour to blue. Then tap on the pencil icon in Bottom toolbar (item 3 in [Fig. 5.3](#)). The selected point feature will be highlighted in red and have an arrow pointing at it.

To change location of a selected point simply pull it or arrow pointing at it to a desired place. Also a point can be moved using buttons from Bottom toolbar - to the center of the screen shown as Red Crosshair marker (item 6 in [Fig. 5.13](#)) or to the current device location (see item 7 in [Fig. 5.13](#)).

You can cancel editing at any point of time, without saving changes, by close editing button. (see item 1 in [Fig. 5.13](#)). The system will warn you about this.

In the end you can have your geofeatures digitized as shown below. See [Fig. 5.13](#).

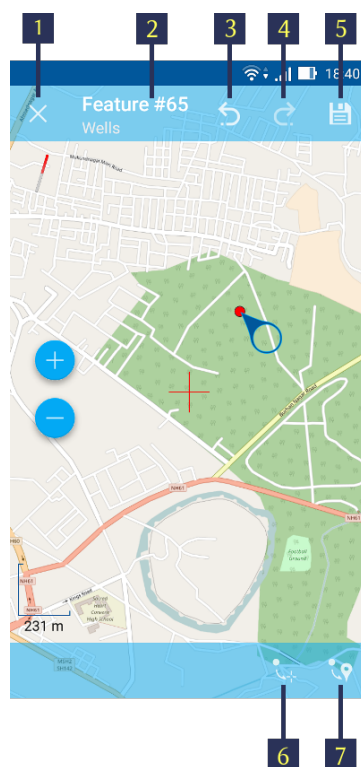


Рис.5.13: Editing point.

The numbers indicate: 1 - Close editing (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Move point to the Red Crossover (Center); 7 - Move point to the current location.

When you edit a multipoint all points included in it change their colour to blue. The selected point will be highlighted in red and have an arrow pointing at it (see [Fig. 5.13](#)).

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & Name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add point; 7 - Delete point; 8 - Move point to the center of Map screen; 9 - Move point to the current location.

You can delete selected point (item 7 in [Fig. 5.14](#)), move it to a new location simply pulling it or arrow pointing at it to a desired place, to the center of the screen shown as Red Crosshair marker (item 8 in [Fig. 5.14](#)) or to the current device location (item 9 in [Fig. 5.14](#)). Also you can add a new point to the multipoint (item 6 in [Fig. 5.14](#)).

5.6.2 Editing a line

To start editing a line first select the linestring/multilinestring layer in the Layer tree and switch to Edit mode, then select a line by pressing on it. It will change its colour to blue. Then tap on the pencil icon in Bottom toolbar (item 3 in [Fig. 5.3](#)). The line will change its colour to red and will show all its vertices. Current vertex is highlighted in red and has an arrow pointing at it. The center of line segment

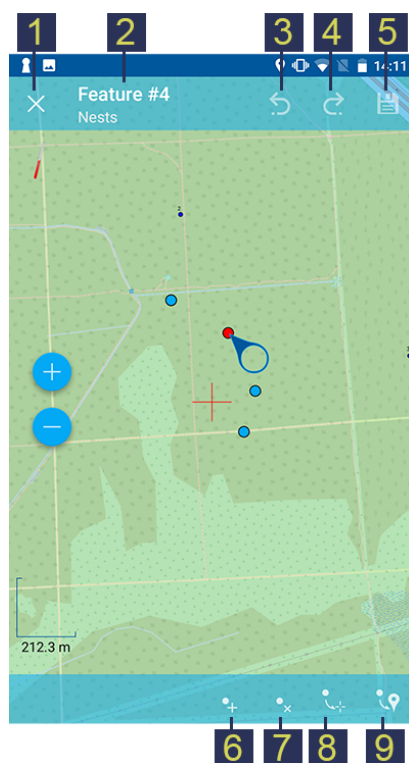


Рис.5.14: Editing multipoint.

between vertices is also indicated. Pressing the center of line segment leads to two new vertex being added to the line.

Selected vertex can be moved simply by pulling it or arrow pointing at it to a desired place. Also a vertex can be moved using buttons from Bottom toolbar - to the center of the screen shown as Red Crosshair marker (item 7 in Fig. 5.15) or to the current device location (see item 8 in Fig. 5.15).

You can delete the unrequired vertex by highlighting it and tapping delete vertex (see item 6 in Fig. 5.15)

In this way you can even get a smooth curve as per the geographic shape.

In the end you can have your geofeatures digitized as shown below. See Fig. 5.15.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Delete vertex; 7 - Move vertex to the center of Map screen; 8 - Move vertex to the current location; 9 - Append geometry by walk; 10 - Edit by touch.

Note: If only one vertex remains in a line this line is deleted automatically.

When you edit a multiline all points included in it change their colour to blue. The selected point will be highlighted in red and have an arrow pointing at it (see Fig. 5.16)

You can delete selected point or line (item 7 and 8 in Fig. 5.16), move a point to a new location simply pulling it or arrow pointing at it to a desired place, to the center of the screen shown as Red Crosshair marker (item 9 in Fig. 5.16) or to the

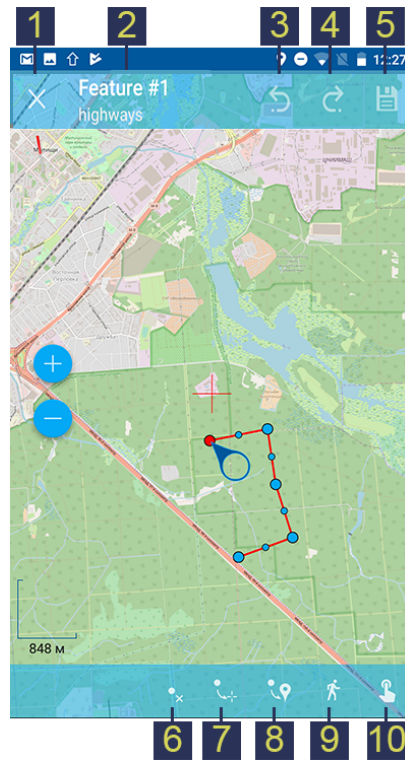


Рис.5.15: Editing line.

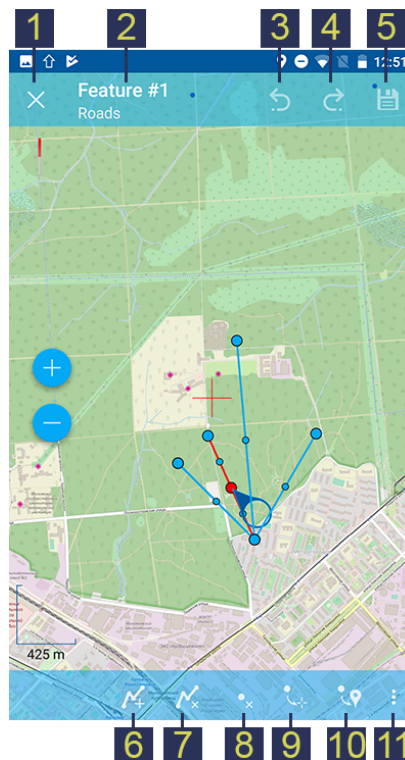


Рис.5.16: Editing multiline.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add line; 7 - Delete line; 8 - Delete vertex; 9 - Move vertex to the center of Map screen; 10 - Move vertex to the current location; 11 - Contextual menu with the rest of commands (Append geometry by walk, Append geometry by touch).

current device location (item 10 in [Fig. 5.16](#)). Also you can add a new line to the multiline (item 6 in [Fig. 5.16](#)).

5.6.3 Editing a polygon

To start editing a polygon first select the polygon/multipolygon layer in the Layer tree and switch to Edit mode, then select a polygon by pressing on it. It will change its colour to blue. Then tap on the pencil icon in Bottom toolbar (item 3 in [Fig. 5.3](#)). The polygon will change its colour to red and will show all its vertices. Current vertex is highlighted in red and has an arrow pointing at it. The center of line segment between vertices is also indicated. Pressing the center of line segment leads to two new vertex being added to the line.

New vertex can be moved or otherwise edited right after it has been added. Selected vertex can be moved simply by pulling it or arrow pointing at it to a desired place. Also a vertex can be moved using buttons from Bottom toolbar - to the center of the screen shown as Red Crosshair marker (item 7 in [Fig. 5.17](#)) or to the current device location (see item 8 in [Fig. 5.17](#)).

You can delete the unrequired vertex by highlighting it and tapping “Delete vertex” button (see item 6 in [Fig. 5.17](#)).

Note: If only two vertices remain in a polygon this polygon is deleted automatically.

When you edit a multipolygon all points included in it change their colour to blue. The selected point will be highlighted in red and have an arrow pointing at it (see [Fig. 5.18](#)).

You can delete selected point or polygon (item 7 and 10 in [Fig. 5.18](#)), move a point to a new location simply pulling it or arrow pointing at it to a desired place, to the center of the screen shown as Red Crosshair marker (item 11 in [Fig. 5.18](#)) or to the current device location (item 11 in [Fig. 5.18](#)). Also you can add a new polygon to the multipolygon (item 6 in [Fig. 5.18](#)) and add or delete a hole (item 8 or 9 in [Fig. 5.18](#)).

5.7 Editing attributes

To start editing attributes first select a layer you want to edit attributes in. Then switch to Edit mode using any of the methods described in [Switching to Edit mode](#) (c. 36) section.

After Editing Toolbar is opened tap “Attributes info” button (item 5 in [Fig. 5.3](#)). This will open Attributes Info panel as shown in [Fig. 5.19](#) below.

Note: NextGIS Mobile shows the following attribute fields by default (see item 4 in [Fig. 5.19](#)):

- For Point/Multipoint layers: each point’s location (in Latitude/Longitude).
- For Line/Multiline layers: length of each line feature (in meters).

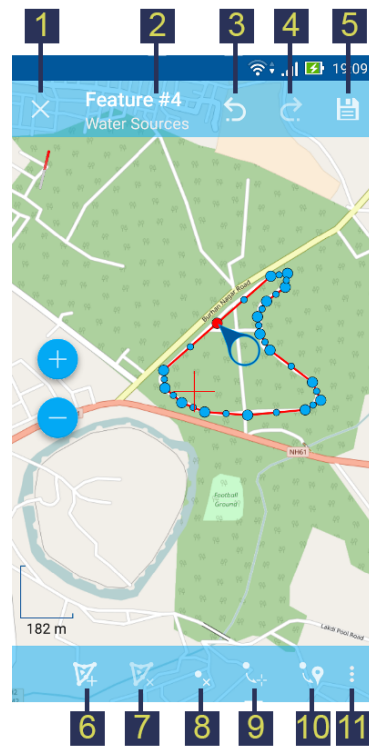


Рис.5.17: Editing polygon.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add hole; 7 - Delete hole; 8 - Delete vertex; 9 - Move vertex to the center of Map screen; 10 - Move vertex to the current location; 11 - Contextual menu with the rest of commands (Append geometry by walk, Append geometry by touch).

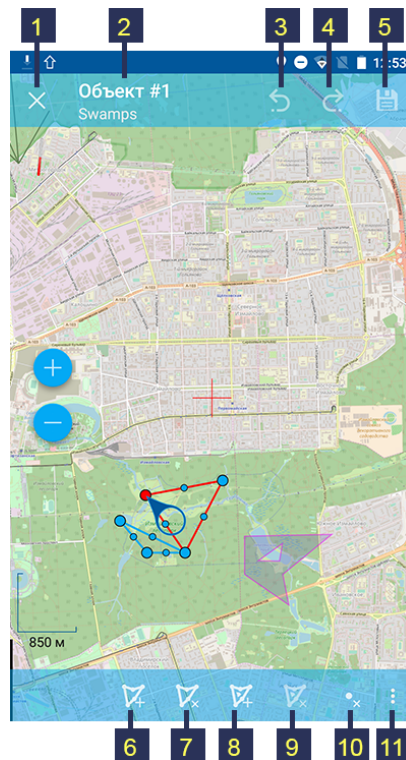


Рис.5.18: Editing multipolygon.

The numbers indicate: 1 - Quit (without saving); 2 - Feature ID & name of the Layer; 3 - Undo changes; 4 - Redo changes; 5 - Set attributes; 6 - Add polygon; 7 - Delete polygon; 8 - Add hole; 9 - Delete hole; 10 - Delete vertex; 11 - Contextual menu with the rest of commands (Move vertex to the center of Map screen, Move vertex to the current location, Append geometry by walk, Append geometry by touch).

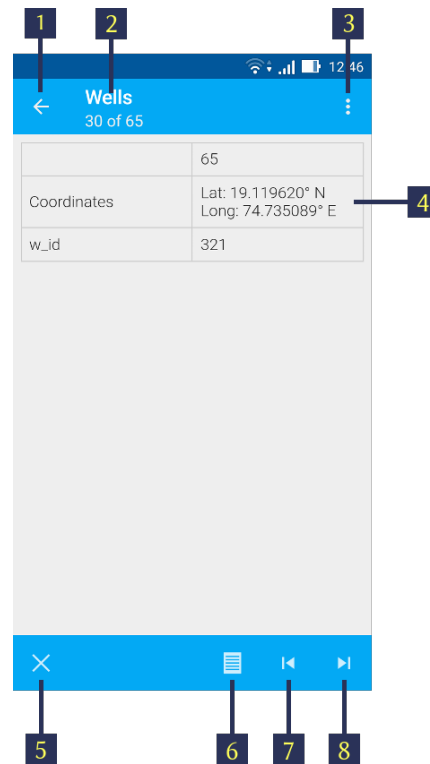


Рис.5.19: Attributes Info panel

The numbers indicate: 1 - Back to previous screen; 2 - Layer name & feature count; 3 - Settings; 4 - Attribute fields; 5 - Close Attributes Info panel; 6 - Set attributes; 7 - Previous record; 8 - Next record.

- For Polygon/Multipolygon layer: length of each polygon feature's perimeter (in meters) & area of each polygon feature (in square meters).

5.7.1 Editing attributes using standard form

To start editing attributes using standard form first tap on "Set attributes" button (see item 6 in Fig. 5.19).

This opens a standard Attributes editing form as shown in Fig. 5.6.

After all the attributes are set tap "Tick" icon in the top right corner (item 2 in Fig. 5.6) to save the edits.

Note: If you tap the back button in the top left corner (item 1 in Fig. 5.6) instead, the system will warn you about unsaved changes.

The Camera icon at the bottom of a standard Attributes editing form (item 3 in Fig. 5.6) allows to add to each feature image files (e.g. photos) from the local storage or take new photos.

5.7.2 Editing attributes using custom form

If the layer was *created from a custom form (NGFP)* (c. 19) the custom Attributes editing form will be used for editing. An example of such custom form is shown below in Fig. 5.20:

Рис.5.20: Custom Attributes editing form.

The numbers indicate: 1 - Back to previous screen; 2 - Apply changes; 3 - Settings; 4 - Text or Integer field; 5 - Dropdown list; 6 - Date & Datetime; 7 - Radio buttons.

Custom Attributes editing forms may contain the following entry fields:

- Text;
- Space;
- Text field;
- List; Tandem list;
- Checkbox;
- Radio button;
- Date Picker;
- Photo.

“Text” field is used to provide additional information about geometry feature.

“Space” field is used to increase intervals between fields.

“Text field” can be used to add text or integers, depending on the field type (see item 4 in Fig. 5.20).

“List” and “Tandem list” fields are used to store and select values included in custom lists, for example, “List” - region/republic/territory, “Tandem list” - district/area in region/republic/territory (see item 5 in [Fig. 5.20](#)).

“Checkbox” field allows to check or uncheck a value.

“Date picker” field allows to select date, time or both of them (see item 6 in [Fig. 5.20](#)).

“Radio button” field allows to select one element from a list of mutually exclusive options (see item 7 in [Fig. 5.20](#)).

“Photo” field allows to take a new photo or to add photos from the local storage.

After all the attributes are set tap “Tick” icon in the top right corner (item 2 in [Fig. 5.20](#)) to save the edits.

Note: If you tap the back button in the top left corner (item 1 in [Fig. 5.20](#)) instead, the system will warn you about unsaved changes.

TRACKS

NextGIS Mobile allows to record and display tracks. Recorded track points are saved to the internal database. Track points recorded within one session are combined and displayed on the map as a line.

Note: Make sure that Location mode is switched on in your Android device settings. Also check the configurations of “My Tracks” and “Location” settings in NextGIS Mobile Settings as shown in [Fig. 3.9](#).

6.1 Recording a track

Tracks can be recorded in two ways.

6.1.1 Record tracks in GPX format

1. To start recording a track press “Start new track” button in the Contextual menu on the Main screen (item 5 in [Fig. 3.1](#)).

Track recording is performed in background mode. To indicate that the process is running a status icon of the walking man is displayed in Android Notification bar. For more information click on it and it will show the track status as shown in [Fig. 6.1](#) below.

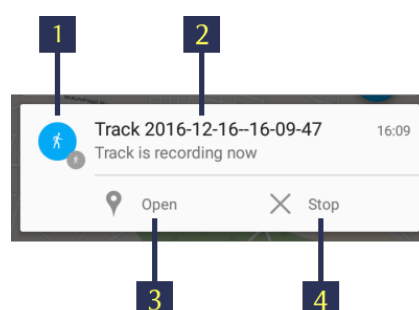


Рис.6.1: Recording track status.

The numbers indicate: 1 - The status icon; 2 - Name of track session; 3 - “Open recording” button; 4 - “Stop track recording” button.

During track recording you can see the geometry of the track on Map screen as shown below in [Fig. 6.2](#)

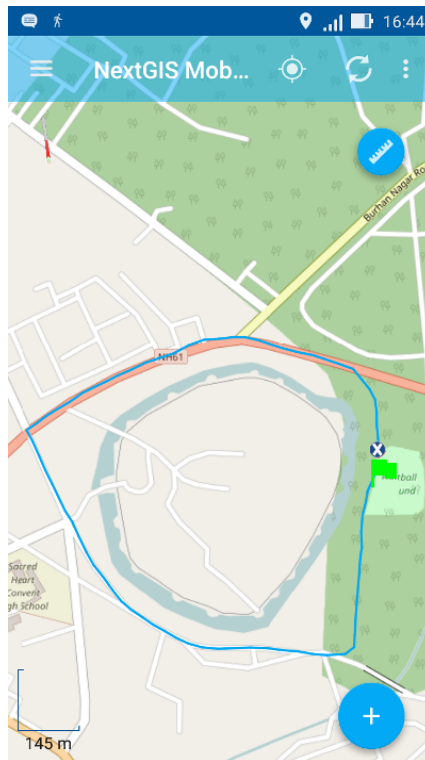


Рис.6.2: Recording track.

Recorded track is displayed on the map immediately even though recording is not completed. The status icon (walking man) is still visible in the notification bar. The green flag shows the starting point of the track whereas the location marker shows the current device location.

Note: Track points are grouped by days and sessions within a day. If track recording continues the next day track will be split up into two parts.

2. To stop track recording, tap “Stop” button either in notification bar (see item 4 in Fig. 6.1) or in Contextual menu (see item 5 in Fig. 3.1). The status icon will disappear from notification bar, the location marker will be replaced by the red flag indicating the end of the track, and the track line will change its colour as shown below in Fig. 6.3
3. You can now manage this track, including its export in GPX format. To learn how to export the tracks see [Exporting tracks in GPX](#) (c. 64).

6.1.2 Record tracks to vector layer

You can also add a feature to an existing line or polygon vector layer by tracking.

1. Tap on Main actions button (see item 8 in Fig. 3.1) and then “Add geometry by walk” button (see item 5 in Fig. 5.1). It will open list of all editable Linestring/Multilinestring and Polygon/Multipolygon vector layers in a separate dialogue as shown below in Fig. 6.4

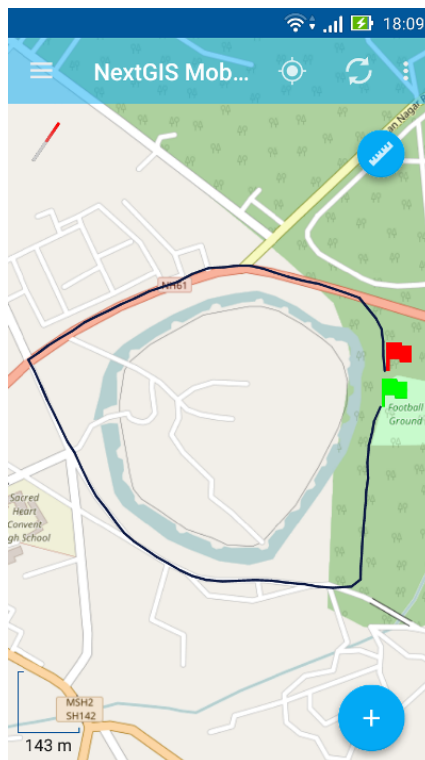


Рис.6.3: Recorded track.

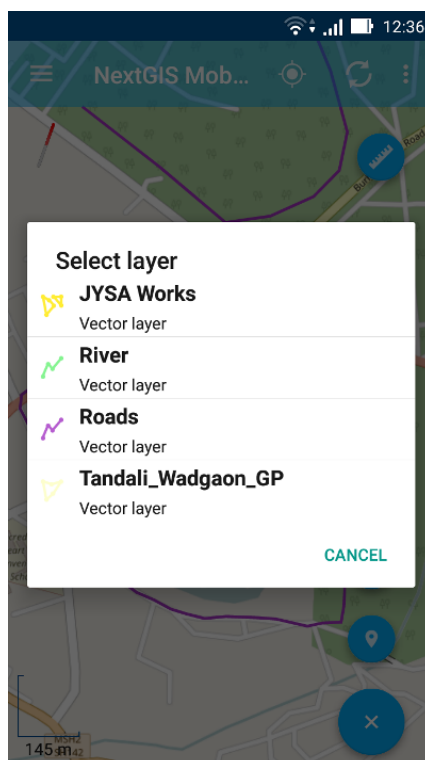


Рис.6.4: Select Layer dialogue.

2. Select the layer to which you want to add a new feature by walk. This layer will be opened in Edit mode as shown below in Fig. 6.5, and NextGIS Mobile will start recording a new geometry to the vector layer.

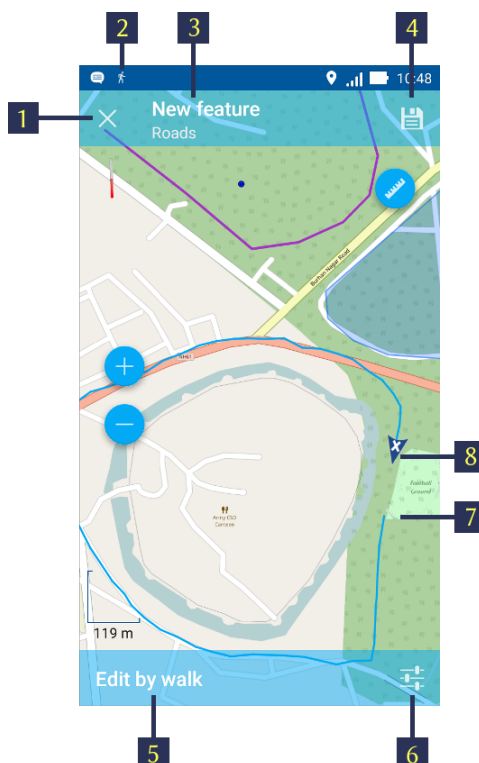


Рис.6.5: Vector layer editing by walk.

The numbers indicate: 1 - Close editing (without saving); 2 - Status icon; 3 - Feature ID & name of the Layer; 4 - Save feature; 5 - “Edit by walk” mode status; 6 - Location settings; 7 - Start point; 8 - Current device location.

Note: You can also switch to “Edit by walk” mode by first switching to Edit mode using any of the methods described in [Switching to Edit mode](#) (c. 36) section, and then by tapping “Append geometry by walk” button (see item 9 in Fig. 5.7, item 11 in Fig. 5.8, item 11 in Fig. 5.9 and item 11 in Fig. 5.10)

If you’re not satisfied with the accuracy of the appended geometry, you can access NextGIS Mobile Location settings (see Fig. 3.9) directly from “Edit by walk” screen (see item 6 in above Fig. 6.5).

3. When recording is finished tap on the “floppy” button (see item 4 in Fig. 6.5). It will open the standard Attributes editing form, similar to Fig. 5.6, as shown below in Fig. 6.6.
4. The new feature is now added to the existing Linestring/Multilinestring or Polygon/Multipolygon vector layer.

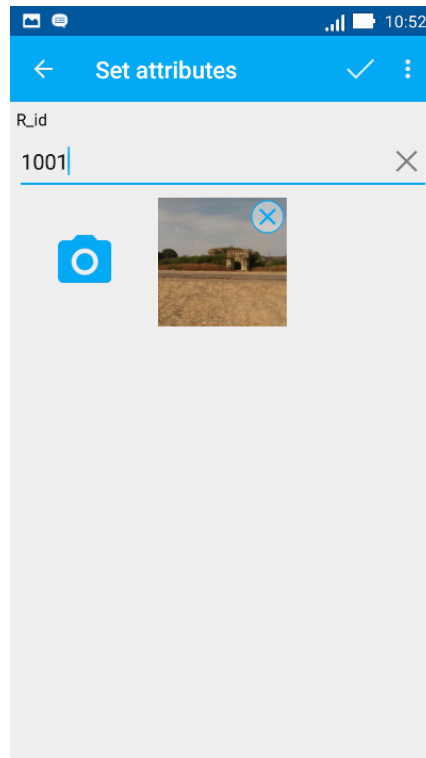


Рис.6.6: Vector layer attribute editing.

6.2 Managing recorded tracks

To start managing recorded tracks first find “My Tracks” group in Layers tree panel. Then tap on contextual menu button as shown in [Fig. 6.7](#) and select “List”.

This will open a list of recorded tracks as shown in [Fig. 6.8](#) below. Tracks’ points will be grouped by days and sessions within the day.

Select a track by ticking the corresponding checkbox, and buttons in Top toolbar will become active as shown in [Fig. 6.9](#) below.

To hide a layer from Map screen tap on “Eye” button (item 6 in [Fig. 6.9](#)).

You can change the colour of the track tapping the “Colour palette” button (item 3 in [Fig. 6.9](#)).

When you tap to open contextual menu (see item 5 in [Fig. 6.9](#)), the following menu items will pop up as shown below in [Fig. 6.10](#).

- You can Show or Hide the selected track in the map screen. The starting point is shown in Green marker & the end point is shown in Red marker.
- You can delete the track (permanently).
- You can select all the tracks and perform above actions for all of them at a once.

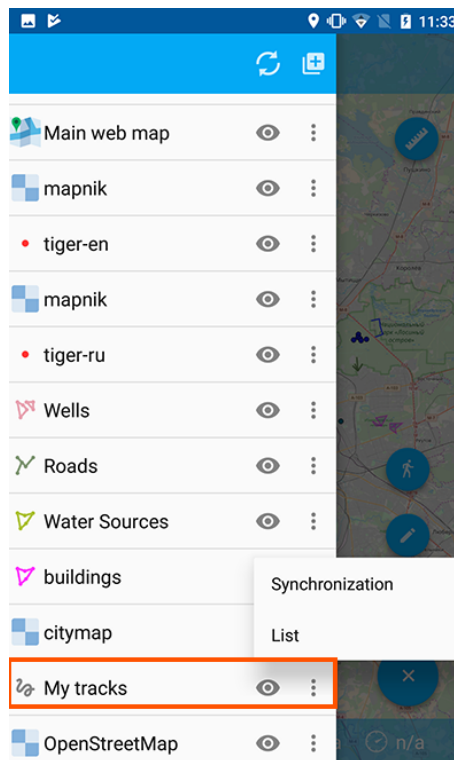


Рис.6.7: “My tracks” in Layers tree panel.

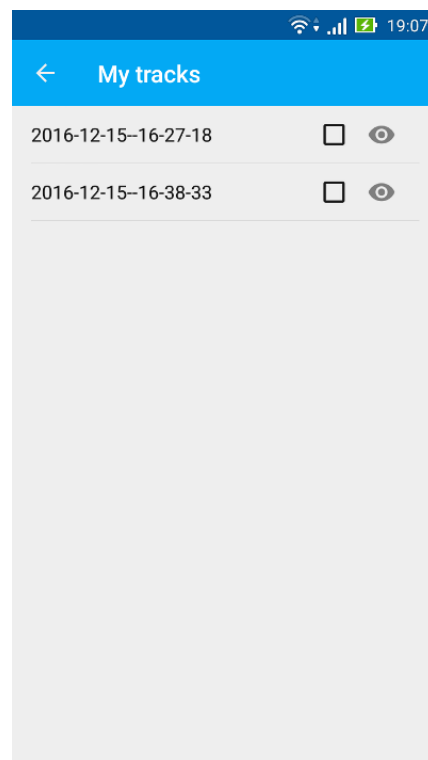


Рис.6.8: List of recorded tracks.

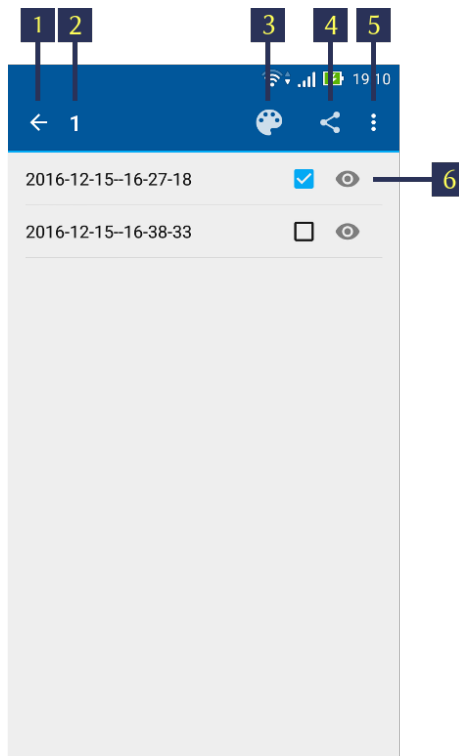


Рис.6.9: Toolbar for selected track.

The numbers indicate: 1 - Go back; 2 - Track ID; 3 - Colour palette; 4 - Export button; 5 - Contextual menu; 6 - Track visibility button.

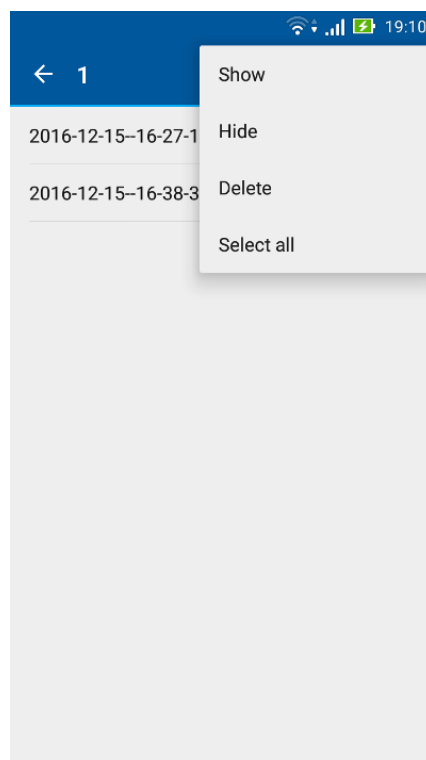


Рис.6.10: Tracks contextual menu.

EXPORTING DATA

7.1 Exporting data in GeoJSON

To export data from NextGIS Mobile vector layer open Layers tree panel (item 1 in Fig. 3.1). Then tap on the contextual menu icon next to the layer name (item 5 in Fig. 3.2). This will open the contextual menu items as shown in item 6 in Fig. 3.2 There you need to select “Share”.

Android standard Share dialogue window with a list of available Share options will open as shown in Fig. 7.1.

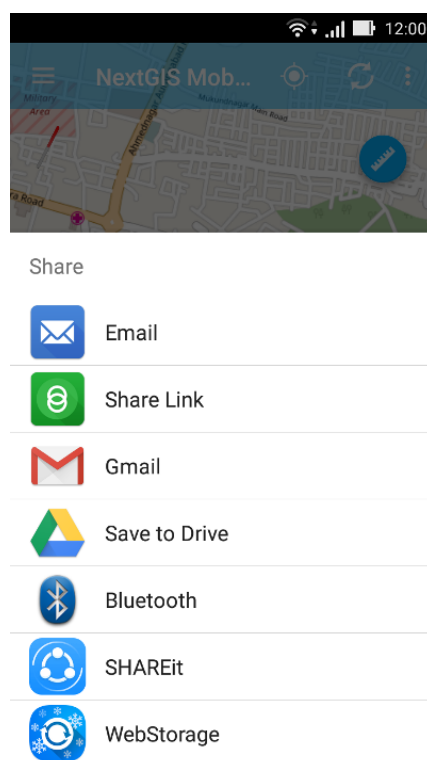


Рис.7.1: Share dialogue window.

After you select a share option, data in the selected layer will be recorded in *GeoJSON* format (*coordinate system* Web Mercator, EPSG:3857) and exported via the selected application. The name of GeoJSON file will be the same as the name of the exported layer.

Some of the share options (availability is dependent on the apps installed on your device):

- You can send the file as an attachment via Gmail or different Email app.
- You can upload the file to Google Drive/Dropbox/other cloud service and then share it with your colleagues.
- You can send the file to another device via Bluetooth or SHAREit.
- You can save the file on a memory card.

Warning: In many Android versions to save a file on the device memory card you need a file manager app (for example, ES Explorer or similar).

7.2 Exporting attachments

Each feature in vector layer can have one or more photos attached to it. Photos are stored separately as image files and added to archive file with layer data during the export. For each feature a separate attachments folder is generated in the archive, the name of the folder corresponds to feature ID.

Example:

(4:10000002.jpg,10000000.jpg,10000001.jpg,10000003.jpg)

Explanation:

4 photos are attached to a feature. These 4 photos are stored in the folder which name is similar to the feature ID.

7.3 Exporting tracks in GPX

To start exporting tracks first find “My Tracks” group in Layers tree panel. Then tap on contextual menu button as shown in [Fig. 6.7](#) and select “List”.

This will open a list of recorded tracks as shown in [Fig. 6.8](#). If there are few tracks recorded in a day, tracks will be divided into sessions. If a track was recorded during few days, this track will be divided into parts corresponding to recording days.

Select a track you want to export by ticking the corresponding checkbox, and buttons in Top toolbar will become active as shown in [Fig. 6.9](#)

To export the track, tap on Share button (see item 4 in [Fig. 6.9](#)). It will open the same Share dialogue window as shown in [Fig. 7.1](#) above.

After you select a share option, data in the selected track will be recorded in GPX format and exported via the selected application.

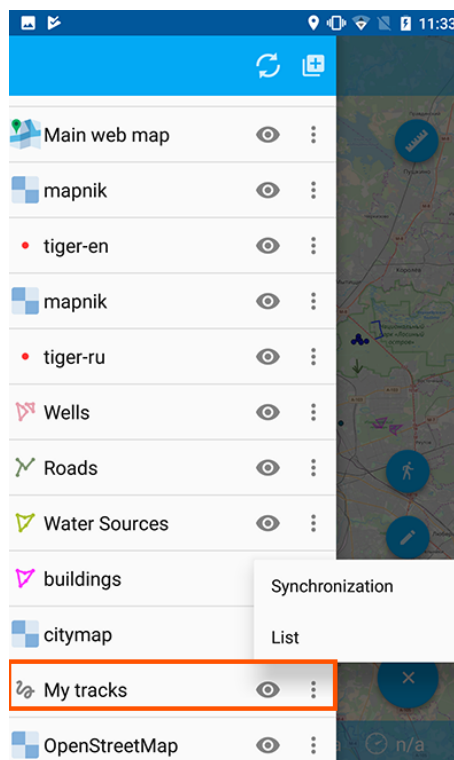


Рис.7.2: “My tracks” in Layers tree panel.

LAYER SETTINGS

Map is a set of raster and vector layers. Layers tree panel is designed to display the content of a map and to control visibility and hierarchy of map layers.

To change the hierarchy of map layers long-press the layer which is to be moved up or down. Layers tree panel will switch to Edit mode. Keep pressing and move the selected layer to its new position.

For turning layer visibility on/off tap on Layer visibility button (item 3 in [Fig. 3.2](#)).

Additional operations with layers are available from a separate layer contextual menu (item 5 in [Fig. 3.2](#)).

For example, contextual menu for a vector layer includes following items:

1. Zoom to extent
2. Attributes
3. Share
4. Send to NextGIS
5. Edit
6. Delete
7. Settings

Note: Contextual menu depends both on layer type and geodata source. Raster layers have different contextual menus than Vector layers. Raster layers created from tile cache have different contextual menus than raster layers created from external geoservices.

8.1 Vector layer settings

8.1.1 Style settings

Open layer contextual menu and tap on “Settings”. Vector layer style settings will open as shown in [Fig. 8.1](#) below.

Vector layer style settings depend on the selected Render type - Simple or Rule (item 4 in [Fig. 8.1](#)).

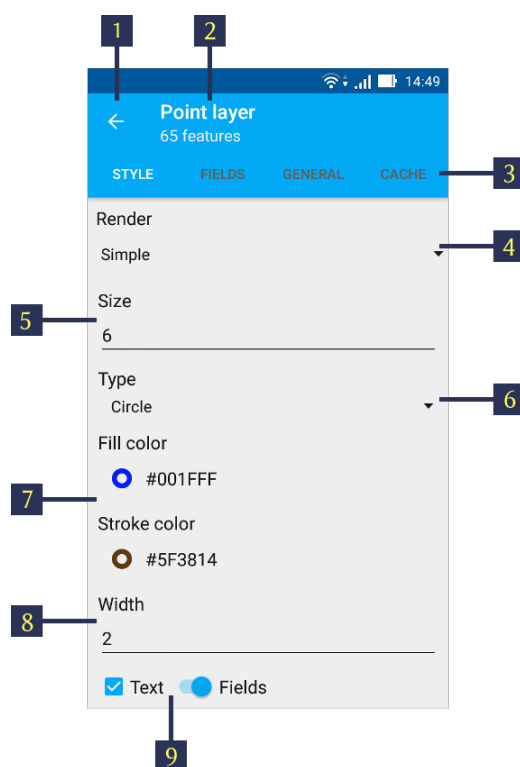


Рис.8.1: Vector point layer style settings (simple render style).
The numbers indicate: 1 - Go back; 2 - Layer type & Feature count; 3 - Layer Settings tabs; 4 - Render type; 5 - Feature size; 6 - Feature type; 7 - Color palette; 8 - Stroke width; 9 - Label settings.

Simple rendering

Fig. 8.1 shows Simple Render style settings. If you select this Render type, all the features in the layer will have the same shape, color, size, etc.

For example, for a point/multipoint layer you can select features shape by using “Type” menu (see item 6 in Fig. 8.1) using the following options:

- Point
- Circle
- Diamond
- Cross
- Triangle
- Box
- Edit circle
- Crossed box

You can also set point size (see item 5 in Fig. 8.1), fill and stroke color (see item 7 in Fig. 8.1) and stroke width (see item 8 in Fig. 8.1).

In linestring/multilinestring layers you can select line type (solid, dash or edge solid), as well as fill and stroke color and stroke width.

In polygon/multipolygon layers you can select stroke color and width. Also you can select to display polygons as filled or empty (the semi-opaque stroke color will be applied if “Filled” is selected).

For any vector layer you can also choose to show Labels for each feature on a map. To do this tick “Text” checkbox and either enter the label text yourself or select the attribute field which will be used to label features on a map (item 9 in [Fig. 8.1](#)).

Rule-based rendering

You can also use the advanced styling option for your vector layer, and set different shapes, colors, sizes, etc. for layer features based on their attribute values.

For advanced styling of vector layer select “Rule” in the Render. It will open different style settings as shown in [Fig. 8.2](#) below.

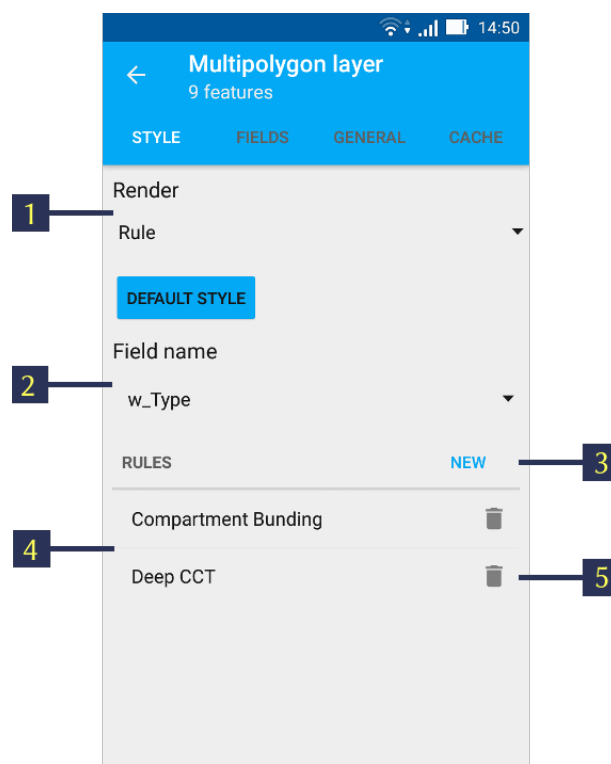


Рис.8.2: Vector layer style settings (rule-based render style).

The numbers indicate: 1 - Render type; 2 - Field selection; 3 - “Create new rule” button; 4 - Previously created rules; 5 - “Delete rule” button.

To adjust rule-based style settings first select the attribute field - its values will be used to create rules (see item 2 in [Fig. 8.2](#)).

Then tap on “Create new rule” button (item 3 in [Fig. 8.2](#)). It will open a list of all the unique values from the attribute field you have selected earlier. Select the value and tap “OK” to open Style settings dialogue as shown below in [Fig. 8.3](#).

Here you can select and apply the same style settings as described above in [Simple rendering](#) (c. 67) (rule-based style settings are also dependent on vector layer type). Select “OK” when finished.

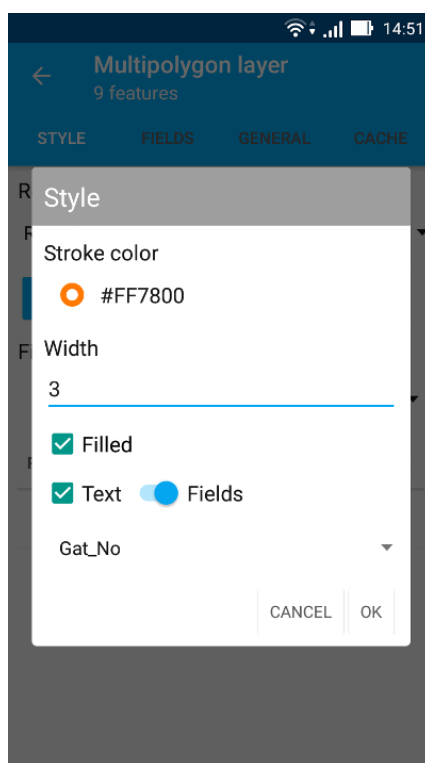


Рис.8.3: Rule-based style settings dialogue.

In this way you can create rule-based render styles for every value in the selected attribute field.

8.1.2 Fields settings

You can select which attribute field will be used to provide Feature ID for Edit screens, etc. To do this tap on “FIELDS” tab (see item 3 in [Fig. 8.1](#)) and select one of the fields as shown in [Fig. 8.4](#)

Warning: The selected field will not be used for rendering features labels on the map. For label settings see [Style settings](#) (c. 66).

8.1.3 General settings

“GENERAL” settings tab shows such information about vector layer as its local path, layer name & zoom levels to show on the map (it is possible to display the layer within certain zoom levels only). See [Fig. 8.5](#) below.

Using this tab you can change layer name and zoom levels to show.

8.1.4 Cache settings

Using “CACHE” settings tab you can execute “Rebuild cache” command to optimize the layer creation process with the ability to save and cancel changes.

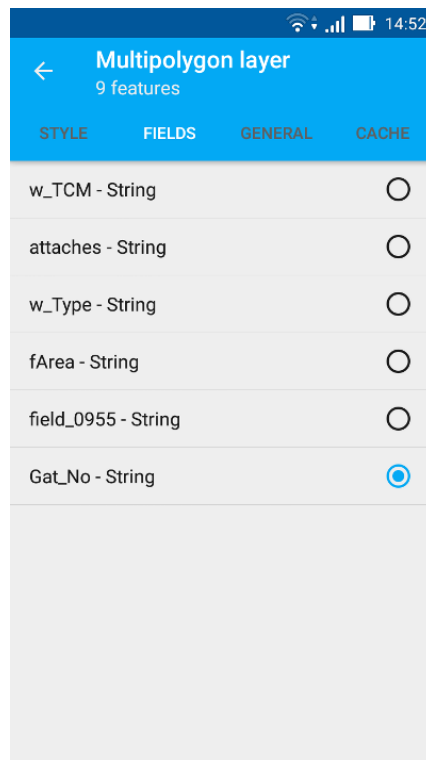


Рис.8.4: “FIELDS” vector layer settings tab.

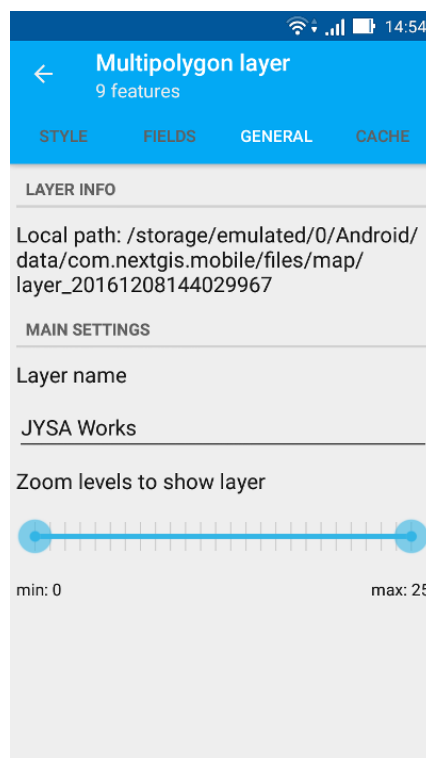


Рис.8.5: “GENERAL” vector layer settings tab.

8.2 Raster layer settings

Raster layer contextual menu includes the following items (see [Fig. 8.6](#)):

- Zoom to extent
- Delete
- Settings

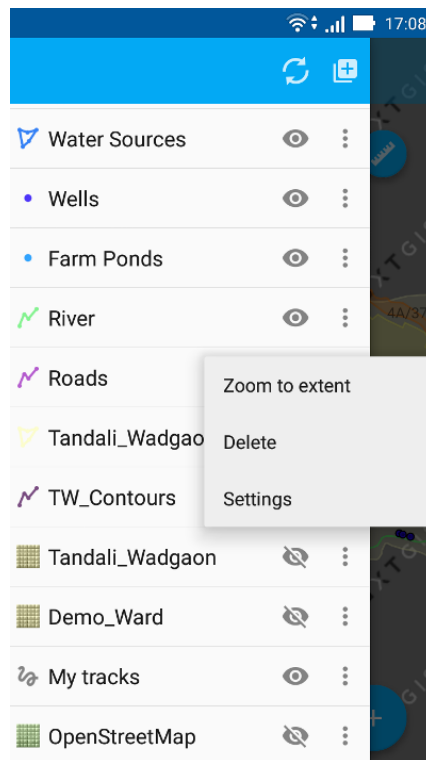


Рис.8.6: Raster layer contextual menu.

Note: Raster layer created from external geoservice will have the option “Download tiles” instead of “Zoom to extent”. See [Caching of tile service data](#) (c. 29) for details.

8.2.1 Style settings

Open layer contextual menu and tap on “Settings”. Raster layer style settings will open as shown in [Fig. 8.7](#) below.

Here you can set the values for:

1. **Opacity.** The value of layer opacity determines how intensive it hides or displays the contents of the underlying layer. Raster layer with 1% opacity is almost transparent. Completely opaque raster layer has an opacity of 100%.
2. **Contrast.**
3. **Brightness.**

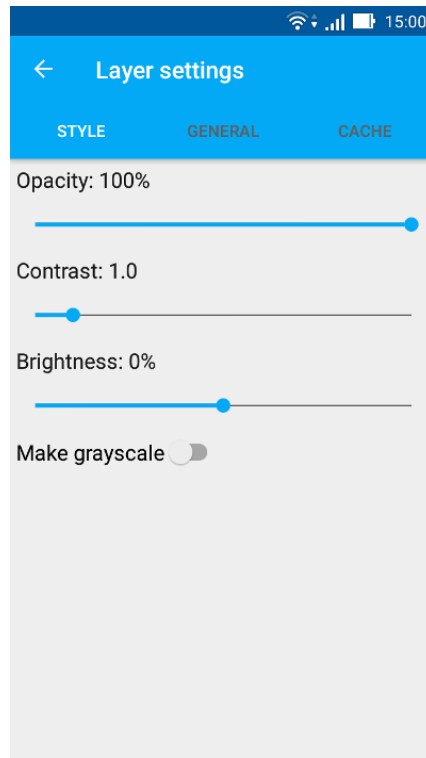


Рис.8.7: Raster layer style settings.

You can also apply to Raster layer the option “Make grayscale” - the layer will be displayed in shades of gray instead of original colors.

8.2.2 General settings

“GENERAL” settings tab shows such information about raster layer as its local path, layer name & zoom levels to show on the map (it is possible to display the layer within certain zoom levels only). See [Fig. 8.8](#) below.

Using this tab you can change layer name and zoom levels to show.

8.2.3 Cache settings

Using “CACHE” settings tab you can set TMS in-memory cache size for a raster layer from these options:

- No cache
- 1 screen
- 2 screens (recommended)
- 3 screens

You can also clear in-memory cache for this layer from this settings tab.



Рис.8.8: “GENERAL” raster layer settings tab.

INTEGRATION WITH NEXTGIS WEB

New in version 2.2.

You can learn more about main features of Web GIS in *Web GIS: Description and Main Features* :ref:'Web GIS <ngcom_description>.

9.1 New Web GIS creation

There are two ways to create a new Web GIS. The **first way** is the following:

1. Open Layers tree panel (item 1 in [Fig. 3.1](#)).
2. Then tap on “Add geodata” button (item 4 in [Fig. 3.2](#)).
3. Select “Add from Web GIS” ([Fig. 9.1](#))

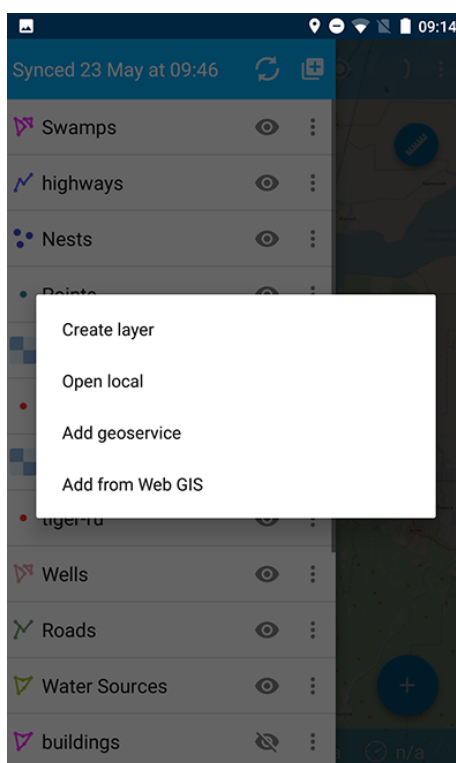


Рис.9.1: Add geodata dialogue.

4. In opened dialogue select “Add Web GIS” ([Fig. 9.2](#)).

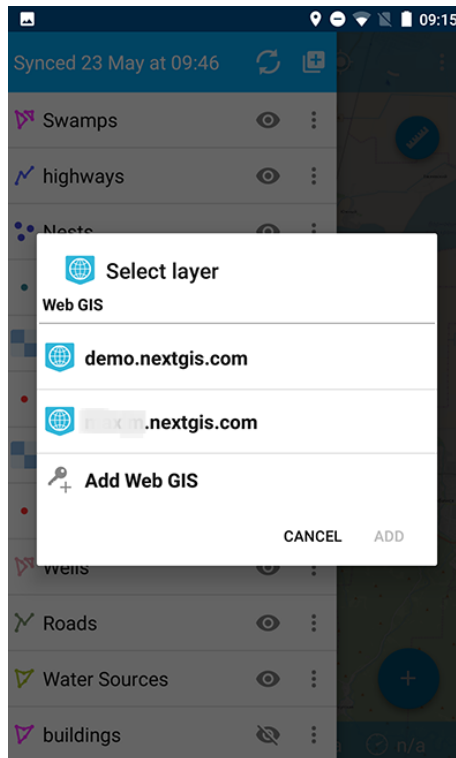


Рис.9.2: Web GIS dialogue.

5. Then fill up your Web GIS domain's name and password for Web GIS in the form for Web GIS adding and tap "Sign in" button (Fig. 9.3).

The **second way** is the following:

1. Tap contextual menu icon (item 5 in Fig. 3.1).
2. Select "Settings" (Fig. 9.4).
3. Select "Web GIS" (Fig. 9.5).
4. In opened dialogue select "Add Web GIS" (Fig. 9.6).
5. Then fill up your Web GIS domain's name and password for Web GIS in the form for Web GIS adding and tap "Sign in" button (Fig. 9.3).

9.2 Connection to Web GIS

To create a connection to an existing Web GIS account:

1. Open Layers tree panel (item 1 in Fig. 3.1).
2. Then tap on "Add geodata" button (item 4 in Fig. 3.2).
3. Select "Add from Web GIS" (Fig. 9.1)
4. In opened dialogue select Web GIS (Fig. 9.2).
5. The dialog of layer selection for importing geodata from your Web GIS to NextGIS Mobile will open. If you have only one Web GIS, the dialog of layer

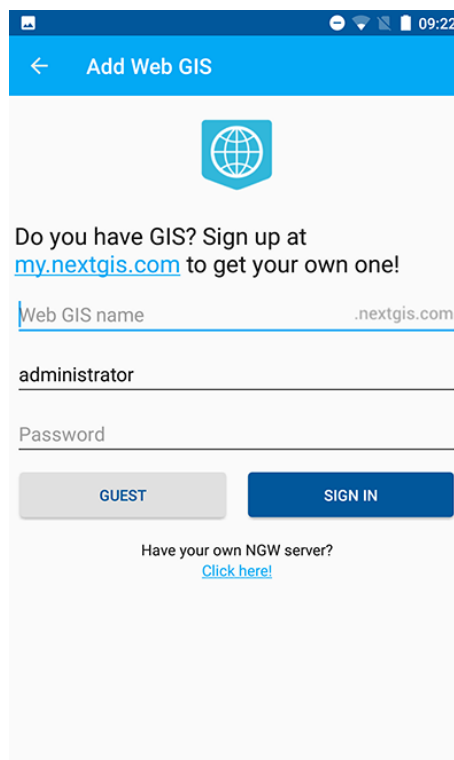


Рис.9.3: Web GIS adding dialog.

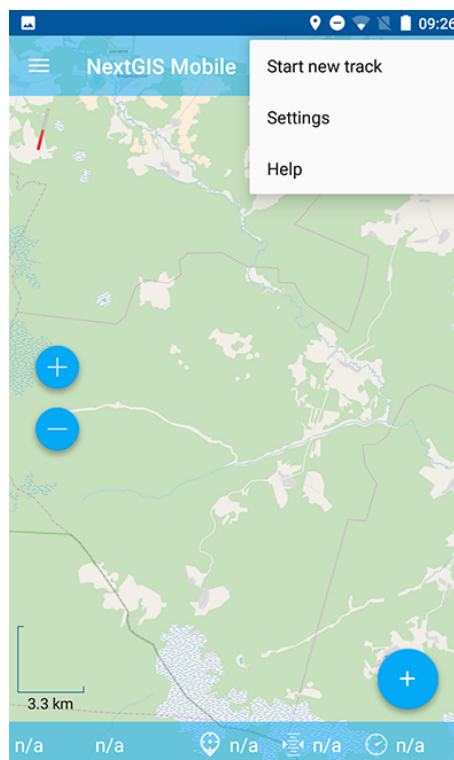


Рис.9.4: Contextual menu.

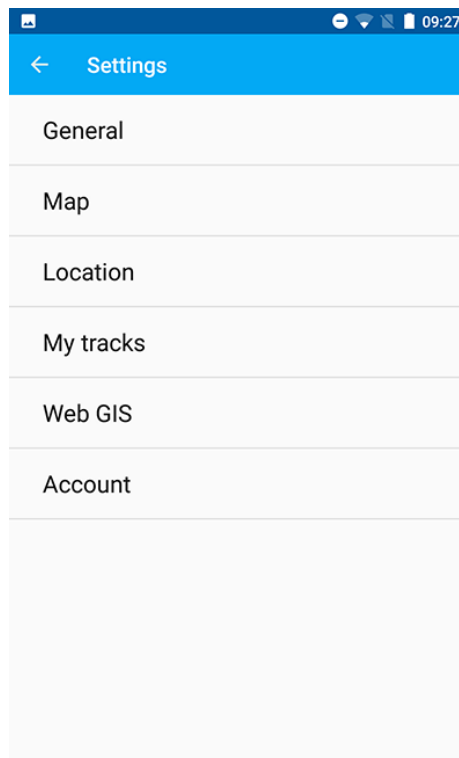


Рис.9.5: Setting dialogue.

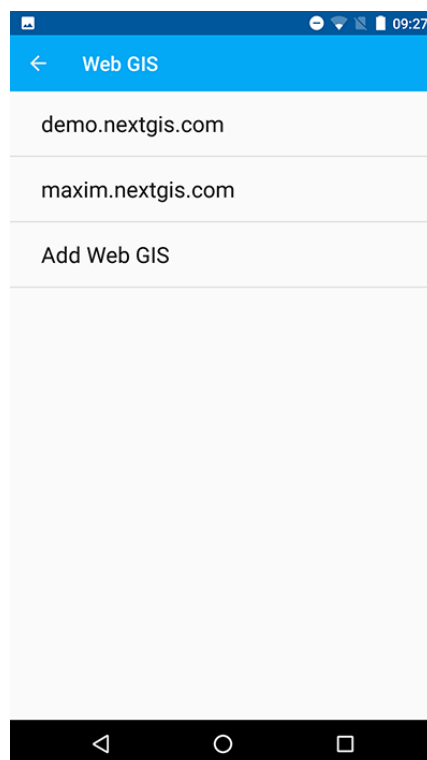


Рис.9.6: Web GIS dialogue.

selection for importing geodata from your Web GIS to NextGIS Mobile will open immediately after tapping “Add from Web GIS” button.

9.3 Connection to NextGIS Web

You can learn more about main features of NextGIS Web in [Key features of NextGIS Web](#)²⁷.

If you want to keep your data on your own NextGIS Web server, tap “Add Web GIS” using either of the ways to create a new Web GIS (see above), follow the link at the bottom of the screen (see [Fig. 9.7](#)) and use your account.

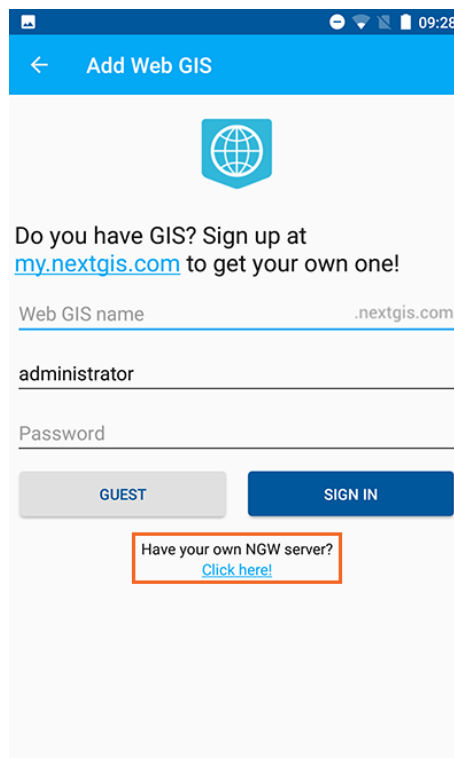


Рис.9.7: Add Web GIS dialogue.

In opened dialogue fill up NextGIS Web [URL](#), login and password in the form and tap “Sign in” button (see [Fig. 9.8](#)).

Note: Login and password for NextGIS Web adding should be filled up without spaces! Many gadgets add a space at the end of the text during autosubstitution or pasting the text from the clipboard to the login/password, and NextGIS Web identifies this as another login or password and cancel the connection.

9.4 Editing of Web GIS account

To edit Web GIS account:

²⁷ http://docs.nextgis.com/docs_ngweb/source/general.html#ngweb-keyfeatures

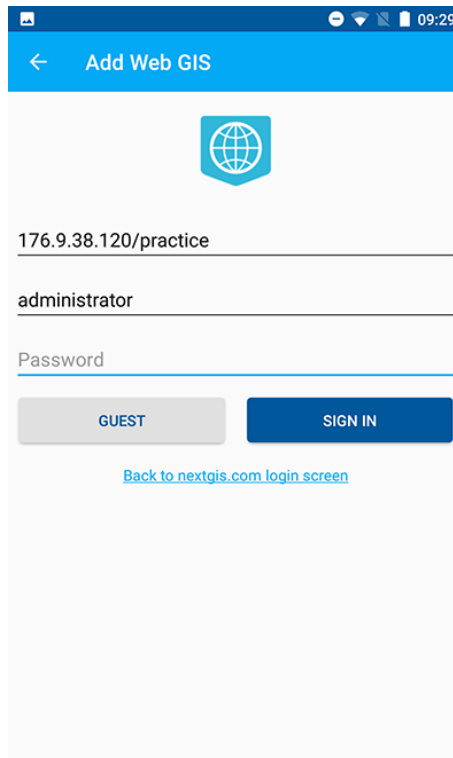


Рис.9.8: NextGIS Web adding dialogue.

1. Tap contextual menu icon (item 5 in Fig. 3.1).
2. Select “Settings” (Fig. 9.4).
3. Select “Web GIS” (Fig. 9.5).
4. Select Web GIS account (Fig. 9.6).
5. In opened window select “Edit account” (see Fig. 9.9).
6. Here you can edit the following fields (see Fig. 9.10):
 1. Login.
 2. Password.

9.5 Deleting of Web GIS account

You can delete Web GIS account in a several ways. The **first way** is the following:

1. Tap contextual menu icon (item 5 in Fig. 3.1).
2. Select “Settings” (Fig. 9.4).
3. Select “Web GIS” (Fig. 9.5).
4. Select Web GIS account (Fig. 9.6).
5. In opened window select “Delete account” (see Fig. 9.11).
6. Delete selected Web GIS account.

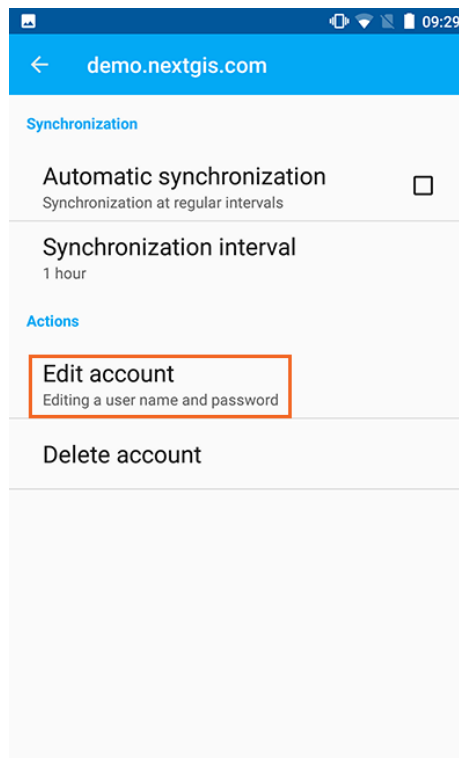


Рис.9.9: Settings dialogue.

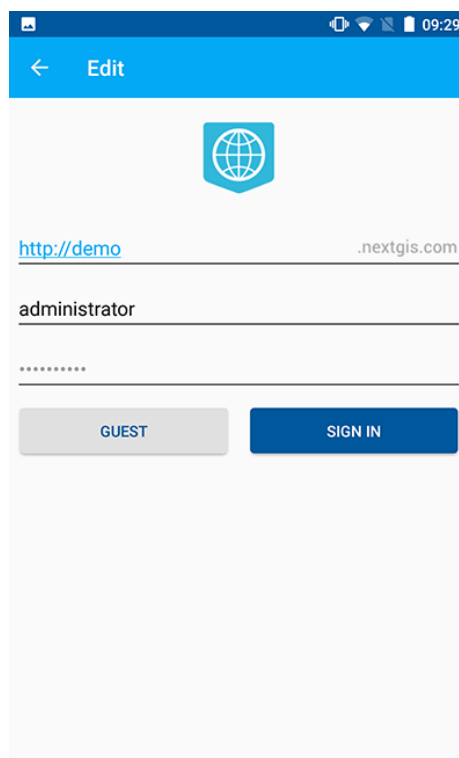


Рис.9.10: Editing of Web GIS account.

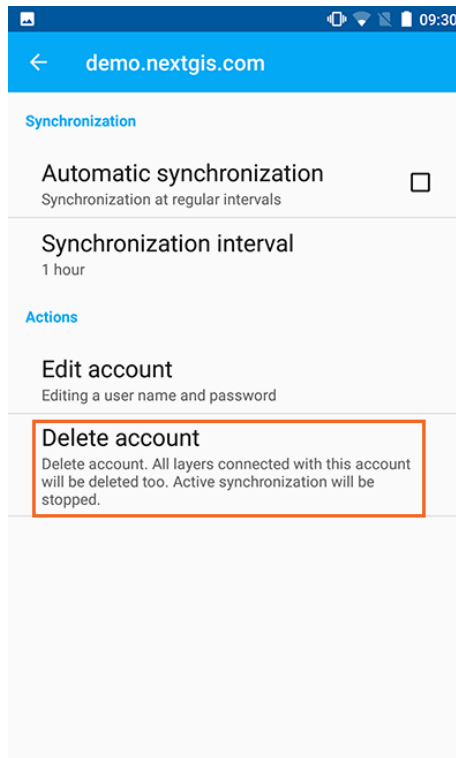


Рис.9.11: Settings dialogue.

7. In the case of successful deleting, the window with Web GIS selection will be opened without deleted Web GIS account.

The **second way** to delete Web GIS account is the following:

1. Open OS settings of the gadget.
2. Select "Accounts" in settings (see Fig. 9.12).
3. Select the "NextGIS" account from the list(see Fig. 9.13).
4. In opened window select Web GIS account (see Fig. 9.14).
5. In opened "Sync" window tap contextual menu icon in the right upeper corner of the screen and select "Remove account" (see Fig. 9.15).

9.6 Adding of a layer (vector/raster) from Web GIS

To add a layer (vector/raste) from Web GIS:

1. Open Layers tree panel (item 1 in Fig. 3.1).
2. Then tap on "Add geodata" button (item 4 in Fig. 3.2).
3. Select "Add from Web GIS" (Fig. 9.1)
4. In opened dialogue select Web GIS (Fig. 9.2). You can learn more about creating of Web GIS account in `ngmobile_create_a_connection`.
5. In opened window you can see the list of internal resources and layers (vector and raster) for the selected Web GIS account (see Fig. 9.16).

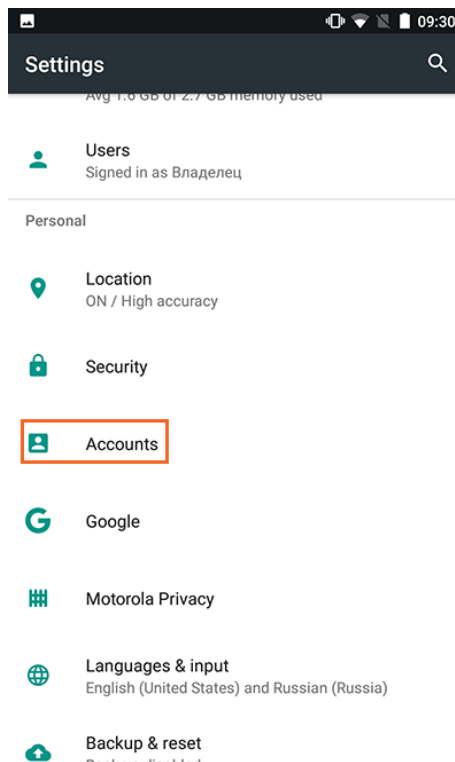


Рис.9.12: Accounts selecting in OS settings.

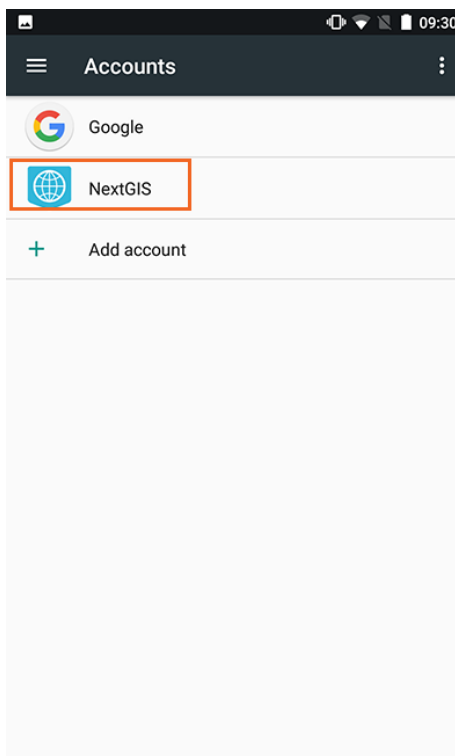


Рис.9.13: NextGIS account in OS settings.

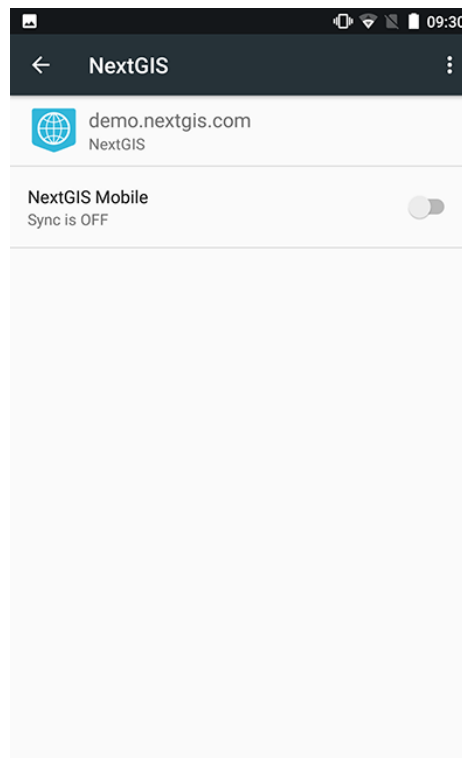


Рис.9.14: Web GIS account selecting in OS settings.

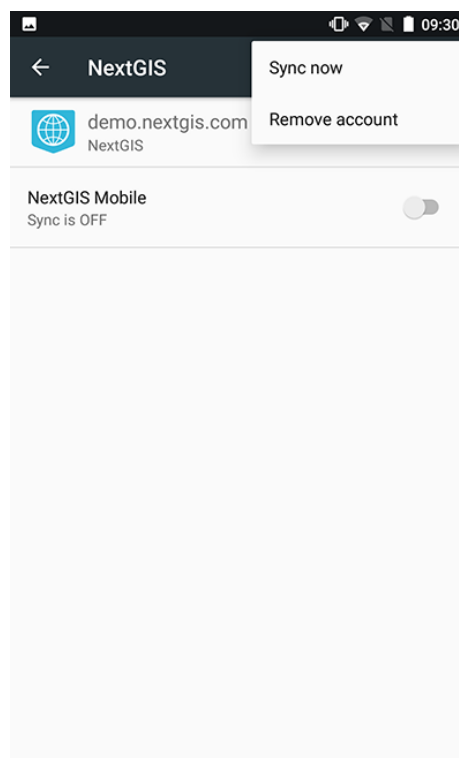


Рис.9.15: Web GIS account deleting through the OS settings.

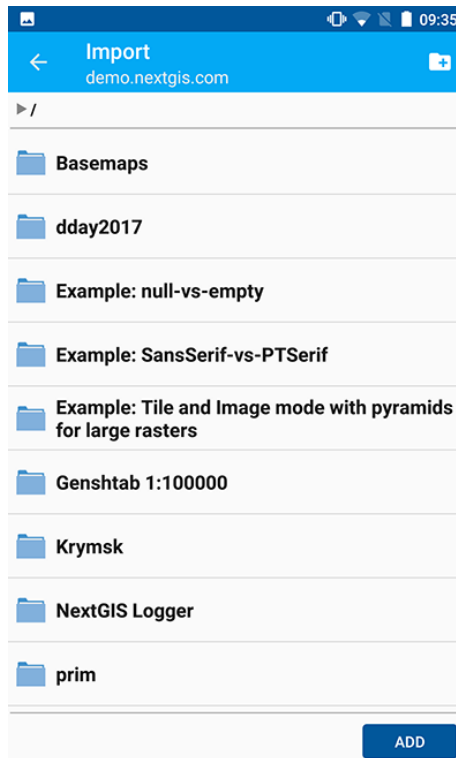


Рис.9.16: The list of Web GIS internal resources and layers.

6. Select a group of Web GIS resources and within it tick a layer (vector/raster) you want to add and tap “Add” (see [Fig. 9.17](#)).

Note: If you need to select several layers in different groups of Web GIS account, the tick of the layer selection will keep while you switching over the groups.

7. Layer’s processing dialogue includes options “Cancel” and “Hide” (see [Fig. 9.18](#)).

To stop Web GIS layer’s processing tap “Cancel” button. To avoid program’s interface blocking and to continue working with NextGIS Mobile tap “Hide” button. As a result Web GIS layers’s processing dialogue will be transfered to status panel (see [Fig. 9.19](#)).

Note: To stop the processing of Web GIS layer, which was transfered to status panel touch the screen on the layer’s processing panel with thumb and forefinger and move them in different directions sliding along the screen. The indicator of the Web GIS layer’s processing will be transfered to status panel and the “Stop” button will appear. Tap it to stop the processing of Web GIS layer.

After you execute all above mentioned selected Web GIS layers (vector/raste) will be added to a map and will be shown up in the layers tree.

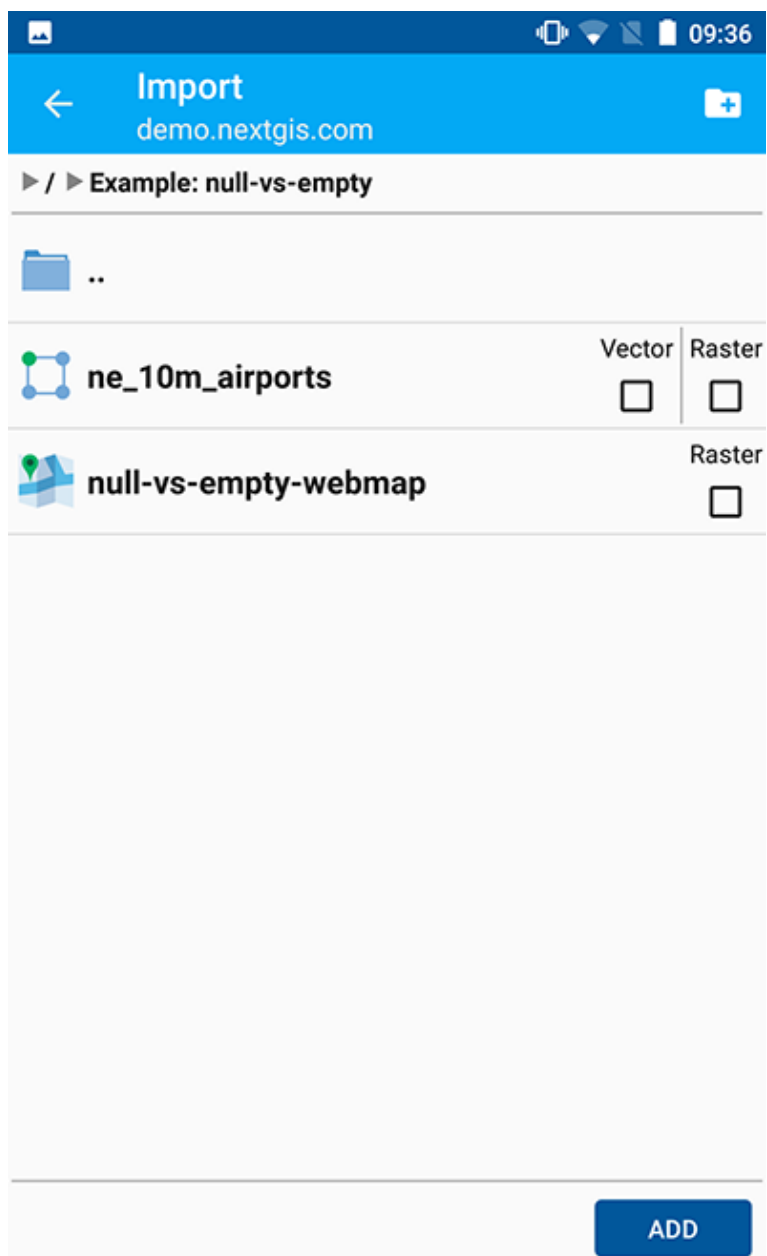


Рис.9.17: Selecting a layer within a Web GIS resources group.

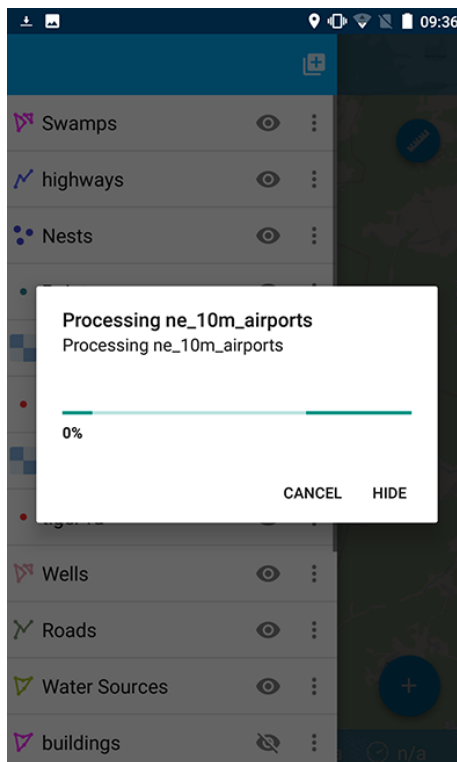


Рис.9.18: Layers's processing dialogue.

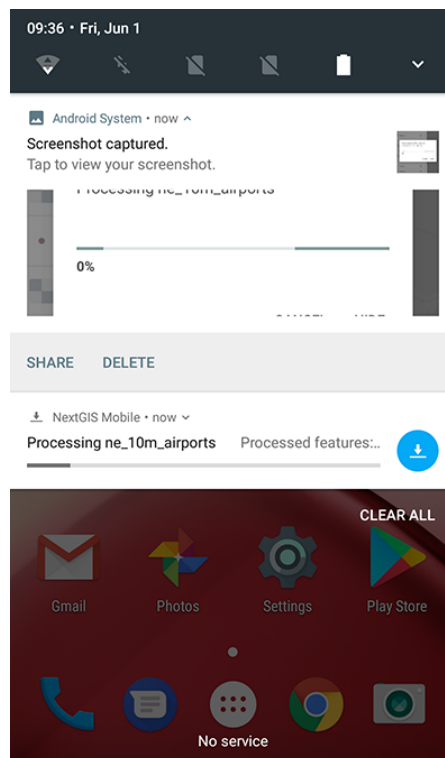


Рис.9.19: Status panel.

9.7 Synchronization settings for Web GIS vector layer

Synchronization helps to interchange of geodata corrections quickly and to provide the identity of information interchanging between user's PC and mobile gadget. To synchronize Web GIS vector layer:

1. Tap contextual menu icon (item 5 in [Fig. 3.1](#)).
2. Select "Settings" ([Fig. 9.4](#)).
3. Select "Web GIS" ([Fig. 9.5](#)).
4. Select Web GIS account ([Fig. 9.6](#)).
5. It will open a dialogue with options (see [Fig. 9.20](#)):
 - automatic synchronization;
 - synchronization interval (can be set to 5 minutes - 2 hours);
 - synchronization of the Web GIS layers.

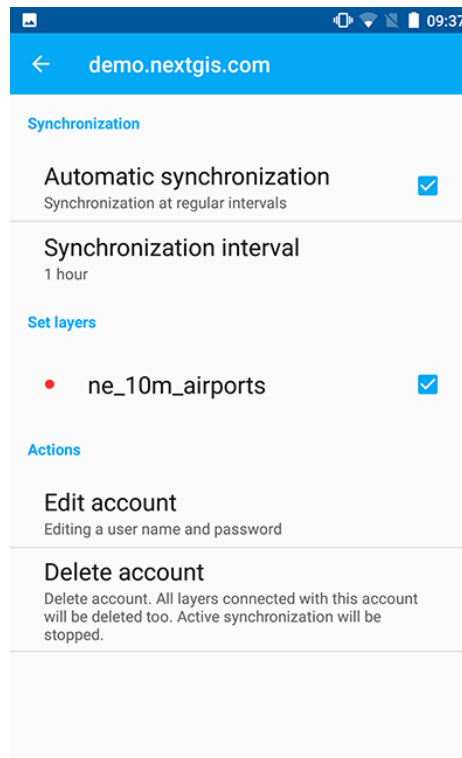


Рис.9.20: Settings of Web GIS account.

After a Web GIS layer for synchronization is selected the icon of the synchronization beginning appears near the the icon of the selected layer and near the icon of that layer on the layers tree (see [Fig. 9.21](#)):

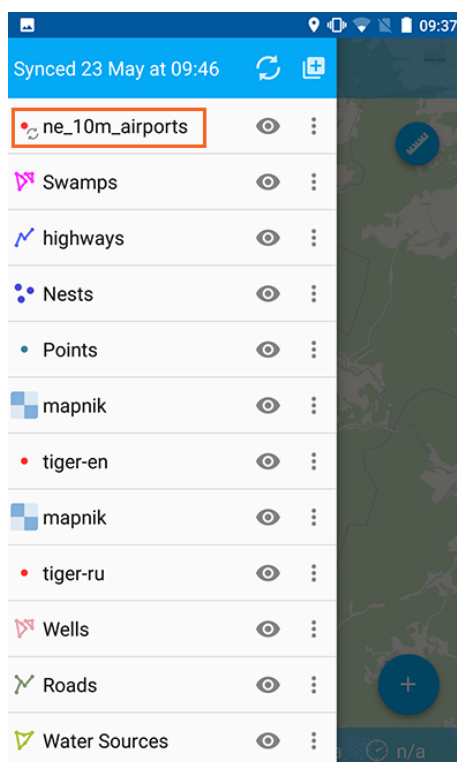


Рис.9.21: Layers tree.

GLOSSARY

Android

Android Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android has the largest installed base of all operating systems (OS) of any kind. Android has a growing selection of third-party applications, which can be acquired by users by downloading and installing the application's APK (Android application package) file, or by downloading them using an Google Play Store that allows users to install, update, and remove applications from their devices.

Cloud

Cloud Computing Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers, that may be located far from the user-ranging in distance from across a city to across the world.

Coordinate System

Geographic Coordinate System A geographic coordinate system is a coordinate system that enables every location on Earth to be specified by a set of numbers, letters or symbols. The coordinates are often chosen such that one of the numbers represents a vertical position, and two or three of the numbers represent a horizontal position. A common choice of coordinates is latitude, longitude and elevation.

Geodata

Geodata Geodata is collection of geographic features & asociated information about them, also known as spacial information.

GeoJSON

GeoJSON GeoJSON is an open standard format designed for representing simple geographical features, along with their non-spatial attributes, based on JavaScript Object Notation. The features include points, linestrings & polygons and multi-part collection of these types.

GIS

Geographic Information System A Geographic Information System is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographical data. In general, the term describes any information system that integrates, stores, edits, analyzes, shares, and displays geographic information. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations. GIS is a broad term that can refer to a number of different technologies, processes, and methods. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business. For that reason, GIS and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization.

GLONASS

Globalnaya Navigatsionnaya Sputnikovaya Sistema “Global Navigation Satellite System”, is a space-based satellite navigation system operating in the radionavigation-satellite service and used by the Russian Aerospace Defence Forces. It provides an alternative to GPS and is the second alternative navigational system in operation with global coverage and of comparable precision. Manufacturers of GPS devices say that adding GLONASS made more satellites available to them, meaning positions can be fixed more quickly and accurately (location to within 2 meters).

GPS

Global Positioning System The Global Positioning System (GPS) provides geolocation and time information to a GPS receiver in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

Raster

Raster Raster image is a dot matrix data structure representing a generally rectangular grid of pixels or cells. The information is stored in a cell.

Tile

Tile These are square images sorted by the grid, displaying the map, often with size of 255 X 255 and in PNG format.

TMS

Tile Map Service Tile Map Service or TMS, is a specification for tiled web maps, developed by the Open Source Geospatial Foundation. The definition generally requires a URI structure which attempts to fulfill REST principles. The TMS protocol fills a gap between the very simple standard used by OpenStreetMap (XYZ) and the complexity of the Web Map Service

standard, providing simple urls to tiles while also supporting alternate spatial referencing system.

URL

Uniform Resource Locator A Uniform Resource Locator (URL), commonly informally termed a web address, is a reference to a web resource that specifies its location on a computer network, like Internet, and a mechanism for retrieving it.

Vector

Vector In a GIS, geographical features are often expressed as vectors, by considering those features as geometrical shapes. Different geographical features are expressed by different types of geometry as, Points, Lines & Polygons. The information about these features is stored in an attribute table.

XYZ

Raster Tile Map Slippy map (in OpenStreetMap terminology) or Tiled Web Map is a map displayed by seamlessly joining dozens of individually requested image files over the internet. It is currently the most popular way to display and navigate maps, replacing other methods such as WMS which typically display a single large image, with arrow buttons to navigate to nearby areas. X, Y & Z denotes the numbering scheme to serve the images. The images are commonly of the size 256 X 256 in PNG format.

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Version 3, 29 June 2007

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