Creating the Administrative Boundaries in JOSM

Objectives:

- To be able to explain the definition and example of relation in OpenStreetMap
- To be able to explain administrative boundary concept in OpenStreetMap
- To be able to explain term and condition to create an administrative boundary in OpenStreetMap
- To be able to create the administrative boundaries in OpenStreetMap

The mapping of administrative boundaries in OpenStreetMap was suggested to an advanced mapper or experienced user with regularly mapping in OpenStreetMap. You can obtain the administrative boundary by government which have authorized with the boundary. In the PDC InAWARE project, we are associated with village offices and university in the cities. Therefore, we can obtain the administrative boundaries data from village offices, they drawing the boundaries in the paper maps.

The data source very important in administrative boundaries, you can not decide the boundary by yourself. If the data source is unclear and does not have an Open Data Commons Open Database License (ODbL), the data is not allowed to be uploaded into OSM. This can cause problems when other users download and use administrative boundary data freely for their benefit.

I. Relation in OSM

A relation is a group of elements. To be more exact it is one of the core data elements that consists of one or more tags and also an ordered list of one or more nodes, ways and/or relations as members which is used to define logical or geographic relationships between other elements. A member of a relation can optionally have a role that describes the part that a particular feature plays within a relation. The types of relation the administrative boundary :

a. Relation Tags

Relation tags to the administrative boundary in Indonesia

Key	Value	Definition
admin_level	(1-11) Adjusted according to administrative boundaries	The admin_level key describes the administrative level of an object within a government hierarchy. A lower level means higher in the hierarchy. Besides others, this tag is used for the borders of territorial political entities (e.g. country, state, municipality) together with boundary=administrative. Due to cultural and political differences, admin levels of different countries only correspond approximately to each other.

Key	Value	Definition
boundary	administrative	An administrative boundary. Subdivisions of areas/territories/jurisdictions recognized by governments or other organizations for administrative purposes.
type	boundary	This tag to identify the object in administrative boundary
name	Name of administrative level	This tag to identify the name in administrative boundary, example: RW 03, Candisari Village
place	Example suburb, island	This optional tag, used to indicate that a particular location is known by a particular name, to indicate what sort of "place" it is. A place tag should exist for every significant human settlement (city, town, suburb, etc.) and also for notable unpopulated, named places. http://wiki.openstreetmap.org/wiki/Key:place
land_area	administrative	Tags to identify a land area boundary
is_in:province	Name of province	Tags to identify the name of the province. This tag must be included in lower-level administrative from (City/Town, Municipality, Village, Community group, Neighborhood Unit)
(City) is_in:city, **(Town)** is_in:town	Name of City/Town	Tags to identify the name of the city/town. This tag must be included in lower-level administrative from City/Town (Municipality, Village, Community group, Neighborhood Unit)
is_in:municipality	Name of Municipality	Tags to identify the name of the municipality. This tag must be included in lower-level administrative from Municipality (Village, Community group, Neighborhood Unit)
is_in:village	Name of Village	Tags to identify the name of the village. This tag must be included in administrative from Village (Community group, Neighborhood Unit)

| Key	Value	Definition
is_in:RW	Name of Community group	Tags to identify the name of the community group. This tag must be included in lower-level administrative from Community group (Neighborhood Unit)

b. Relation Members

- Admin_centre

The point that represents the centre of administration in one area (a capital, county seat, etc.), usually a town, city or village (depending on the boundary level, see place=*).

- Outer

  The multiple ways that form the closed border

- Inner

  Enclaves of this border - the multiple ways that form the closed inner borders
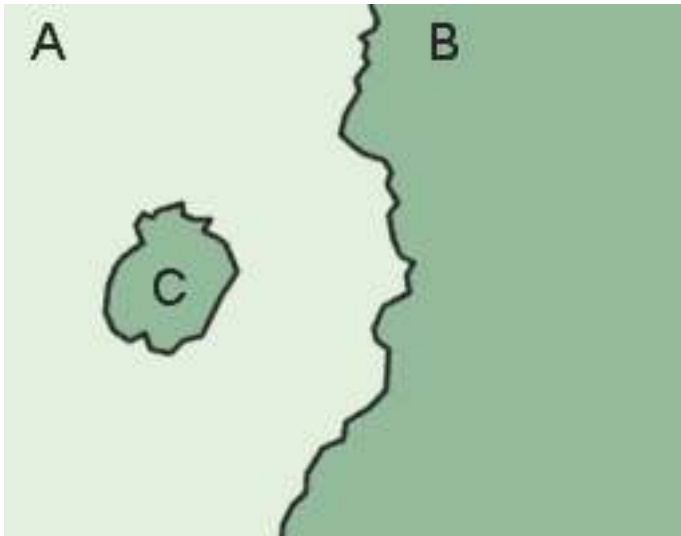
Area C is inside Area A and Area C is identified as an inner of the relation members (https://wiki.openstreetmap.org/wiki/Ma

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II. Understanding Administrative Boundary in OSM

a. Definition of Administrative Boundary

An administrative boundary. Subdivisions of areas/territories/jurisdictions recognized by governments or other organizations for administrative purposes. These range from large groups of nation-states right down to small administrative districts and suburbs, as indicated by the 'admin_level=*' combo tag.

Boundary Administrative in Petamburan (openstreetmap.org)

b. Admin_level values for specific countries

Admin_level=1 to 10 has been introduced in order that different borders can be rendered consistently among countries (doing this based on border_type would require knowledge of their hierarchy in each country). The lists of admin-level boundary for specific countries: http://wiki.openstreetmap.org/wiki/Tag:

boundary%3Dadministrative or https://tinyurl.com/wiki-batasadm

c. Admin_level values for Indonesia

The division of administrative boundaries in Indonesia is adjusted to the division of regions and divisions in Indonesia which are managed by regional governments based on the principles of autonomy, decon-centration, decentralization and co-administration tasks. The types of administrative boundaries that exist in Indonesia are Provinces, City/Town, Municipality, Village, Hamlet (only rural area), Community group, Neighborhood Unit.

When the types of administrative boundaries in Indonesia are seen in OpenStreetMap, administrative boundaries have different values according to the level of administration. The levels of administration in Indonesia is as follows:

value	Admin Level	Example Rendering	Place
1	-	-	-
2	Country		-
3	-	-	-
4	Province		Province
5	City/Town		Big City=City, Small City=Town
6	Municipality		Municipality
7	Village		Village
8	Hamlet		Hamlet
9	Community Group		Community Group
10	Neighborhood Unit		Neighborhood Unit

III. Terms and Condition When Create Administrative Boundary in OSM

a. Term and Condition to Mapper

As mentioned above, administrative boundaries are a sensitive topic to map. In order to avoid issues in the future, there are specific requirements when it comes to mapping administrative boundaries on OpenStreetMap, they are:

- The mapper has learned the concept relation data in OSM especially for the relation of administrative boundary
- The mapper has learned about how to create the administrative boundary and concern the data source
- The mapper can explain the admin level of the administrative boundary in Indonesia

b. Term and Condition to Data Source

Term and condition to the data source of the administrative boundary in OSM:

- Data must come from a reliable source, for example the Geospatial Information Agency (BIG)

- Data used must have a permission to use license, to ensure it is legal to be used for public use.
- Data must have clear administration boundaries, as legally acknowledged and approved by the concerned authorities.

IV. Adding the Administrative Boundary in OSM

In making administrative borders, it is highly encouraged to use editor Java OpenStreetMap (JOSM) due to the complete tools available to edit and modify are much easier to use than other editors such as iD editor.

> **Note :** Data used in this tutorial are fictitious data to easily help understand and practice creating administrative borders.

Here are the steps in creating administrative boundaries on OpenStreetMap:

a. Drawing the Lines of Administrative Boundary * Open JOSM editor. * Then, select that you will make administrative boundaries in, by downloading the OSM data of the specified area. * If the OSM data has mapped such as buildings and roads, you can use the filter data in JOSM in referring to chapter **Using Filter in JOSM**. The tool filter helps to hide the building and road in OSM data. * Starting to digitize with **Draw Node**

- The image below is an example of digitizing administrative boundaries. We will create three villages that connected in the administrative boundary, there are Desa A (Village A), Desa B (Village B), and Desa C (Village C).
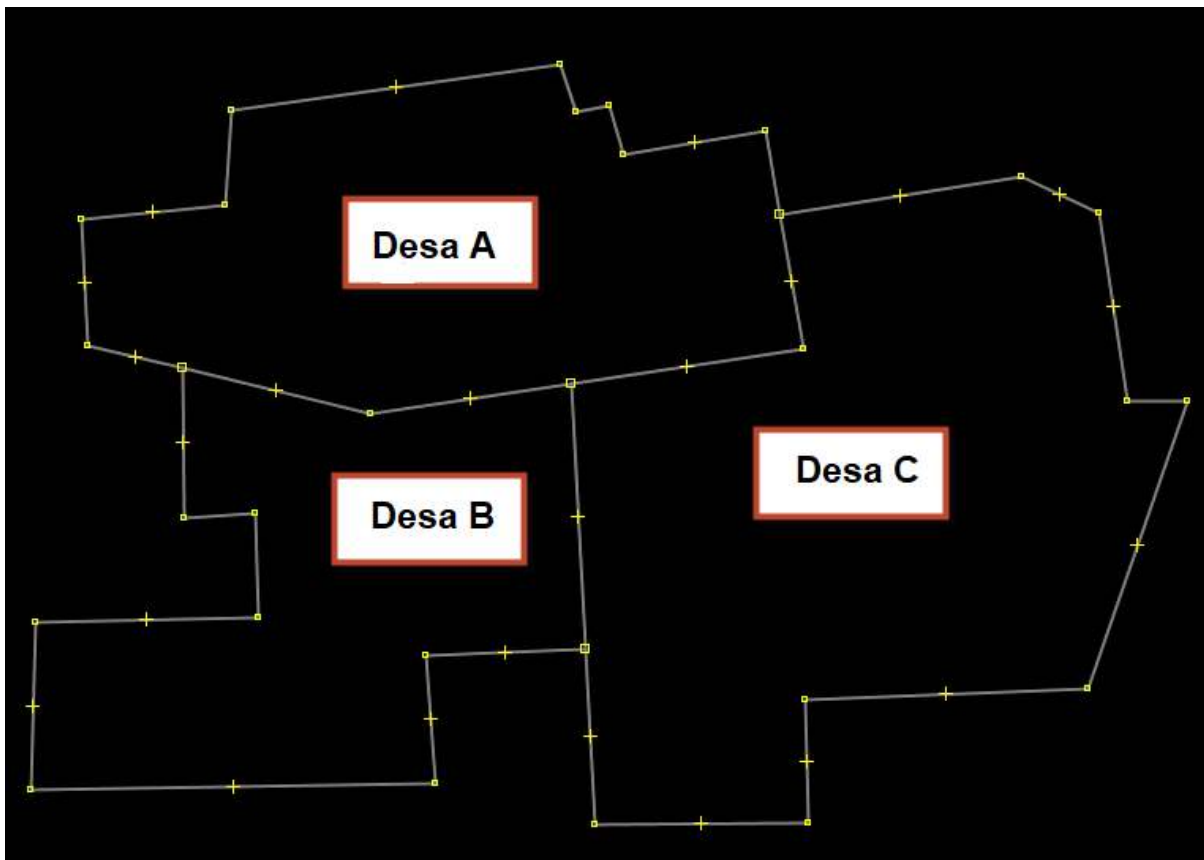
Divide the area

- When drawing administrative boundaries, please consider the following:
    - Drawing lines connects with other lines in administrative boundary

- Ensure that do not overlap lines in administrative boundary and drawn twice
- Ensure that every interconnected line is drawn its own separate line (in a different segment). If the lines look something like this:
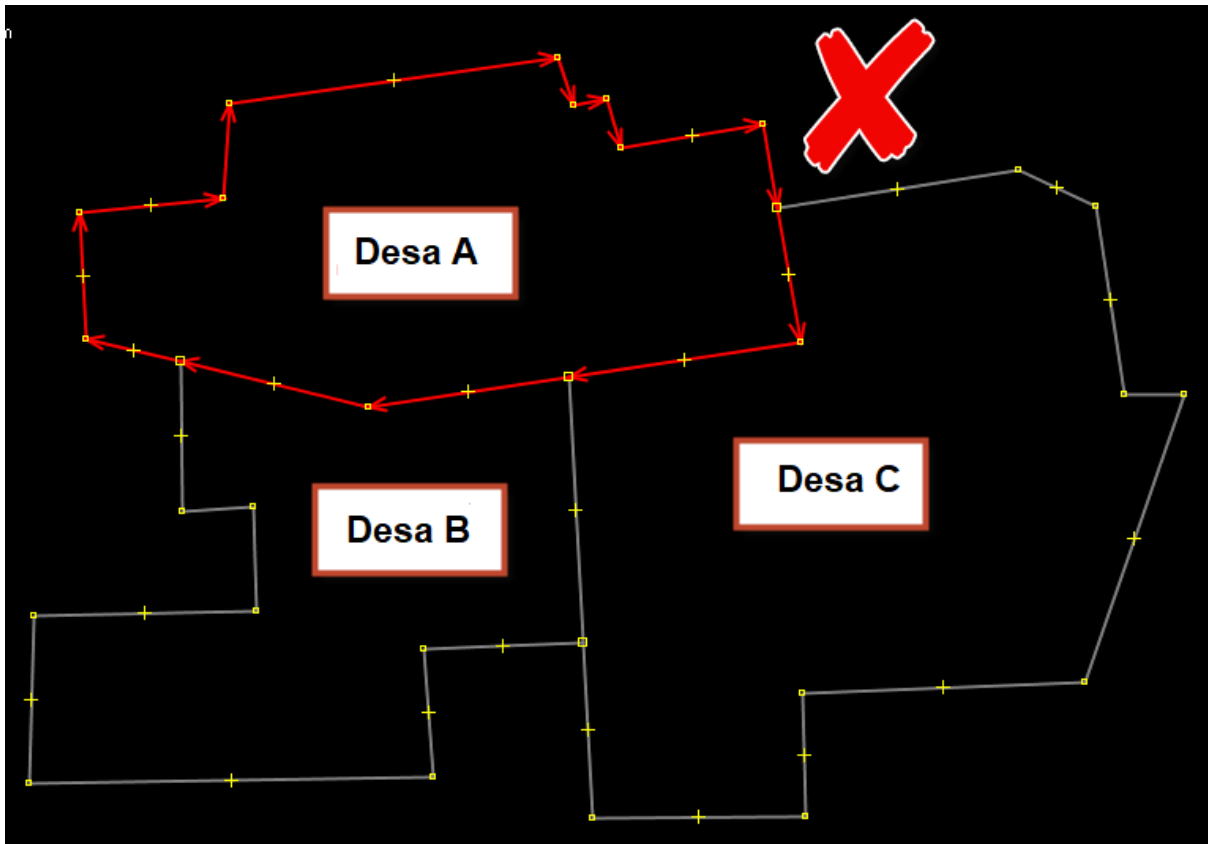
The mistake of creating the relation

You can separate the lines use **Tools → Split Way** or use the shortcut **(P)** in your keyboard with choosing two-node between lines that separated like this:
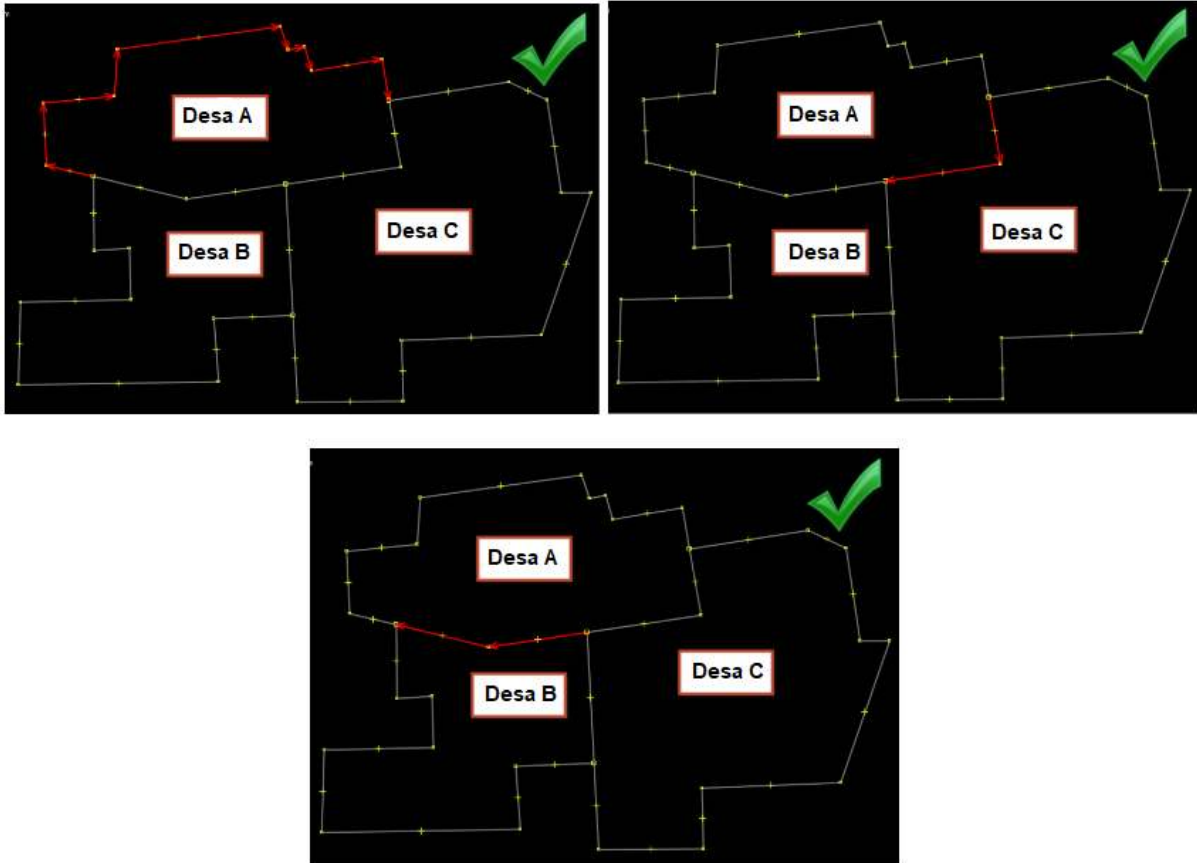
The split way in lines administrative

b. Assigning Tags on Administrative Boundary Lines

- The next step is to assign a tag on each boundary line made Select one line in a segment from the administrative boundary.
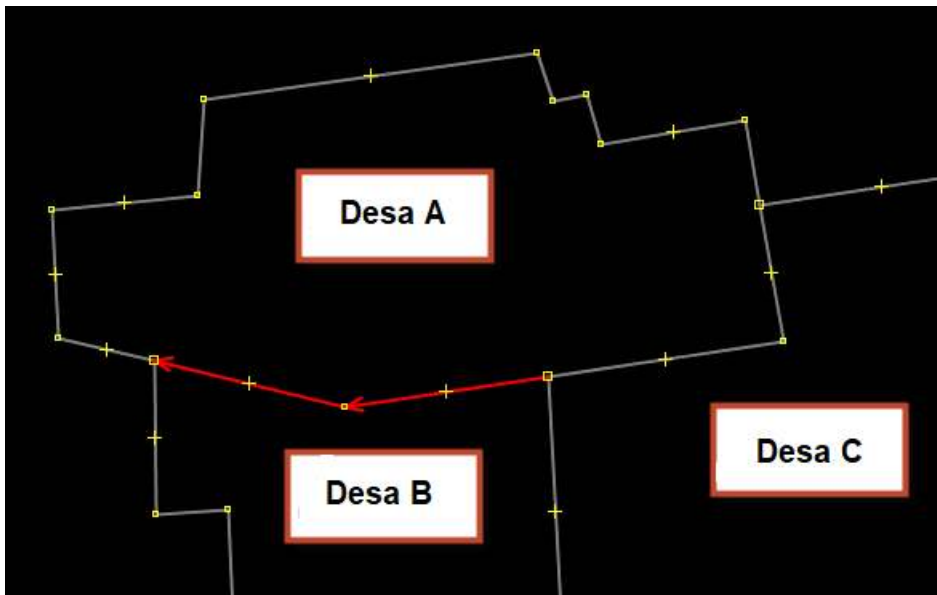
Choose line in administrative boundary

- Then, we will tag the lines with administrative boundary presets with click on **Presets Menu → Batas Administrasi → Garis Batas Administrasi**. If these presets not showing in your Menu Presets, please refer to the chapter **Using JOSM** for adding the "PDC InAWARE Indonesia preset". It is only in Bahasa.
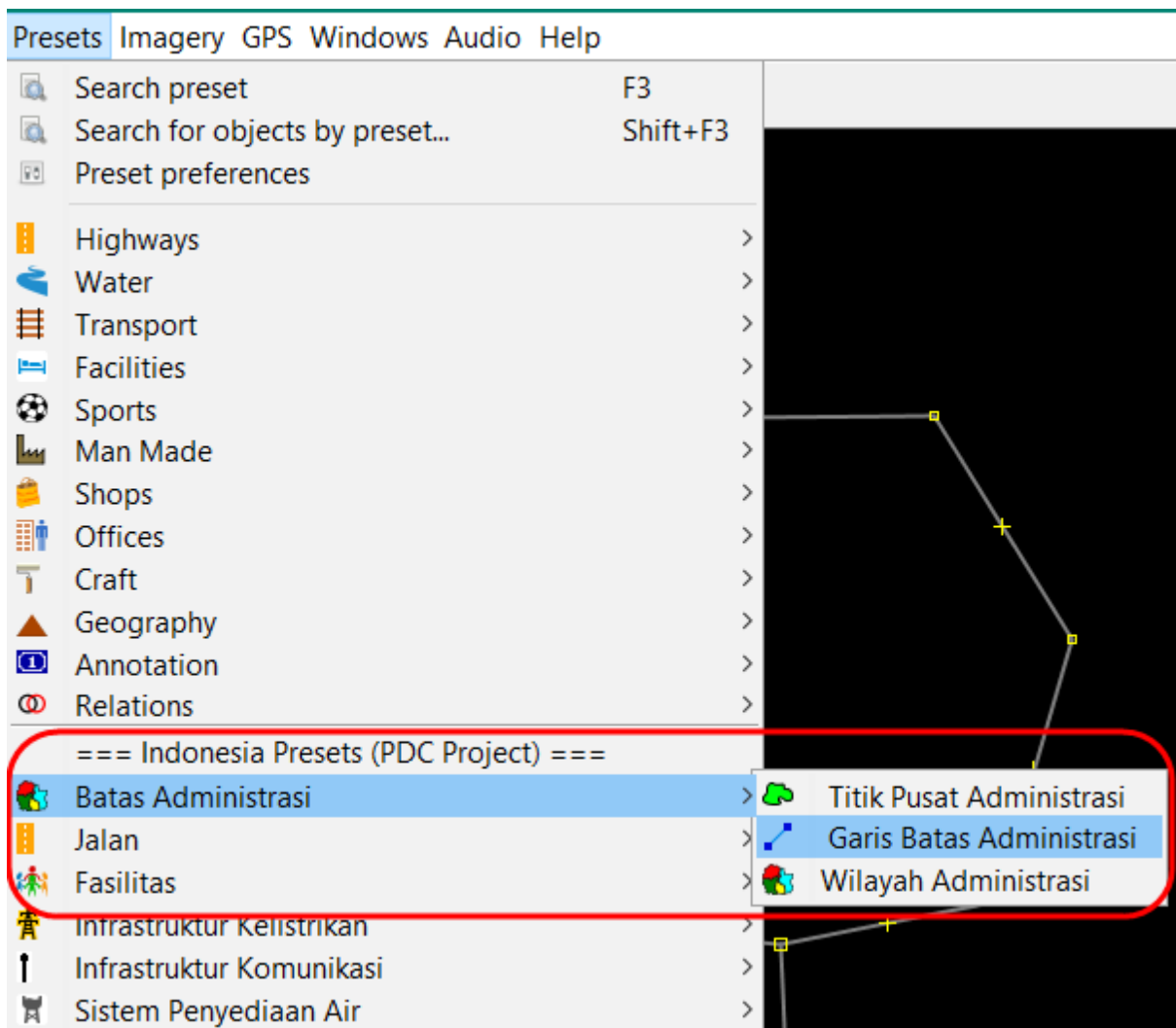
Menu Presets

- It will appear the dialog window that you can fill the name according to the name village between boundaries, such as Desa A / Desa B. This tag is intended to explain the line segments as administrative boundaries for Village A (Desa A) and Village B (Desa B). Then click on **Apply preset** to save the result.
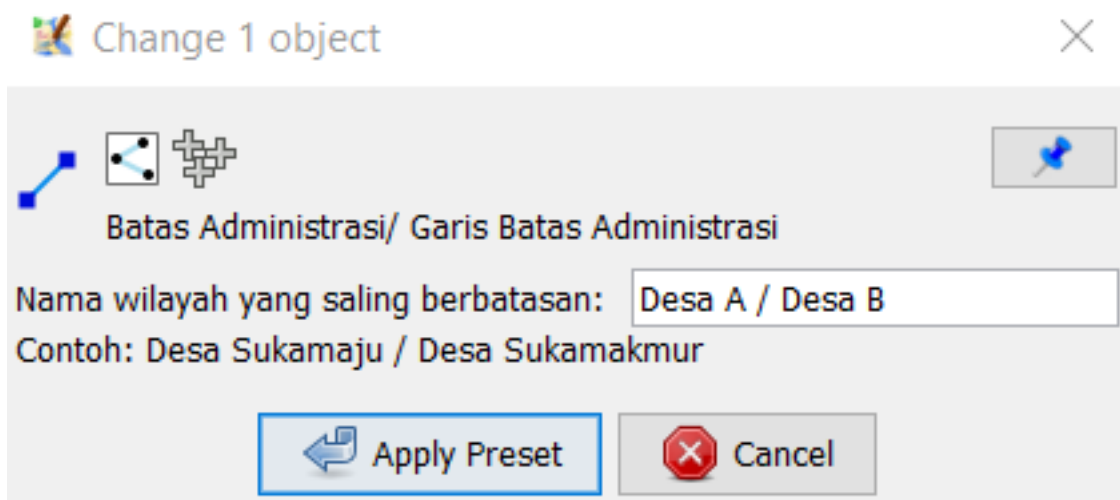
The presets form Administrative Line

- You can see the properties of the tag in line with select the lines using **select tool** and see the information on the right side, like the image below:
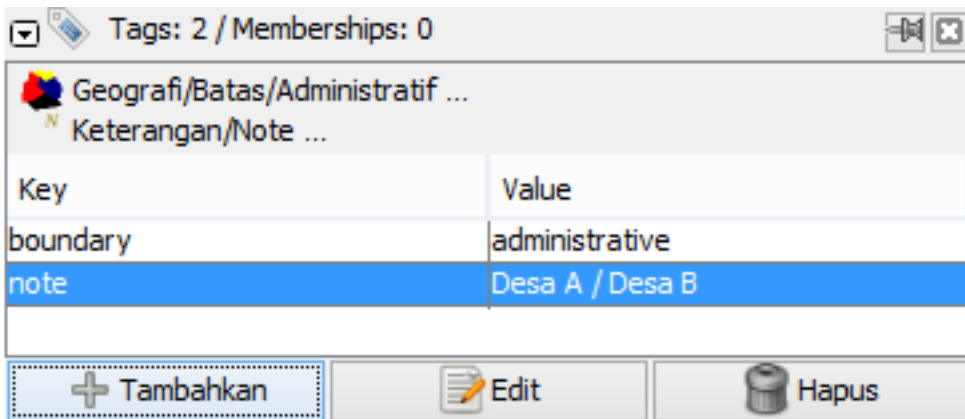
Tagging in administrative line boundary

- In the next step, we will tag on the segments in line administrative boundary Desa A. Select the segment in line between Desa A and Desa C. Tagging in the same way as before.
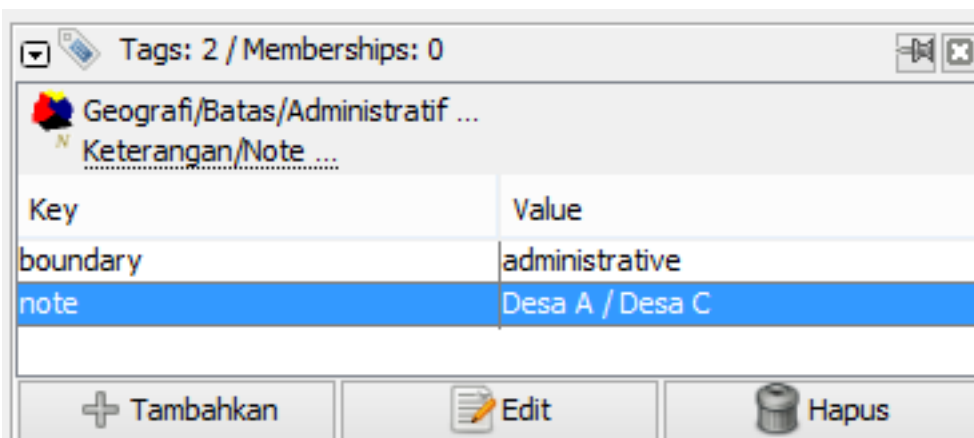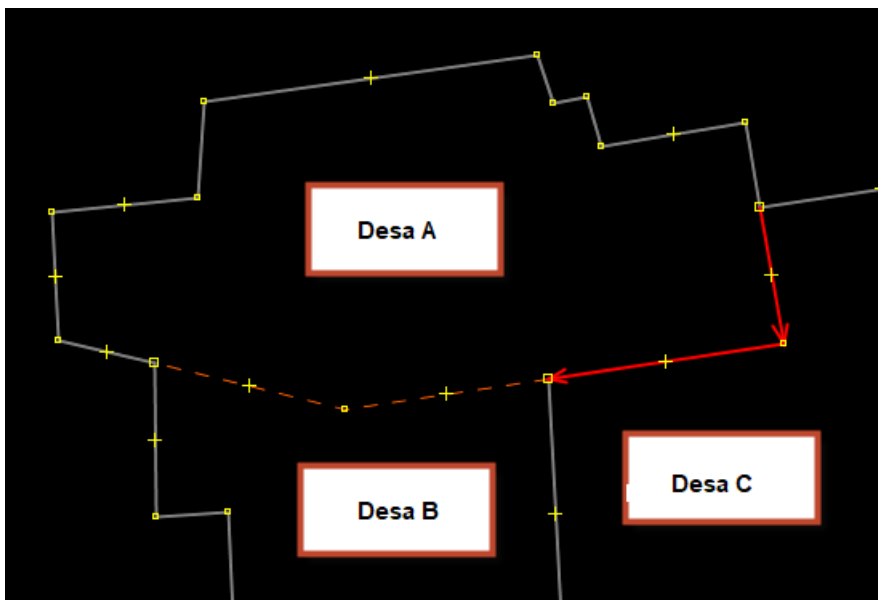
Tagging in administrative line boundary

- This part of the tutorial will show how to make village/district administrative boundaries where the village/district are covers the entire mainland/island. In the image below, the red line is the boundary
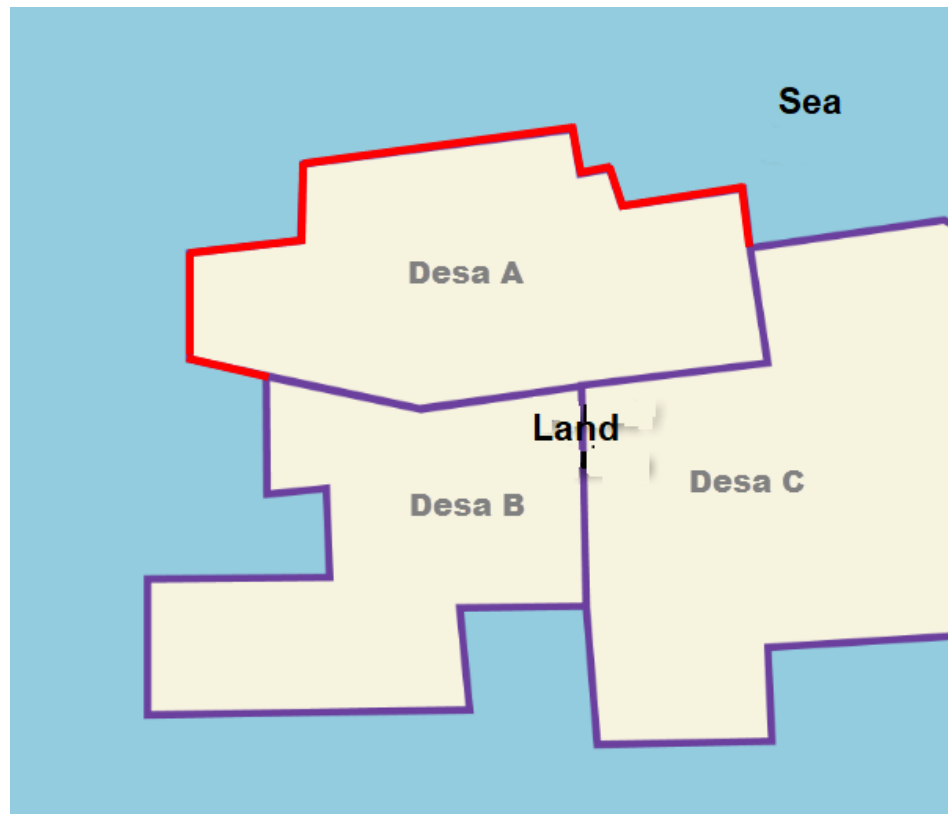
between Village A and the ocean.
The boundary administrative with coastline

In this case, the tag given is different, where you need to add **key=natural** and **value=coastline**, then remove for tag **key=note**. To add the tagging, click on** Menu Presets → Perairan → Natural → Garis Pantai**.
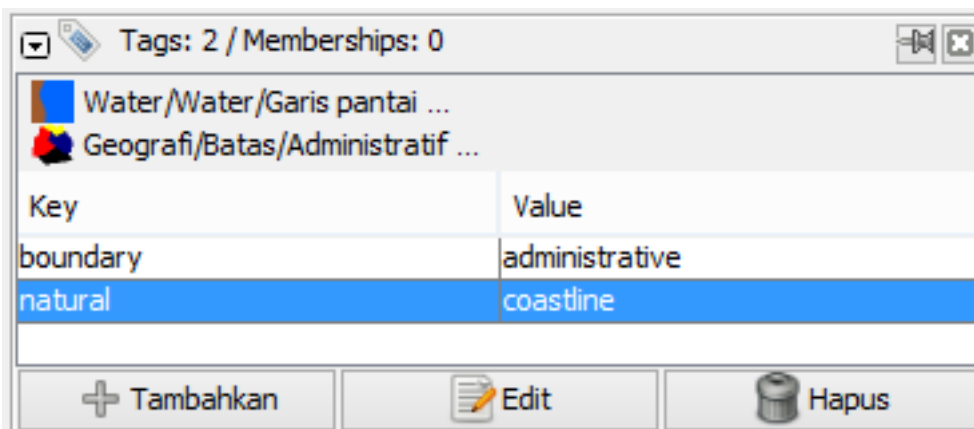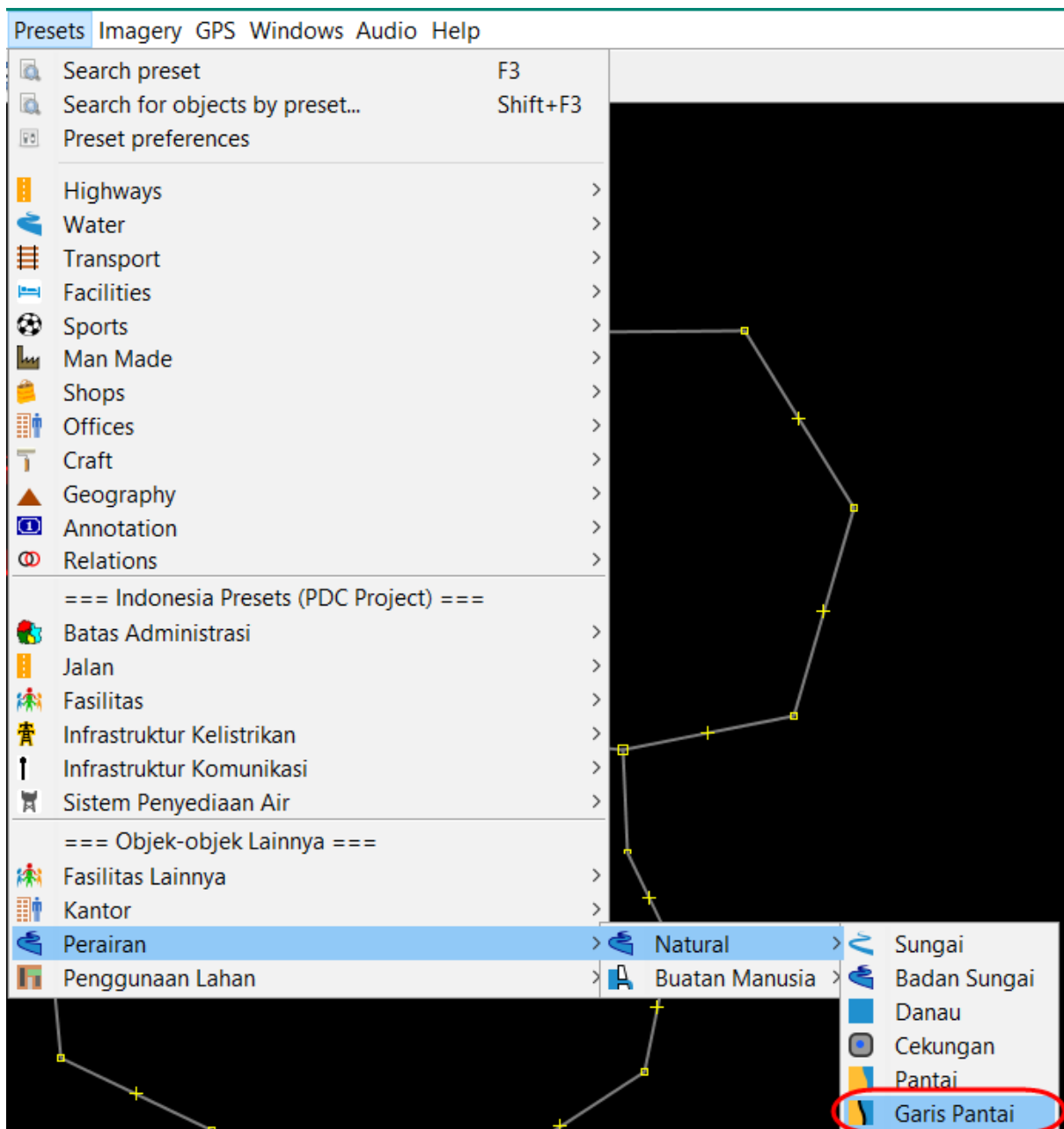
The boundary between line and coastline

- After the segments have tagged in Desa A. Let's draw a node as administrative centre from Desa A.

Digitize a node in Desa A

- Add the presets for the object with **Presets Menu → Batas Administrasi → Titik Pusat Adminis-trasi**. Fill the properties with the village name according to the admin level.
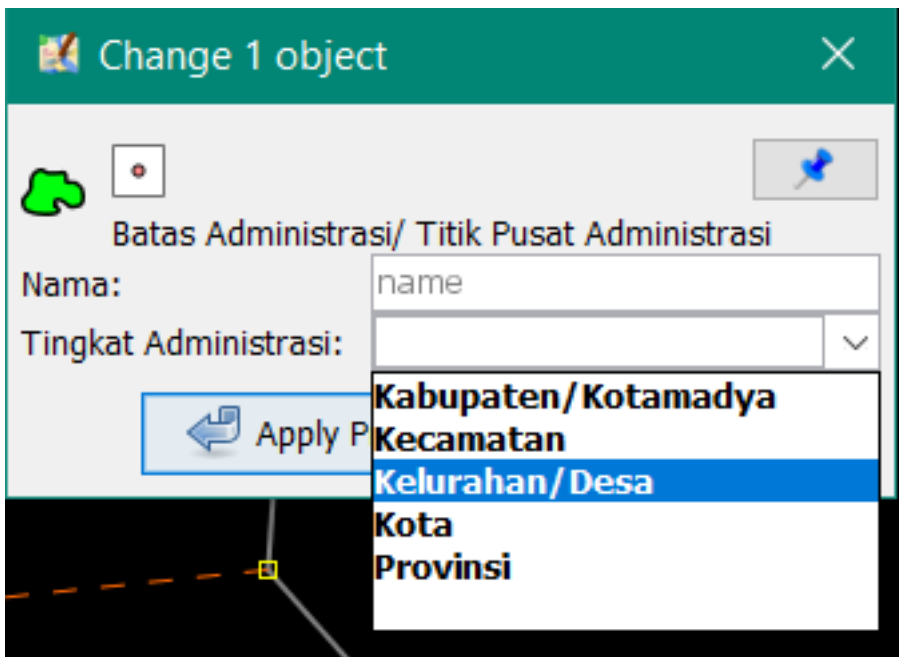
Add tags in point of village

- The result should be like this:

The result for the village name

c. Create Relations Administrative Boundary (example: Desa/Village)

- Next step we will create a relation to the administrative boundary in Desa A. Use the **Select Tool** to select all segments in lines and node in the area Desa A**.**

Select all lines and point in Desa A

- Add presets for the relations with click on **Presets Menu → Batas Administrasi → Wilayah Administrasi**
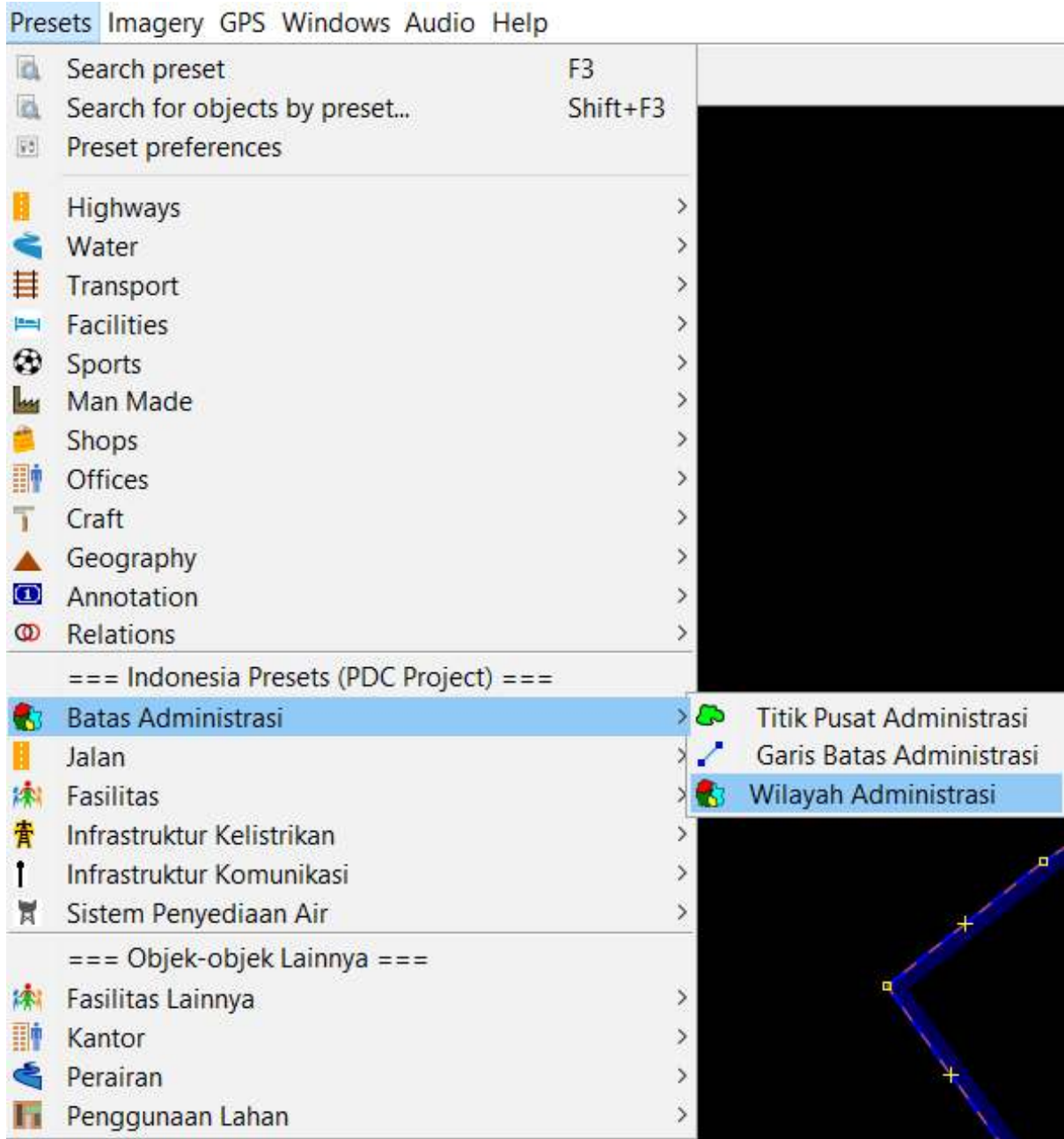
Presets for relation tag

- The preset window above should appear. Assign the administrative name (example: Village A), and on the boundary type column select Administrative, and on Administrative level column, select according to the level of administration (example: Village -. Level of Administration = 7). If you find the **sign v** in the row, please click on it and drop down the row. Click on **New relation** to create a new relation.
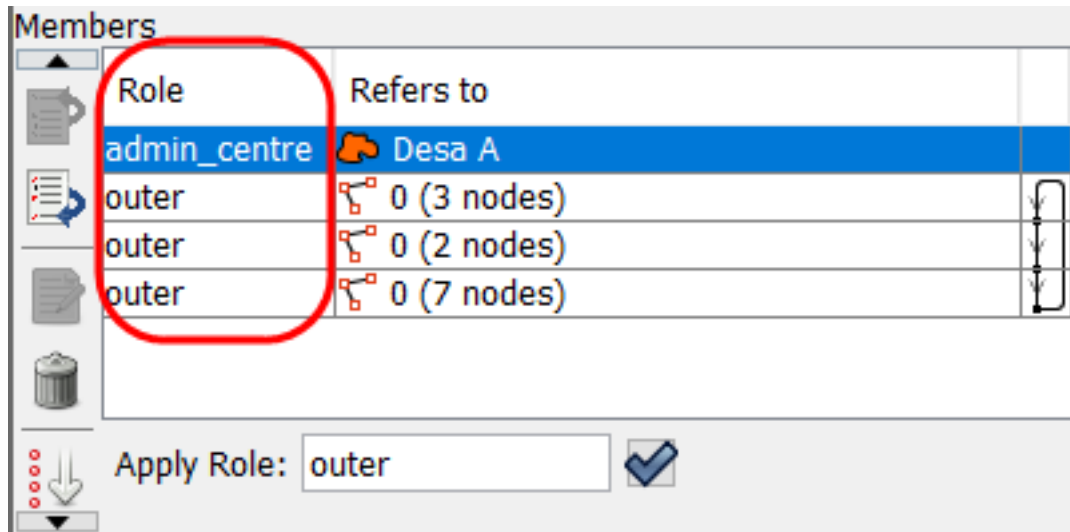
The list the relations tag administrative boundary

- A new relation window should appear:
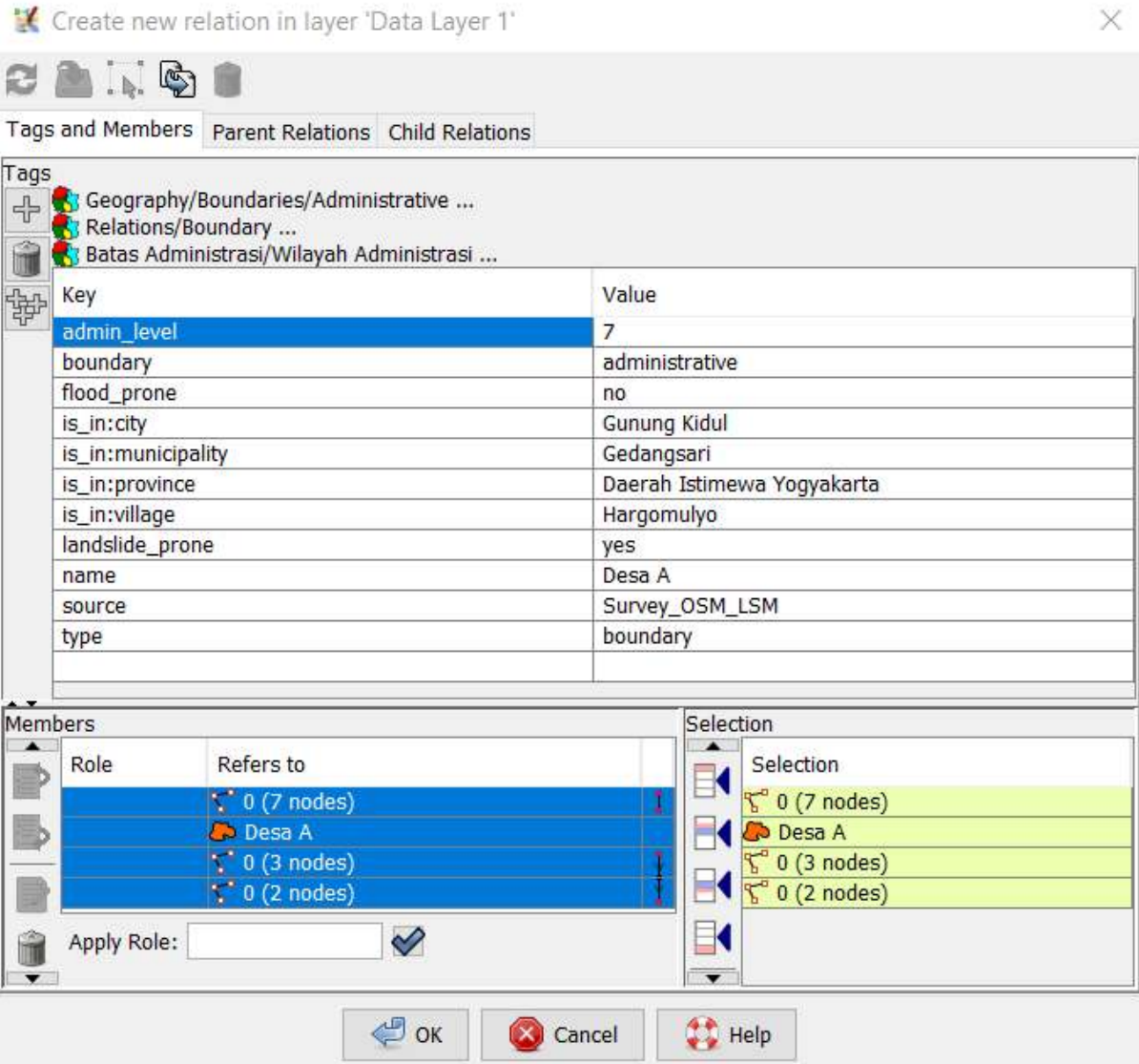
New relation window

- Check on the Role. After relation member Desa A is complete, we can determine the **role** of each member. The line segments Desa A have a role as **"outer"** or an outline from the administrative boundary. Also, add the role to node Desa A with **"admin_centre"**.
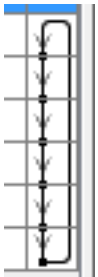
The role of each member

- Ensure the member list of the administrative boundary in order. If it is not ordered, it looks like here:
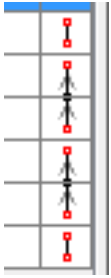
To organize the line segments, click the **Sort the relation members** icon

- After the line segments are in the correct order, the lines in the right hand side of the window should look like this:
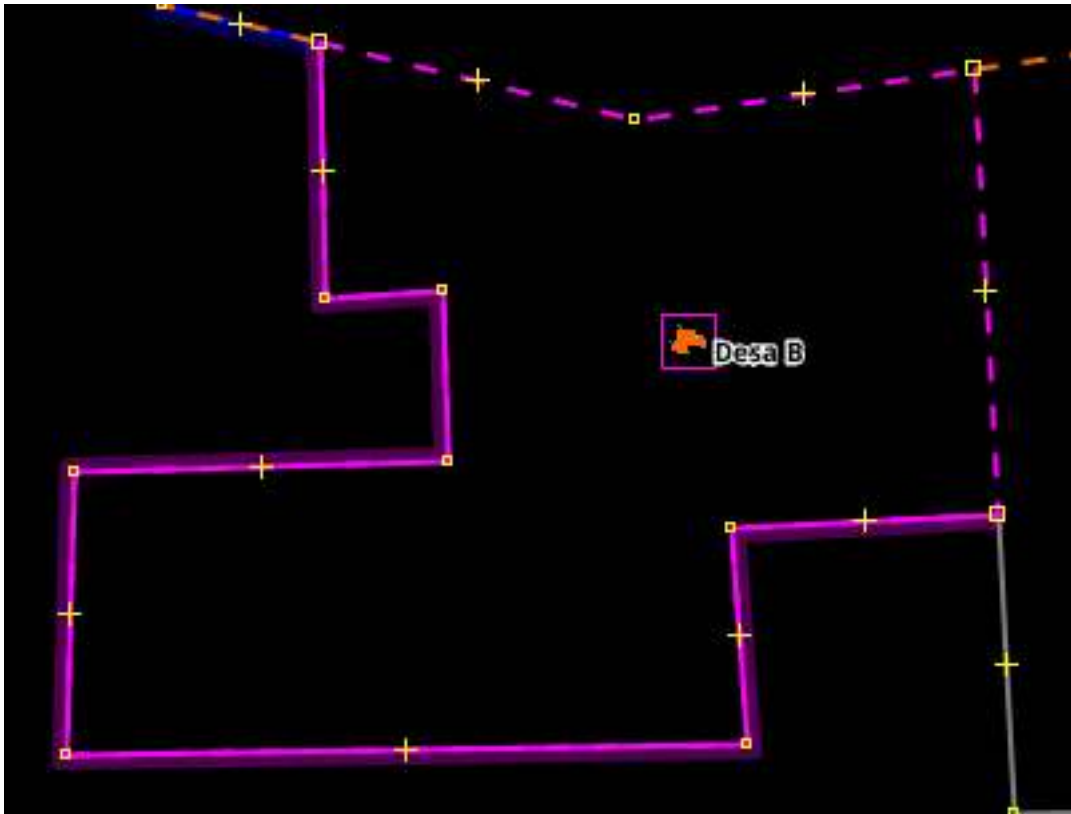

- After assigning the role of each relation as well ensuring the list of administrative boundaries are in order, click **OK.**
- Check on the geometry relation in the data layer with a double-click on the area Desa A. The right relation will be shown in purple color.
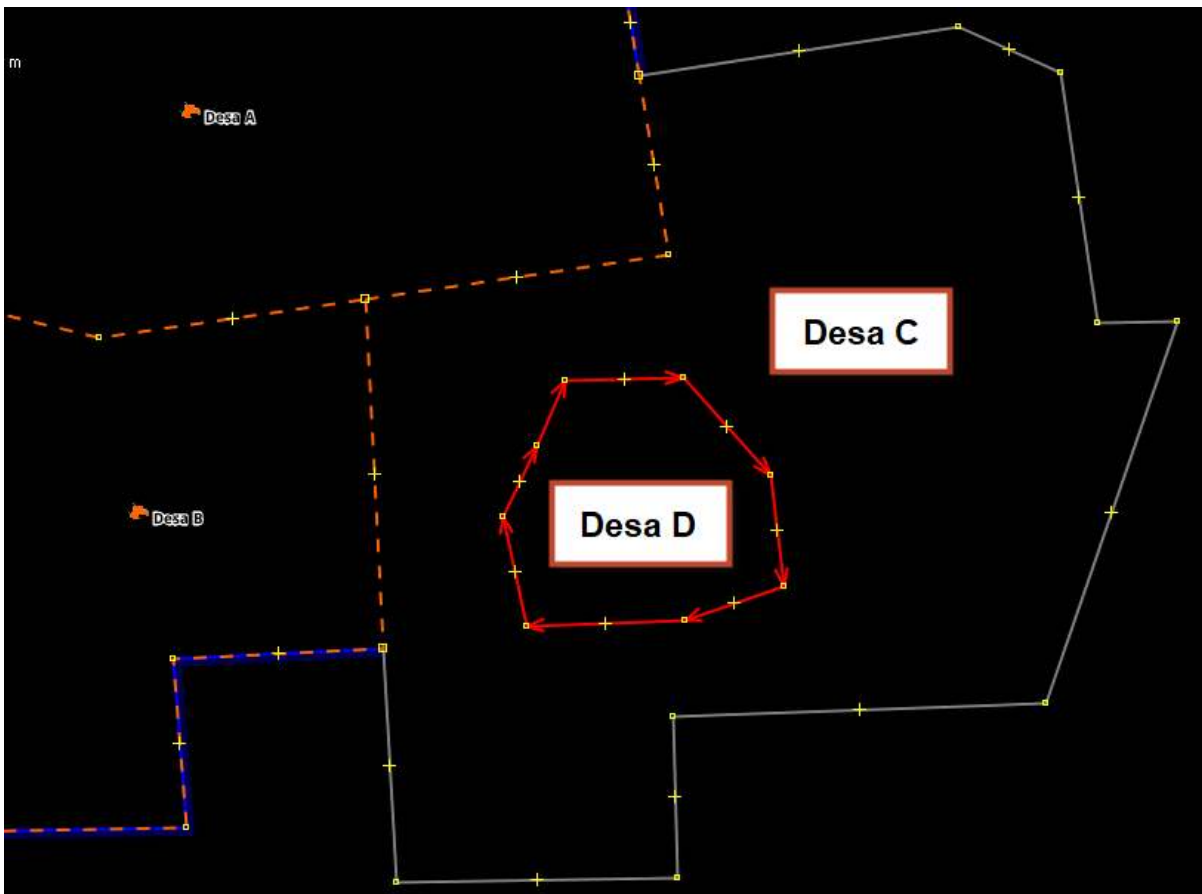

Relation of Desa A/Village A

- Please following step by step the same with before to create a relation of Desa B/Village B. If you are successful, the result like an image below:

Desa B Area

- Add a new village in your relation boundary, we can named with Desa D/Village D. The village inside the area Desa C
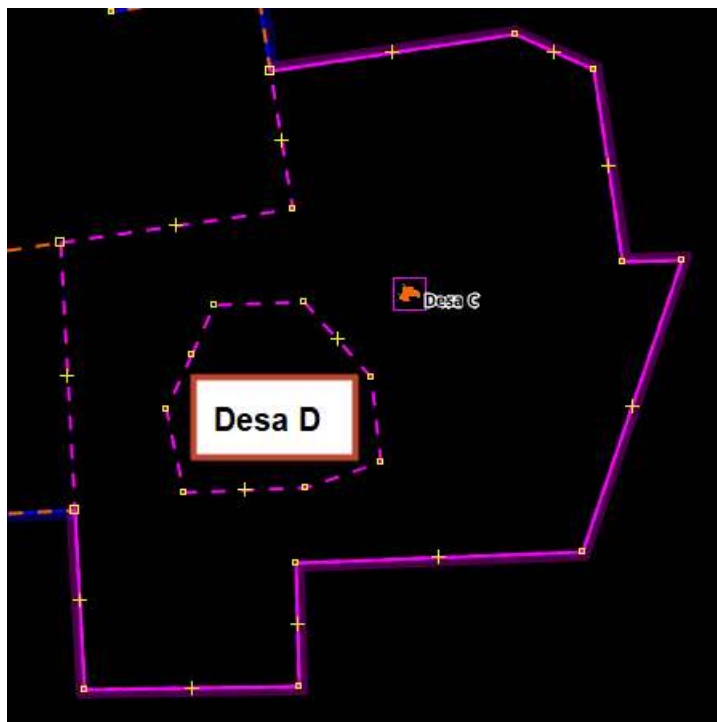
Add new administrative boundary Desa D

- After assigning relation members of Village C, assign the roles of each relation members.
- Line segments of **the outer layer** of Village C (boundary lines between Village C/A, boundary lines between VIllage C/B, and boundary lines between Village C/Ocean) -> acts as the **"outer"** boundaries of the administrative area.
- Line segments of the **inner layer** of Village C (boundary lines between Village C/D) -> acts as the **"inner"** boundaries of the administrative area.
- Centre point of Village C -> assign as **"admin_centre"**

The setting of relation Desa C

- Click on icon **Sort the relation members**, to ensure the list of relation members are in order
- Now Double-click in administrative boundary Desa C. If the relation has been made, the area of Desa C should appear purple color like below:


The result of relation Desa C

- After creating administrative boundaries for Village C, continue creating boundaries for Village D. **Follow the same steps** from **Assigning Tags on Administrative Boundaries** until **Creating Relations of Administrative Boundaries.** The end result should look like this:

The result of relation Desa D

d. Creating the relation of the administrative boundaries (example: Municipality)

- In this section, we will create a boundary in the up-level from the village. The step will be the same to create the relation of the village boundary.
- Let's create a point of administrative centre in Kecamatan Kertamukti, and assign a tag: Click on **Preset Menu → Batas Administrasi → Titik Batas Administrasi**
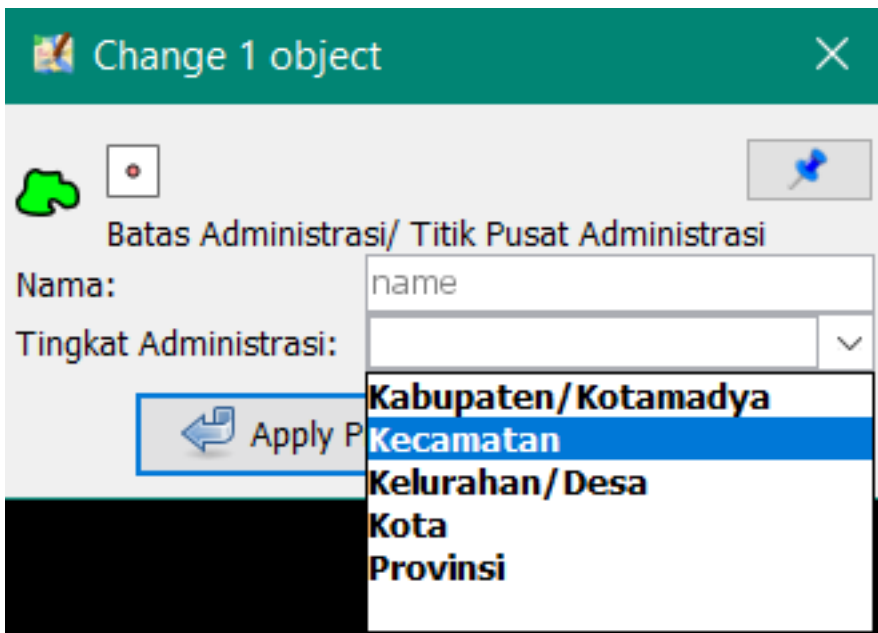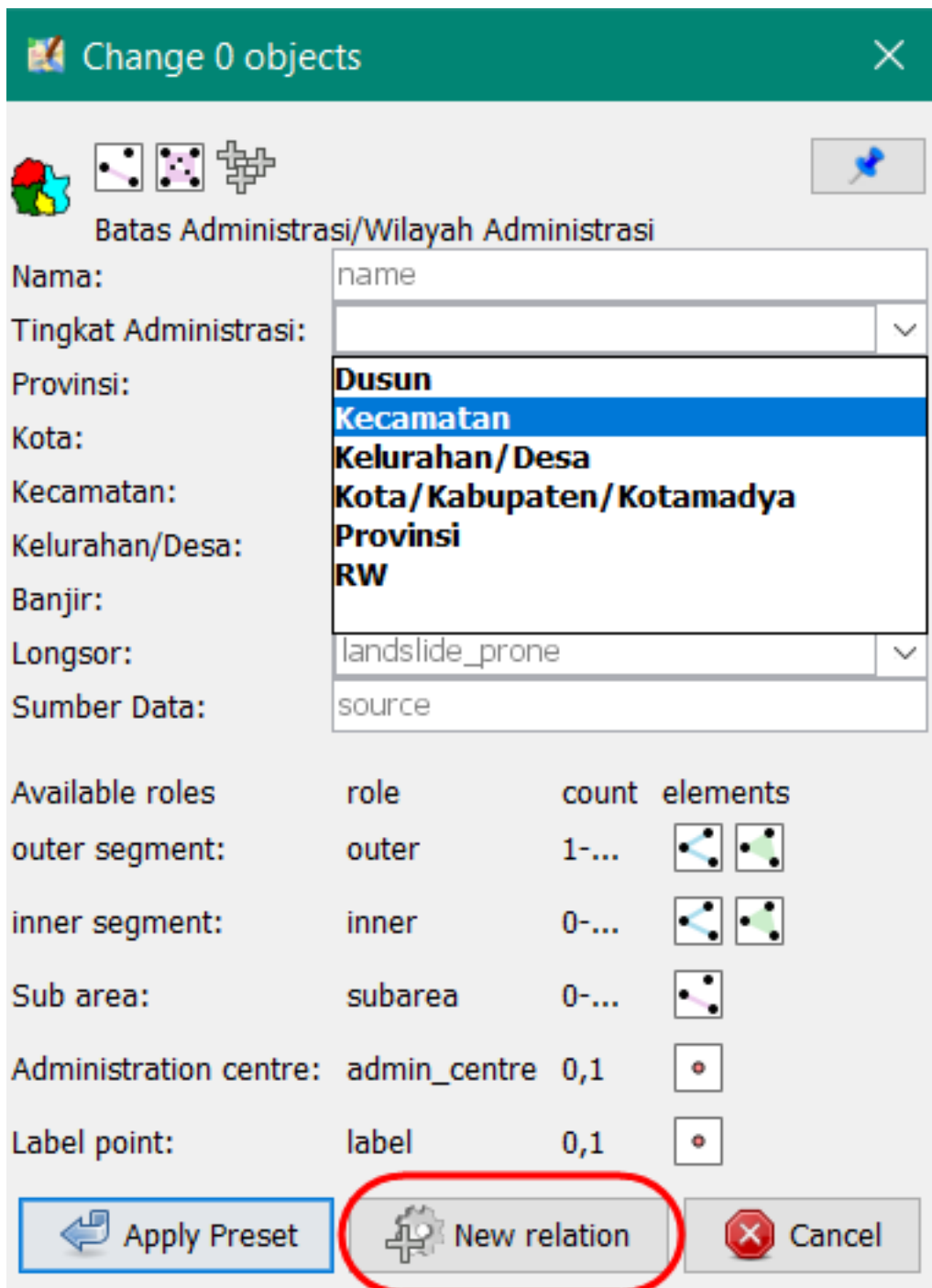

Tagging on admin centre municipality

- Select all segments in an administrative boundary to create a new relation.
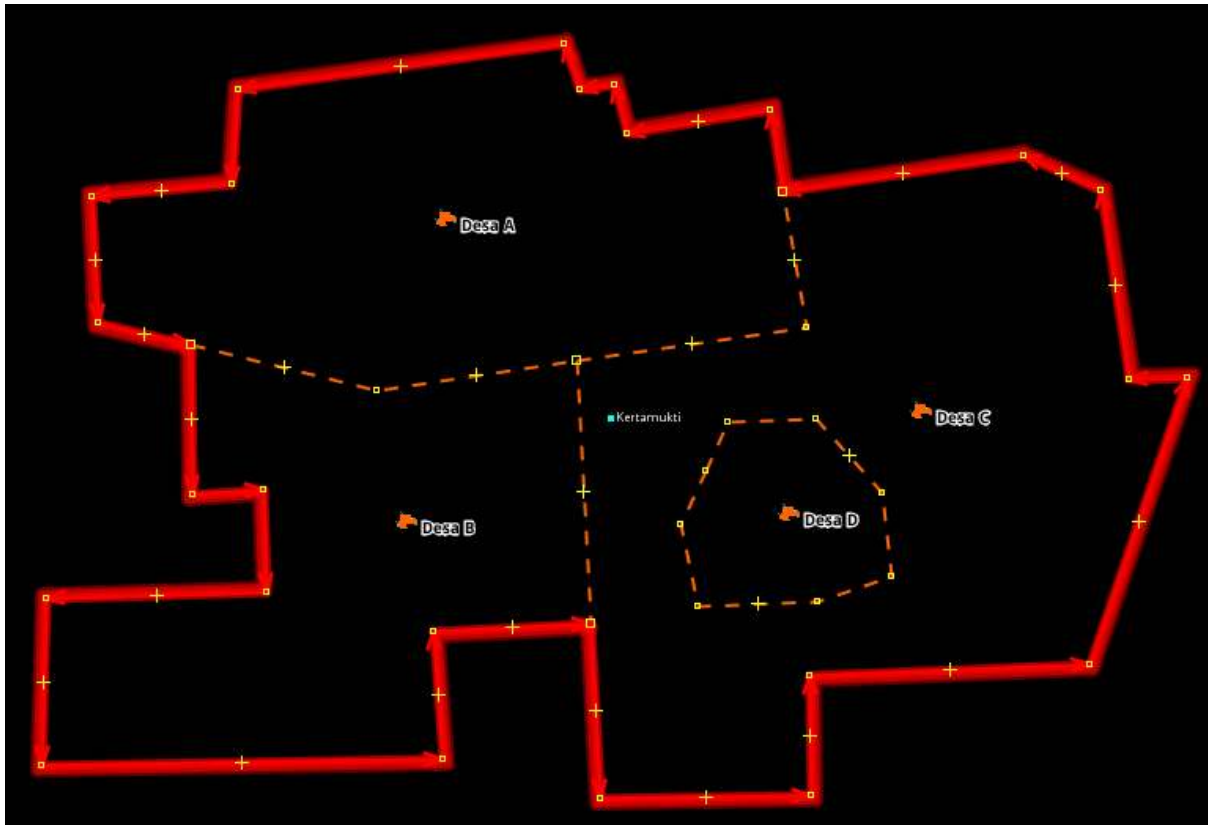
Select all lines outer and node of municipality boundary

- Add tagging with click on **Presets Menu → Batas Administrasi → Wilayah Administrasi**. Please fill the name of municipality, admin-level, and do not fill "Kecamatan"

The lists preset of municipality boundary

- We will determine the role of relation members. All segments in Kertamukti municipality (Kecamatan Kertamukti) has a role as outer and the point of the municipality name has a role as admin_centre.
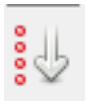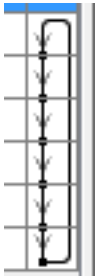

The role of relation member

- Ensure the member list of the administrative boundary in order. If it is not ordered, it looks like here:
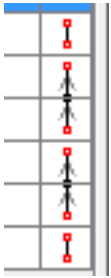
To create the segments in order, click on button **Sort the relation members**

- If the member list of the administrative boundary in order, it looks like here:

- Click **OK**.
- If you need to create the administrative boundary in up-level such as the city and province, you can do the same ways. The different way to add tags on relations and admin centre.
- The result will appear in www.openstreetmap.org

Desa A

Desa C

Desa B

Desa D
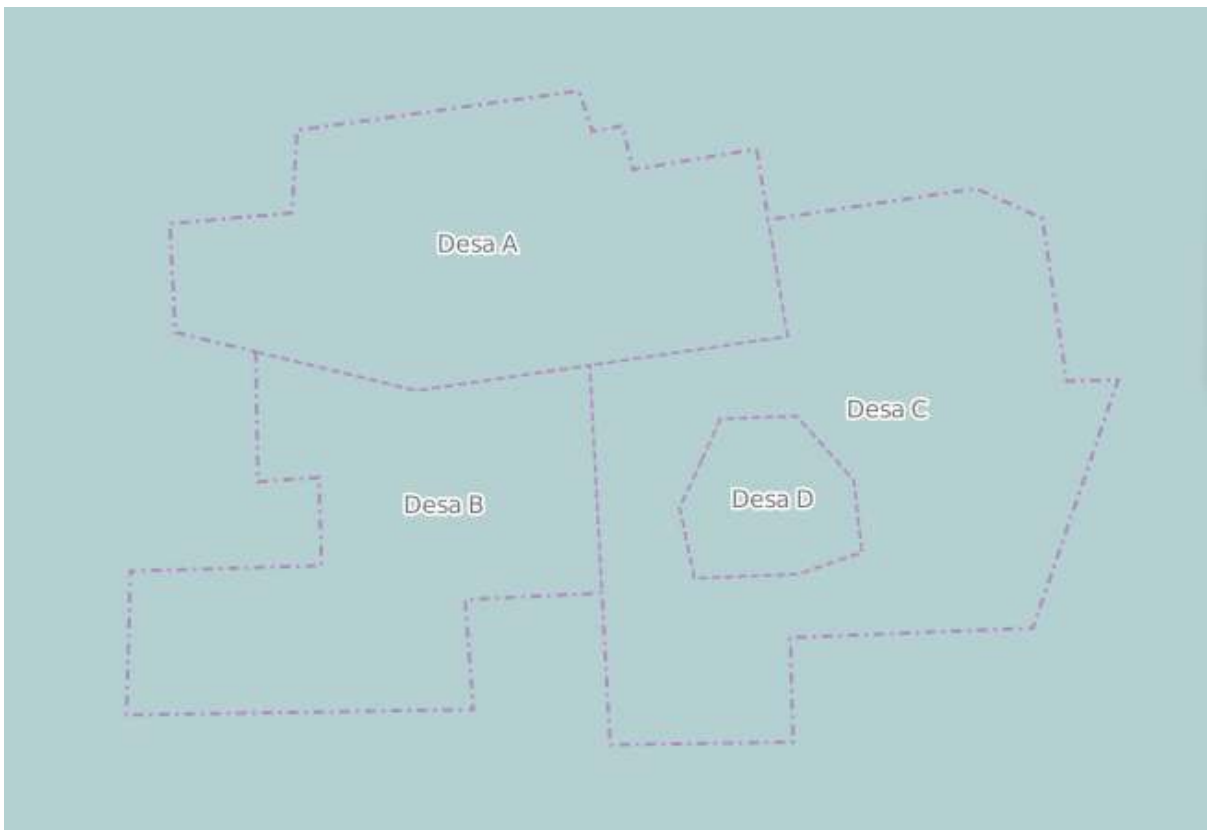
Example the administrative boundary in OSM

SUMMARY

You have learned about activities to create administrative boundaries with relation concepts in JOSM. A relation is a group of elements. To be more exact, it is one of the core data elements that consists of one or more tags and also an ordered list of one or more nodes, ways and/or relations as members which is used to define logical or geographic relationships between other elements. You can download the administrative boundary in polygons using the Export Tool.