

## 5.3 Data Cleaning with JOSM

### Overview

Data collected in the field should always be cleaned for errors and rectified with existing OSM data before upload. There are a lot of OSM data editors available, but in this module the OSM data editor used is JOSM. JOSM has a lot of useful tools and plugins, making OSM mapping a lot easier but most importantly, it is the easiest tool and best tool for maintaining quality OSM data while importing batches of field data into OSM.



Figure 1: to-do list in JOSM

### JOSM Data Cleaning Tools

There are tools built into JOSM, as well as additional plugins that can assist with data quality control during the upload process.

- **Filters** is a built-in tool that allows you to disable, hide, select, and highlight specific groups of objects based on flexible custom parameters. This tool will help you to spot and avoid common mistakes, and review data.
- The **Validation Tool** is another built-in tool that will review and search for common errors as well as provide warnings about potentially problematic data.
- The **ToDo List** plug-in allows users to systematically review data that is to be uploaded, and monitor progress of data cleaning work. The “ToDo List” plug-in, needs to be downloaded before it can be used. Visit this page to learn how to install plug-ins in JOSM, then download the “ToDo List” plug-in.

### Adding OSM Survey Data into OSM Using JOSM

Following a field data collection activity using JOSM, use the following step-by-step guide to clean and upload data to OSM. By following these steps, you will be able to:

- Install plugin Utilsplugin2

- Merge all survey data
- Save .osm file using JOSM
- Download OSM data
- Add satellite imagery layer on JOSM
- Add and edit OSM data using JOSM
- Upload changes into OSM
- View changes of OSM data in OSM website

### **Skills and Technology Needed**

- Computer
- Internet Connection
- JOSM Installed
- Basic JOSM skills
- Survey data

### **I. Installing plugin Utilsplugin2**

Before adding or editing OSM data using JOSM, install plugin you'll be using first. JOSM has a plugin called utilsplugin2 whose one of the functions is makes copying preset/tag easier. To use this plugin, you have to install the plugin first since it is not installed by default. These are the steps to install plugin utilsplugin2:

- Open **JOSM**
- Click menu **Edit → Preferences**
- Select menu **Plugins** to install new plugin. If you haven't downloaded available plugins, click **Download List** first to download it. Make sure that you are connected to the internet.
- After downloading plugins, search the **utilsplugin2** by typing it in the search box. After you found it, give a check on the checkbox next to utilsplugin2.



Installing plugin utilsplugin2

- Click **OK** and wait until the installation process is finished. If the plugin has successfully installed, there will be **More tools** menu on your JOSM.



More tools menu on JOSM

**Note:** Sometimes JOSM ask you to Restart JOSM after installing new plugin to apply newly installed plugins. However, not all newly installed plugin needs JOSM restarting to be used after installation process finished.

## II. Importing Field Data

**a. Merging OMK Survey Data** \*Note: if your data is in a different format, skip to b. Importing Survey Data (non-OMK).

If you have finished conducting survey using field data collection toolkit such as ODK Collect and Open-MapKit, you can use the survey data as the reference to add object's information when mapping it in OSM. Survey data file format from OpenMapKit is .osm. The number of .osm files from OpenMapKit will be the same amount as the surveyed objects since information of one object will be saved in one .osm file. Merge all .osm file to make it easier to use the survey data as mapping reference by following these steps:

- Go to **File Explorer** to where you save .osm file from **ODK Collect** and **OMK**.

| WORK > Survey > Data Survey Jakut                 |                   |             | Search Data Survey Jakut |
|---------------------------------------------------|-------------------|-------------|--------------------------|
| Name                                              | Date modified     | Type        |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:40 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:40 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:41 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:41 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:42 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:42 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:43 PM | File folder |                          |
| Jakarta Utara Data Collection Survey_2018-12-0... | 4/11/2019 2:43 PM | File folder |                          |

File directory for .osm file from ODK Collect

- Search all .osm file by typing “osm” in the **Search** box. Select all .osm file from the search results.

|                                                                                     |                                             |                                                     |     |
|-------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------|-----|
| Search Results in Data Survey Jakut                                                 |                                             |                                                     | osm |
|    | 1a2ed45c21c06248d16d794bd7b200a2b75b5...    | Date modified: 12/3/2018 8:37 PM<br>Size: 643 bytes |     |
|  | 0d33004f663fac7d58641bc90e10c5f154c408c...  | Date modified: 12/3/2018 8:37 PM<br>Size: 549 bytes |     |
|  | 1c1652ef21490facd31ffca8e41eb77576f576bf... | Date modified: 12/3/2018 8:37 PM<br>Size: 609 bytes |     |
|  | 0c1dba9925d4bbe49e7aa6ffb0970ace3b1f74e...  | Date modified: 12/3/2018 8:37 PM<br>Size: 569 bytes |     |
|  | 0c1cd549987cfd58dc6fb813567887eb54dd7b...   | Date modified: 12/3/2018 8:36 PM<br>Size: 606 bytes |     |
|  | 0b496a4c1882baeeb8ece5dfb811a831dfd936...   | Date modified: 12/3/2018 8:36 PM                    |     |

Search results for keyword “osm”

- Drag all selected .osm file to **JOSM**.

| Layers                                                                              |                                                                                     |                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|
|  |  | 1c1652ef21490facd31ffca8e41eb77576f576bf.osm |
|  |  | 1a2ed45c21c06248d16d794bd7b200a2b75b58ea.osm |
|  |  | 0d33004f663fac7d58641bc90e10c5f154c408c8.osm |
|  |  | 0cae83bfd481ff4f368d1adeda611d1b436485f7.osm |
|  |  | 0c3f5973edcdebe107d3a843cfa927032f6fd0b7.osm |
|  |  | 0c1dba9925d4bbe49e7aa6ffb0970ace3b1f74ee.osm |
|  |  | 0c1cd549987cfd58dc6fb813567887eb54dd7b09.osm |
|  |  | 0b496a4c1882baeeb8ece5dfb811a831dfd9363c.osm |



Layers Windows after .osm file from ODK and OMK dragged into JOSM

- Select all those .osm layer by selecting the uppermost .osm layer, then pressing Shift and then selecting the lowermost .osm layer
- Right click on one of the .osm layer, then click Merge. Select target layer Windows will appear, you do not have to change the target layer, click Merge.



Merging all survey data layer

- Save the merged layer and change the name by right-clicking on the merged layer, select Save As, change the layer name and then click Save.



Saving the merged survey data layer

- JOSM provides a plugin named **to-do** to help you mark the mapped or unmapped object from the merged survey data layer. You can refer to **Using to-do list on JOSM module** to learn how to install and how to use **to-do** plugin in details. If you have already installed **to-do** plugin and activated Todo list Windows, select all objects nodes in the merged layer using **Select object icon**, then click **Add** on the Todo list Windows.



Adding objects into Todo list

**b. Importing Survey Data (non-OSM)** You will need to convert your data into a .geojson, .shapefile, or .osm file before beginning data cleaning. We recommend merging and converting files in .QGIS, then open the merged file in JOSM.

### III. Downloading OSM Data

After successfully merging all survey data, you need to download existing OSM data. Downloading OSM data aims to discover which objects already mapped and which objects have not already mapped on OSM. These are the steps to download OSM data using JOSM:

- Click menu **File → Download Data**
- **Download Windows** will appear. It will show you tab **Slippy Map** by default.



#### Download Windows on JOSM

- If the map is not displaying your mapping area, slide the map by **right clicking and hold** your mouse and then **drag the map** to your mapping area. Draw a box at your mapping area by **left clicking and hold** your mouse and then **move** your mouse until a pink box cover the entire mapping area. Then click **Download**.
- If it is quite hard to find your mapping area by sliding the map, you can click tab **Areas around places** and type the name of your mapping area in the **Enter a place name to search for** box then click **Search**. The search result will show you names of your mapping area. **Click on one of the names** then **go back to tab Slippy Map**. The map on the tab **Slippy Map** will be directed to your mapping area. **Draw a box** covering your entire area of mapping, then click **Download**.

**Note:** Do mind the amount of existing OSM data in your mapping area. If there is already a lot of existing data, you should download it part by part since JOSM can not download an enormous amount of data at once.





Tab “Areas around places” at Download Windows

- After finished downloading OSM data in your mapping area, there will be a new layer in the Layer Windows that will also be your editing layer to add or edit OSM data. Make sure that you **only add or edit data in the clear area, not in the shaded area**. The shaded area is not your downloaded area. And make sure your entire survey area is already downloaded. After downloading OSM data, your JOSM will look like this:



Tab “Downloading OSM data on JOSM” at Download Windows

- If you already downloaded OSM data in all your area, merge your downloaded OSM data layer with your survey data layer. Select those **two layers** then **right click**, select **Merge**. Save on your survey data layer. Then click **Merge**.





Merging downloaded OSM data with survey data layer

#### IV. Adding Satellite Imagery

- Add satellite imagery as another reference for mapping by clicking menu **Imagery** → **choose one of the available imagery you want to use, such as DigitalGlobe Premium Imagery**. After successfully adding satellite imagery, it is time to add OSM data. Your JOSM will look like this:



Adding satellite imagery on JOSM

- You can adjust the display of the satellite imagery. Select the satellite imagery layer, then click icon **Change visibility of selected layer** and adjust its display by sliding the blue button left or right.



#### Changing the display of satellite imagery

- If you use **DigitalGlobe Premium Imagery** as your reference, sometimes it has two versions of display when you zoom it in or zoom it out. Usually there is only one version of display aligned with the existing OSM data. Inactivate **Auto Zoom** feature so that the satellite imagery display won't change when you zoom it in or zoom it out. To inactivate Auto Zoom feature, **right click on the Satellite Imagery display → click Auto zoom** so that the checkmark next to Auto zoom disappear.



Inactivating Auto zoom for satellite imagery

## V. Editing OSM Data Using JOSM

Now you are ready to add or to edit OSM data using JOSM. You can draw new objects or you can edit the existing objects using the tools mentioned in **Using JOSM** module. Here are the steps on how to add or edit OSM data using survey data, downloaded OSM data and satellite imagery that you already added before on JOSM:

- After successfully following the steps mentioned in the previous sections, there will be two layers on your JOSM: **satellite imagery layer** (in the picture below, the layer meant is DigitalGlobe Premium Imagery layer) and **merged survey data with downloaded OSM data layer** (in the picture below, the layer meant is *hasil\_survey\_jakut.osm* layer). It will look like this:





Satellite imagery layer and merged survey data with downloaded data layer

- You can use **Filter** feature on JOSM so that you don't accidentally make changes on other objects such as administrative boundaries. Administrative boundaries in OSM is a delicate objects, so if there are already administrative boundaries mapped on your mapping area then it is better to utilize the **Filter** feature. To use this **Filter** feature, activate the Filter Windows by clicking menu **Windows** → **Filter**. There will be Filter Windows in the right panel. Click **Add** in the Filter Windows, type **boundary=administrative** in the **Filter string** box and click **Submit Filter**. New filter will appear for the administrative boundaries. To turn off the filter, simply uncheck the checkmark on the left of the filter. You can find out more about **Filter** feature on JOSM in the **Using Filter on JOSM** module.



Filter Windows on JOSM



Adding filter string in the Filter Windows



Newly added filter in the Filter Windows

- Start mapping by zooming in to an object, select one object in the Todo list Windows and then click **Zoom**. After selecting and zooming in one object, you can copy the tag from the selected object to the downloaded OSM objects. Select the downloaded OSM object that aligns with the selected survey object, then click menu **More tools** → **Copy tags from previous selection** or press **Shift + R** on your keyboard. Make sure you selected the aligned survey object right before copying its tags to downloaded OSM object. Also make sure that the copied tags are consistent with OSM mapping guidelines and suitable for the object type. For example, in the picture below, a clinic located in a shophouse complex, mapped as a point and only have tags suitable for point object. While the building related tags added to the shophouse building where the clinic is located. When you finish copying tags for one object, click **Mark** to identify that it is just already mapped on OSM. Repeat until all of the objects mapped on OSM.



Using Zoom dan Mark feature on the Todo list Windows



Tags suitable for point object



Copying building related tags using Shift + R

- Example given above is for point object. When you find an object that is supposed to map as a polygon, such as school complex which has more than one building inside, how to map it on OSM? Select the school object in the Todo list Windows and then click **Zoom**. Select the point object on the map. Copy the tag to the building polygon aligned with the point object by selecting the building polygon and then clicking menu **More tools** → **Copy tags from previous selection** or pressing **Shift + R** on keyboard. After copying the tags, delete tags that are not related to building and left only building related tags. Draw a polygon covering all school area using **Draw nodes**, then copy tags that are suitable for school area (tags that you deleted before in the building polygon) like amenity, name and addr:full. After that, delete the school point from the survey data since it has just been mapped as a school area polygon.





School point from survey data



Tags suitable for school building



Tags suitable for school area

## VI. Saving Changes

- If you have already done mapping using JOSM, save changes to OSM server because the newly added objects are saved only in your computer. To save the changes you've made, click menu **File → Upload Data**.
- If you encounter warning/error after clicking Upload Data, it is better to fix warning/error first. You can find out more about fixing warning/error and common warning/errors found in **Survey Data Validation Using JOSM** module. However, if you don't have the time to learn how to fix warning/error, you can just go ahead and click **Continue Upload**. Upload Windows will appear.
- If there is no warning/error, Upload Windows will appear. On the Upload Windows, type a brief comment for the changes you've done in the comment box and specify the source(s) in the source box. Type the name of the satellite imagery and survey in the source box. If you want other contributors to review your edits, give a checkmark next to **I would like someone to review my edits**. Then click **Upload Changes**.

Upload to 'https://api.openstreetmap.org/api/0.6/'

84 objects to add:

- node
- node
- node
- node
- node
- node
- node
- node

1

Settings Tags of new changeset Changesets Advanced 5

Provide a brief comment for the changes you are uploading:

added buildings 2

Specify the data source for the changes (obtain from current layers):

DigitalGlobe Standard Imagery, survey 3

Uploading 84 objects to 1 changeset using 1 request (advanced configuration)

Objects are uploaded to a **new changeset**. The changeset is going to be **closed** after this upload (configure changeset)

☐ I would like someone to review my edits. 4

6 Upload Changes Cancel Help

#### Upload Windows on JOSM

**Note:** You need to periodically upload your edits when mapping so that there won't be a hefty amount of edits to upload. The more edits you want to upload, the more time it takes to upload. If you already mapped a lot of edits and haven't done any upload, you can upload it by chunk. You can do it by clicking tab **Advanced** and select **Upload data in chunks of objects** in the Upload Windows. Type the **Chunk size** with how many changes you want to upload per chunk, such as 500. This can be done to avoid incomplete upload, especially when your internet connection is unstable that resulted in object duplication.

#### VII. Saving .osm File

- You can also save your editing layer by **right clicking** on your editing layer and click **Save**. **Save OSM file** WIndows shown below will appear. Type the name of your file, then click **Save**. Your file will be saved in .osm format.





### Save OSM File Windows on JOSM

**Note:** If you haven't finished mapping your area and you want to continue mapping it later, you can save your work as .osm file then you can continue mapping it later. You can open your saved .osm file by clicking menu File → Open, choose the file you want to open and click Open. After opening it, update the OSM data first by clicking menu File → Update Data and you can go ahead to continue mapping.

### VIII. Viewing Changes in the Map

- You can view your changes by checking it on OSM website and directing it to your mapping area. Keep in mind, new changes can be viewed a while after uploading it to OSM server.



OSM map before and after mapping process

### SUMMARY

If you can apply and follow through to all of the steps mentioned in this module, then you are able to go through OSM mapping process using JOSM successfully. You are able to do OSM mapping process, such as downloading OSM data, adding satellite image, editing OSM data, uploading changes, saving OSM data as .osm file and viewing changes. You can upload your changes periodically, such as by region or by village. If you already have finished conducting survey in one region or in one village, you can upload it directly to OSM. This shall be done so that your survey data is not piled up and others can perform data validation for your edits.