



COMAPP Map Generator

Creating Multimedia Maps with OpenStreetMap

COMAPP – “Community Media Applications and Participation”
materials for download: <http://www.comapp-online.de>

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English translation: Susan Jones



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1. “Free Radio in Germany” as an Example: A Multimedia Map Based on OpenStreetMap

Radio today:
free from the bounds
of time and space

Listening on site:
with audio guide
and smart phone

Radio is alive, radio is fleeting, radio is an everyday companion! Such are the sighs of dismay to be heard those in editorial offices and strategy workshops who are at their wits’ end. But they often overlook the fact that completely new forms of listening have taken hold, and that having an audience tune in may require unconventional steps. The situation is similar in schools and adult education: taking advantage of the opportunities offered by new technologies and forms of communication means that one has to be familiar with the available tools. But then, suspenseful options appear for presenting sounds, images, and videos in a new context, making content accessible to target groups previously out of reach, and enabling new forms of reception.

One new option that has scarcely been explored is that of using spatial relationships to make content accessible. One popular example is the policy of Wikipedia authors, in place since October 2010, of attaching geographical coordinates to articles whenever the spatial aspect is relevant.

SUSI (Wohnprojekt)

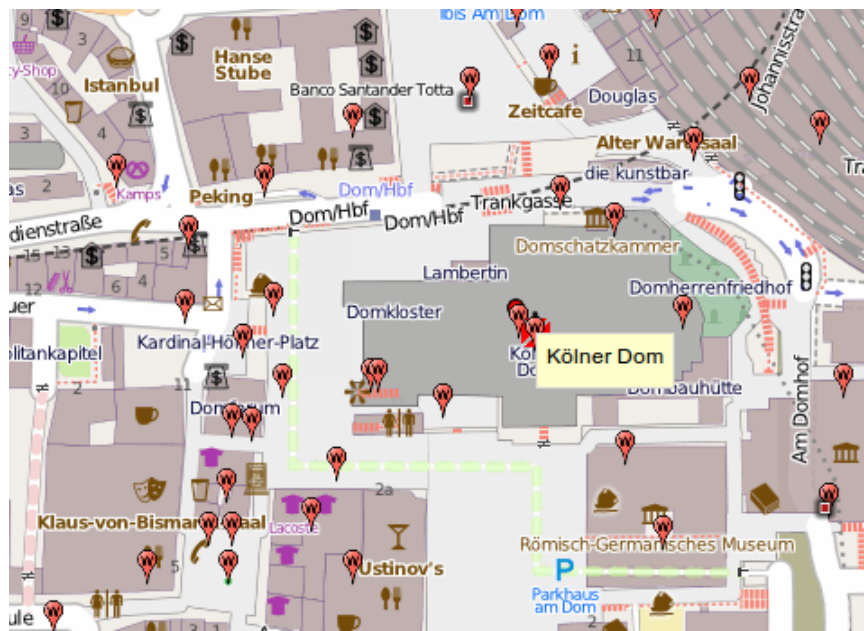
Die **Selbstorganisierte unabhängige Siedlungsinitiative** (SUSI) ist ein seit 1993 bestehendes **Wohnprojekt** im Freiburger Stadtteil **Vauban**. In den vier Häusern leben 260 Personen, weitere in rund einem Dutzend Bauwagen zwischen den Häusern. SUSI ist Mitglied im **Mietshäuser-Syndikat**.

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Koordinaten: 47° 58′ 30″ N, 7° 49′ 38″ O﻿ (Karte)



This makes it possible to view all Wikipedia entries relating to a particular area, and creates entirely new options, for example for use when travelling.



A person standing in the centre of Cologne with a smart phone can use an augmented reality app – aiming the phone’s camera at the famous Richter window of the cathedral – to display the corresponding Wikipedia entry automatically. In short, linking content to geo-data enables entirely new options for use of very diverse content – including radio, or rather, audio material.

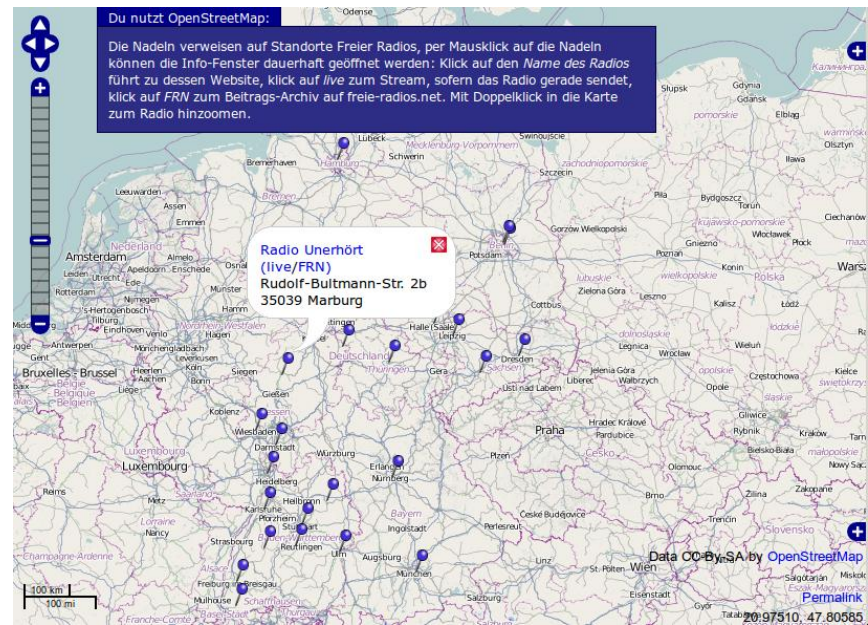
We are all familiar with the audio guides that have become common in museums: visitors wearing earphones tap into information, for example about works of art, provided by an mp3-player they picked up at the entrance. A related example is an audio tour that accompanies tourists visiting Berlin: <http://www.stadt-im-ohr.de/>



A map with acoustic contours

One more comprehensive example of linkage between traditional radio and geographical coordinates is a map produced by the Federation of

Free Radio (BFR) in Germany with an overview of its member stations. The map shows the location of each radio station – and also provides the user with access, directly from the map, to the station archives and to the broadcasts currently on air. And anyone who would like to visit the studio location can download onto the smartphone a file that is provided, which gives directions via a geocaching app.



In the following, we will describe how one goes about creating and using such an individualised internet map. The cartographical basis is the OpenStreetMap project (OSM), whose open license policy allows the maps to be used without legal complications; they can be integrated into just about any scenario that a user develops.

2. The Community Project OpenStreetMap: Background, Functionality, Licenses

The idea

The project OpenStreetMap (OSM) has set itself the ambitious aim of producing a free atlas of the world with the slogan “The Free Wiki World Map”. There are any number of maps available free of charge (Google, Yahoo, Bing). What all these offerings have in common is, however, that their use is subject to limitations. Google maps, for example, cannot be printed without explicit permission (which is why an illustration is “missing” here), and after a certain number of clicks their use even has to be remunerated by anyone who has integrated the maps into his or her internet presentation.

Wikipedia as a model

Projects that are truly free for users – like the worldwide encyclopaedia Wikipedia, software such as GNU/Linux, the internet browser Firefox, or in this case the map project OpenStreetMap – instead apply licensing models that give users as much freedom as possible (CreativeCommons, GNU General Public License of the Free Software Foundation) and effectively prevent proprietarisation of intellectual property.



Furthermore, these and other free and open projects thrive on the contributions and cooperation of hundreds of thousands of participants, most of them idealistically motivated; to an extent that is certainly significant, this detaches much human productivity and creativity from the realm of merchandising.

Founded in 2004

Only three years after Wikipedia was established, during its phase of rapid growth, OpenStreetMap was founded in Great Britain in July 2004 by Steve Coast, who at the time was studying Information Sciences and today is a Microsoft employee. Practical operations began in 2006, and today many hundred thousand contributors all over

OpenStreetMap
gleans information
from many sources

the world are working on OSM. The OSM servers are maintained by the OSM Foundation, an international not-for-profit organisation. The wiki-like (data base) servers are currently located in London at University College. The German contact partner for OSM is the not-for-profit organisation “FOSSGIS” (Free and Open Source Software for Geo Information Systems). The OSM data are made available under the Creative Commons license Attribution-NonCommercial-ShareAlike 2.0, which means, in brief: the data can be used without legal complications in a wide variety of ways, but it is always necessary to identify OpenStreetMap as the original source.

The core interest of the OpenStreetMap project is to collect geo data. Interested parties, called “mappers”, are invited to supplement the project database with such details as the course of paths or the location of interesting sights. In addition, the OSM Foundation attempts to arrange that existing data be made available for OSM use. At this writing, for example, aerial photos from the Microsoft map service “Bing Maps” can be used for tracing, and for this purpose they can be integrated into the OSM editing viewer. The Bavarian State Office of Surveying and Geoinformation has, since February 2011, made detailed aerial views accessible for use in OSM. In many cases, local authorities offer data. But the core of particularly detailed work is undertaken by the volunteer “mappers”.

Only in a second, technical step do the OSM servers compute (“render”) all this information into graphically adapted maps or topical maps derived from them. Other servers can then compute routes; mobile devices can use OSM data for navigation. When one opens the standard home page of OpenStreetMap

(<http://www.openstreetmap.org/> or <http://osm.org/>), there is a view

of one among many possible representations of the OSM map data, illustrated here by the standard renderer “mapnik” as an example.



Examples of contemporary map usage

Printed map segments: Due to the uncomplicated handling of licenses, OSM maps are being used by cities and communities more and more often. Early examples of this would be the signposts for the ornithological hiking path in Gutau near Linz/Austria (<http://ancalime.de/gutau.html>), or the tourist map of the village of Finale in Liguria/Northern Italy.

Use on the www: Since OSM maps often depict with accuracy the smaller roads in remote areas, there are special bicycle maps available, for example at <http://www.opencyclemap.org/> and <http://hikebikemap.de/>

Topographical map for riders: <http://www.wanderreitkarte.de/>

Public transportation in Germany: <http://www.opnvkarte.de/>

For entering additional information, links:

<http://www.openlinkmap.org/>

Accessibility for the disabled

(can be edited): red/yellow/green logos show where access is more (or less) barrier-free.

<http://www.wheelmap.org/>



Routing on the www: plan routes with waypoints on

<http://www.yournavigation.org/>; Komoot creates tour routes including Wikipedia content; commercial routing services, e.g.

<http://www.cloudmade.com/> and <http://www.geofabrik.de/>)

Use on a navigation device: The drop in prices for smart phones and the general availability of OSM data are shaking up the market for GPD devices. The navigation app OsmAnd (Android, to be recommended) offers routing for bikers and pedestrians. Attempts are being made to let Navit (open source) run on commercial TomTom navigation devices in cars.

3. With GPS-based Tools: Editing Map Data on OpenStreetMap

OpenStreetMap
thrives on
participation

For small details:
the online editor

The editor JOSM

Editing content in a text-based Wiki like Wikipedia is extremely simple: a click on “Edit” opens the source code of the article, and alterations in the text are easily made even by inexperienced computer users. In fact, OSM is technically constructed on a data base that is very similar to a Wiki. But beyond the purely technical level, the matter is a bit more complex. Alongside their names, streets have attributes, such as the type of surfacing, direction of traffic, vehicle restrictions – these are parameters that are relevant for certain applications, for example for using OSM data in a navigation system. For these reasons, there are essentially two procedures for editing map data: directly on the OSM website with the online editor, or by using the special editing software JOSM. In both cases, OpenStreetMap requires personal registration as a mapper.

For minor adjustments in the existing maps, the online editor may be the method of choice: while in the normal OSM map-viewing mode, a click on “Edit” will make it possible to alter elements in the map segment that was previously selected. This is indeed a quick and easy route, but the options are restricted and the working procedure is not very convenient.



JOSM is a JAVA-based software available for all the popular platforms. For Linux, JOSM is accessible via the usual software sources and can be installed readily with a few mouse clicks. Before making alterations in the OSM data, it is necessary to download all the data linked to a particular map segment. Particularly for cities, this means that the data volume may be very high: therefore, it is recommended to download only the segment one actually needs:

JOSM: editing and drawing

Using mobile GPS devices

File > Download from OSM Server ...

On the first tab page, the segment to be downloaded can be selected graphically. Practically this means: with copy and paste, the so-called permanent link for normal OSM map depiction can be imported from the browser and, if necessary, details can be adjusted.

After the geo data has been downloaded, all the information stored on the OSM server about the selected segment will be displayed and can be edited. It is essential to take note of the distinction between the first two settings (buttons) for the function of the mouse:



Marking mode: The attributes attached to existing nodes (such as objects in the landscape) or lines (such as paths) can be edited in accord with OSM rules. Beginners may find it practical to use the templates provided by JOSM in the menu bar. Very extensive details – relating to attributes of hiking paths, roads, or landscapes – are included in the OSM Wiki.



In drawing mode, new nodes or lines can be drawn in. Mappers who have detailed knowledge of an area can plot in, without any further support, a building on a particular street, a telephone booth, a container for recycling glass, or the elephant compound at the zoo.

For working on a larger scale, mobile GPS devices are indispensable. Thanks to the satellite-based Global Positioning System (GPS), they “recognize” their momentary position along with the coordinates (latitude/longitude) of the location. This permits special devices produced for this purpose, as well as conventional smartphones, to document a running series of geodata and – even while stored in a backpack or a bicycle saddle bag – they can thus “record” a route. Individual points along the way can later be linked to additional notes in the form of text, audio, or images. One example of serviceable software for this is the Android app “OSM Track”. JOSM can open such “recordings” using the (open development) exchange format for geodata “gpx”:

File > Open ...

The gpx file, once opened, generates a thin grey line: this serves as a means of support for making entries as described above, or editing

JOSM: Uploading onto the OSM server

existing entries in accord with the notes one has taken on location. A sensible way to proceed – once the gpx file is displayed – is to download the OSM data for the desired segment, as explained above. It is recommended to begin with a spatially limited project covering perhaps a few hundred metres (much smaller in a well-mapped city), so that one can maintain an overview despite the large number of elements displayed.

When all the editing has been completed, the altered data has to be uploaded onto the OSM server [File > Upload data]. For this step, JOSM requires – as mentioned earlier – the personal registration information of the mapper. To confirm that one's work has been successful, taking a look at the OSM map is advisable: after just a few minutes, the OSM renderer Mapnik should display, in the more detailed map resolutions, the individual alterations one has made. For this, it is practical to have copied the permanent link into the address slot of the browser (simply by clicking on the permanent link): Then, a "reload command" [F5 or Ctrl+r] in the internet browser will lead directly to the display of the updated map.



4. The COMAPP Map Generator: Multimedia Content on an OSM Map – How it Works


Using OpenStreetMap
for individual
purposes

In the previous chapters we have addressed the background and functionality of OpenStreetMap. Now, we will turn to the options for using OSM by adapting existing map data for one's own purposes. Expressed in traditional terms that could mean: up to now, we've been working for a map publisher and contributing to a map that will be made public; in the following we are going to cut segments out of that map – which has been published, printed, and sold – and use these segments to make, for example, a city guide. With OSM as a starting point, we will show how to affix marking pins to particular locations in a selected map segment and how to attach additional information to these pins – texts, images, or sounds, in a fashion similar to what we saw in the first chapter with the overview of free radio stations in Germany.



Linking in
one's own content

The basis required for this is an interface provided by OpenStreetMap. Very simply stated, it allows us to “project” onto the OSM image our own marking pins or similar graphic elements that are each associated



with a particular location (longitude, latitude) we have defined while setting the markers. These marking pins serve as “hooks” onto which we “hang” specific content: when a user moves the mouse over the marker or clicks on it, text relating to the location can be displayed, or multimedia content can be activated.

This can be realised technically when a user possessing the necessary detailed knowledge produces an HTML page with the corresponding functionalities. HTML (imprecisely put, a “data format”) is the descriptive language used to “generate” internet pages. With the additional technical options offered by “JavaScript”, enhanced functions can be realised on a web page. Both are applied in our map project. In order to keep the procedure as simple as possible, the COMAPP project has developed the COMAPP map generator. It enables the user to produce multimedia maps based on OSM data without having to master more extensive skills. In addition, the map offers buttons for downloading special files that – when fed into the geocaching app of a smartphone – lead to the location of the marker in the “real world”.

5. Practice with the COMAPP Map Generator: Seven Steps to an Individual Multimedia Map

The screenshot displays the 'comapp openstreetmap-Generator' interface. At the top, there's a title bar with 'Vorhandenes Projekt laden' and a language dropdown set to 'deutsch'. Below the title bar is a map of Portbou, Spain, with several multimedia markers overlaid. Each marker has a text box containing information and a play button icon. The markers include:

- Grenzort Portbou:** In der Zeit des spanischen Bürgerkriegs flohen hier Hunderttausende über die Pyrenäen von Spanien nach Frankreich. Wer wenige Jahre später vor dem Nationalsozialismus fliehen musste versuchte sein Leben mit einem Fußmarsch nach Spanien zu retten.
- Wirklich Selbstmord?:** Hier starb Walter Benjamin in einer kleinen Pension. Allerdings berichten kritische Stimmen von Ungereimtheiten in der Todesnacht.
- Museum:** In den Ausstellungsräumen sind einige Tafeln zur jüngeren Geschichte des Orts ausgestellt, auch zu Walter Benjamin.
- Walter Benjamin Gedenkort:** Der Philosoph 1940 in Portbou das Kunstwerk "Passagen" des Dadaisten Dani Karavan wurde 1994 eröffnet.

Below the map is a settings panel titled 'Allgemeine Karteneinstellungen (Karte im Vorschaumodus)'. It contains five sections:

- 1. Titel:** (Offene) Grenzen in der EU: Der Weg über die Pyrenäen bei Portbou/Cerbere
- 2. Beschreibungstext zur Karte:** Grenzort Portbou: In der Zeit des spanischen Bürgerkriegs flohen hier Hunderttausende über die Pyrenäen von Spanien nach Frankreich. Wer wenige Jahre später vor dem Nationalsozialismus fliehen musste versuchte sein Leben mit einem Fußmarsch nach Spanien zu retten. Beim Laden der Seite Beschreibungstext automatisch einblenden
- 3. Ausschnitt der Karte:** Länge: 3.1611885401, Breite: 42.426688004, Zoom: 18. Koordinaten/Zoomfaktor aus Karte hierher übertragen
- 4. Bedien- und Anzeigeelemente:** Pan/Zoom-Bar, Permalink, Skala
- 5. Genereller Pfad zu verlinkten Dateien:** <http://www.freie-radios.net/>

At the bottom of the settings panel is a 'Karte herunterladen' button. The footer of the interface contains the text: 'Map data CC-BY-SA OpenStreetMap.org | Editing Icons CC-BY | Pro Theme Design | Webprogrammierung | mapGenerator - Updates+News'.

How to proceed:
first the overall
settings, then the
markers

With the *COMAPP Map Generator*, you can enter marker flags into an OSM map and connect these markers to multimedia content (<http://comapp-online.de/generator>). This can be done easily with just a few instructions. The following steps refer, firstly, to the overall map settings and then to the placement of individual markers. With the *comapp Map Generator*, you produce your own HTML file, and you download it during the last work step. When this compact HTML file is opened it retrieves the map image anew from the OSM

Title and descriptive text

servers. The advantage is that your map is always up-to-date; on the basis of this data, your personal markers will be “projected” onto the current version of the OSM map.

You decide for yourself whether your personalised (multimedia) map will be uploaded onto a server, used locally on your computer, or sent to others via e-mail. Take the following steps to create your map.

The short title you assign here will later be displayed in the title bar of the internet browser when the map is opened. The more detailed descriptive text can provide background information about the map; it can later be faded in and out as the user wishes. Both texts should be as short and concise as possible, they will be analysed by search engines when the map is uploaded.

Map segment

The most convenient way to specify what segment of the OSM world map should be depicted is by using the mouse to move the map around in the OSM generator and then adjusting the scale to suit your purposes. To set the scale (“zoom”), you can use the slide bar, your mouse wheel, or a double click onto the area you wish to enlarge. When you have the desired segment in the scale you want, click on “Accept current map segment” to copy the values you have chosen into your map settings. After that, you can also choose handling and display options for your map.

Master path to linked files

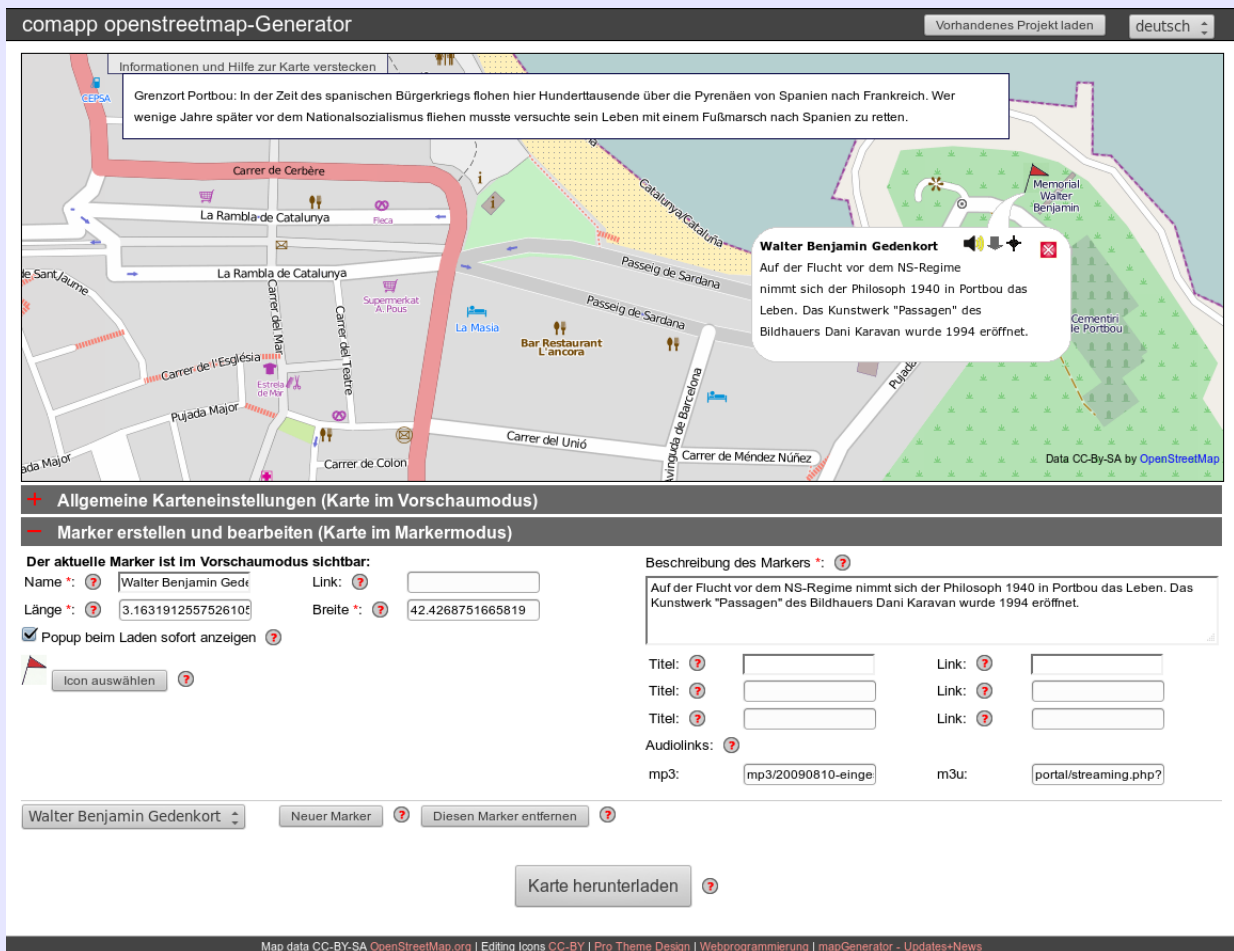
When setting markers, you will have the option of integrating multimedia elements. Probably, these elements will be stored on the same server as the HTML file you produce with the generator. By naming a master path to the multimedia files you are linking in, you gain two advantages: firstly, this allows you to list only the file name when attaching, for example, a photo to a marker (myphoto.jpg). Secondly, if at any later time you move all the files from one server to another, it will suffice to change the master path given in this slot (say, from <http://www.myserver.eu/> to <http://www.nynewserver.eu.de/>). It’s also possible to leave this box empty and instead enter the complete path leading to a file when you link in each of your multimedia elements.

Switching into marker mode:

Switching into marker mode on the generator, you will see just one single marker, as a preview. Give it a name and confirm its coordinates

creating and editing markers

by clicking on the map. To designate the position as exactly as possible, you can zoom deep into the map before doing this. Being precise is wise, since those using your map can navigate directly to the position of the marker with the aid of a smartphone.



Descriptive text for a marker

To make sure the map remains readable, the number of characters allowed in the text slots is limited. Moreover, in the online world it is assumed that users dislike scrolling: what you see right away, you read. Therefore, the name of the marker should contain only about 20 characters, and the descriptive text about 150. Start with the most important information – tersely formulated, straight to the point. Empty phrases, such as “interview with ... ” are a waste of space, a brief paraphrase of an important statement made by your interview partner would be better.

Links

For any marker, you can enter up to three links to designated files of

Audio links

your choice, and each link is given a title. A link might refer to a website, to a photo image, or a video. In the “Link” slot you need to enter the complete valid internet address leading to the file, including the preface `http://`, or alternatively – building upon the “master path to linked files” you have given under “overall settings” – the extension of that internet address leading to the individual file.

As soon as you link in an audio file, your marker will indicate the integrated (flash) player in the form of a small loudspeaker. Two steps are required when creating an audio link:

1. The slots “mp3” and “m3u” require complete addresses of mp3 or m3u files that are freely accessible on the internet; as described directly above, there is again the option of using “master path to linked files”.
2. If no streaming server is available, you’ll need to deposit a streaming command manually on your server, in the form of an m3u file. The latter consists of a text file with the extension “.m3u” in its name, containing only (as text) the complete internet address of the mp3 file followed by a line break command (“Enter”). Be sure to build this file with an uncomplicated text editor, if necessary by first assigning a file name with the extension `.txt`, and then altering the extension.

Using both of these files ensures that your audio will be accessible on an internet browser with or without a pre-installed flash plug-in. On your completed map, the audio will directly accessible via a small “play” button.

Please take note!

The generator produces a conventional internet application: it relies, at practically every step from displaying a map to setting the position of a marker, on a functioning internet connection. The same is true of your multimedia links – which may consist of the “master path to linked files” plus folder/file name: each link must provide a correct, complete address leading to files that are readily accessible on the internet. Otherwise, your links will not function properly – neither in preview mode nor on the completed map.

Additional markers

You can set up as many markers as you want. Markers you have already created appear in a list, where you can select them for further editing at any time.

Downloading results and publishing them

Your completed map can be downloaded as an HTML file via the large button at the bottom of the generator page, and then used in the ways described at the beginning of this chapter. Should you upload the file onto an internet server or publish it on a social network, then it will be available to the general public.

Downloading results and publishing them

Your completed map can be downloaded as an HTML file via the large button at the bottom of the generator page, and then used in the ways described at the beginning of this chapter. Should you upload the file onto an internet server or publish it on a social network, then it will be available to the general public.

Continuing work on a project

At any point in time, you can again load your project into the generator and continue working on it. To do this, click at the very top of the generator on “Load existing project”. If your project is accessible on an internet server, choose the option “Load project from URL. If the project is stored on your computer as a HTML file, choose “Load local file”. When you’ve completed your editing session, you can re-publish the file – as described above.

Geocaching technology: finding the flags in the real world

The map generator automatically creates files in the gpx format used by mobile devices. To access them, the device must have a geocaching app installed. Details can be found in the Geocaching Reader, which can be downloaded from the address given in the reference list (see Chapter 7).

A symbol attached to the marker flags on the map enables users to download the gpx files, import them into the geocaching app, and thus proceed to the actual geographic location of the marker.

6. Enhanced Functions:

Background Information for Advanced Users

Technical background

The *comapp* OSM Generator produces a HTML file containing text information for the map as well as JavaScript instructions ensuring that control functions and the markers described above can be faded in and out of an OpenStreetMap segment. The HTML file itself contains neither the map itself nor the sounds and images that may be connected to it. In technical terms: The programme interface OpenLayers is used to display geo-data on the web browser. Two illustrations of this:

Based on the entries for lon (longitude), lat (latitude) and zoom (resolution/scale) and supplementary information (e.g. about the OSM renderer, which determines what style of depiction is called for in the OSM image), the HTML file loads the map itself from the internet. The markers are also positioned in the desired locations by JavaScript instructions, and the audio player – if an audio link is included – is realised as a flash player. The play list format m3u, containing a link to the appropriate mp3 audio file, serves as a default option, in case the browser accessing the page has no flash player included: depending on the settings of the terminal being used, it starts a locally installed media player.

Manual editing of the HTML code

The entries made in the various text slots may contain HTML code, as long as it does not restrict the functionality of the map data. Format commands are possible, for example, as are links included in the running text. Those with advanced skills may want to integrate a short slide-show or a video clip as an iFrame.

Facts about GPS

Founded in 1970, deliberately restricted to inexact positioning until May 2, 2000, served today by 24 satellites. (Russia: GLONASS, EU development [also for military purposes] Galileo.) The satellite signal continually provides current data on the position of the satellites and the precise time. GPS receivers require up to 15 minutes for orientation after a cold boot. Assisted GPS devices (AGPS) load railroad parameters from the internet and therefore can boot more quickly.

7. References and Sources

OSM background

Ramm, Frederik and Topf, Jochen: OpenStreetMap. Die freie Weltkarte nutzen und mitgestalten (*Using and Contributing to the Free World Map*). Berlin: lehmanns media 2010

The OSM Foundation online:

http://www.osmfoundation.org/wiki/Main_Page

Tutorial

In English:

http://wiki.openstreetmap.org/wiki/Editing_Standards_and_Conventions

Geocaching

Klug, Andreas: Developing Projects with Geocaching

<http://www.comapp-online.de> and <http://mediensyndikat.de>

Statistics

<http://wiki.openstreetmap.org/wiki/Stats>

Creating a website

<http://w3schools.com/>

Audio on the web, m3u

<http://www.scvi.net/pls.htm> zu m3u

Basic technology: primary sources

<http://openlayers.org/>

<http://www.osgeo.org/openlayers/>

This reader including
all links as QR codes

