Session 1.4

GIS to BIM using Dynamo

Maarten Vroegindeweij, 3BM, Domera

Class Description

GIS to BIM using Dynamo. In this class you will learn how to use Dynamo and Revit to load GIS-data into your BIM-model.

We will have a look at:

1. General Introduction to GIS
2. GIS & BIM
3. Geocoding
4. Coordinate & CRS.
5. Web Map Service/Web Map Tile Service
6. Web Feature Service
7. Direct Download
8. Geo Pointclouds

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About the Speaker:

Maarten Vroegindeweij is a structural engineer and founder of 3BM in Zwijndrecht, the Netherlands. He worked for nearly 3 years as a BIM-manager and structural engineer at dJGA in Rotterdam(Large hospital projects). In 2009 he founded his own consulting engineering company with currently 4 employees. He is working with Revit since 2005. Maarten worked as a Revit consultant and trainer for several leading engineering companies.

In his free time and during his studies he worked as a carpenter and bricklayer. Maarten is a Revit and dynamo addict, author of the GIS2BIM-package and working on some other opensource projects. At dutchrevitblog.blogspot.com he shares topics about, Dynamo, GIS, Revit, wood framing, monuments and woodworking. He is building his own floating home since 2016. In 2018 this resulted in a new company with his brother for building floating homes: www.domera.nl.

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Preface

The class(and handout) is meant for:

- Architects/Engineers
- Not famililiar with GIS.
- Some experience with Dynamo
- Want to use GIS-data in their Revit/BIM-model.

We will have a look at a lot of subjects with the aim of practical application in Revit by using Dynamo. So this pretends not to be a complete introduction to GIS or an exhaustive explanation of webservices. It gives enough information so that you can actually directly loading it into your BIM-model using it in your daily life as architect or engineer.

If you are looking for a gentle introduction to GIS have a look at the this site of QGIS: https://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/index.html

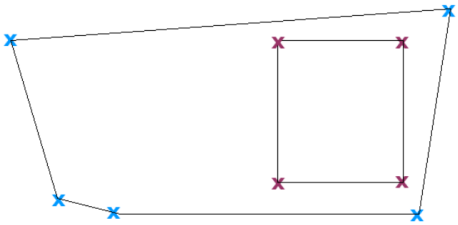
1. General Introduction to GIS

GIS means Geographical Information System. It contains:
-Digital Data
-Computer Hardware
-Computer Software

1.1 GIS data types

The most common GIS data types are:

- **Geographical Vector data.**



Geographical Vector Data are point, lines, polygons, surfaces, solids etc.

- **Geographical Raster data**

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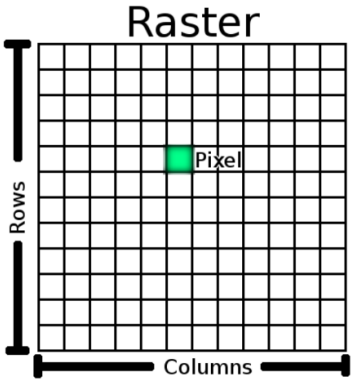
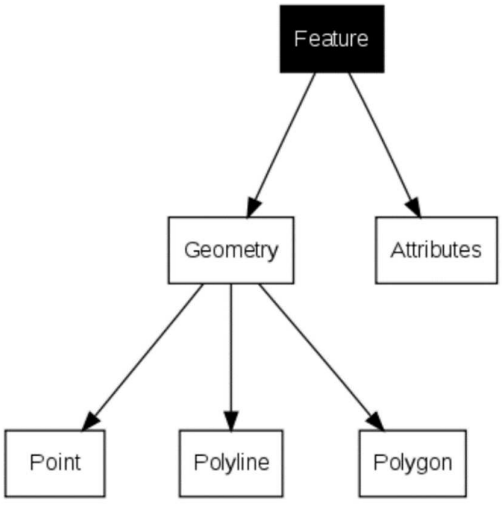


Rasterdata are images. Aerialphotos or rendered maps are examples of this.

- **Non geographical data**

Vectordata can contain attribute data.
By example a location is a point(vector) with attributidata(streetname, housenumber, place etc.)



- **Lidar**

Lidar is an optical remote technique that uses laser light to sample the surface of the earth. It produces a highly accurate x,y,z measurement.

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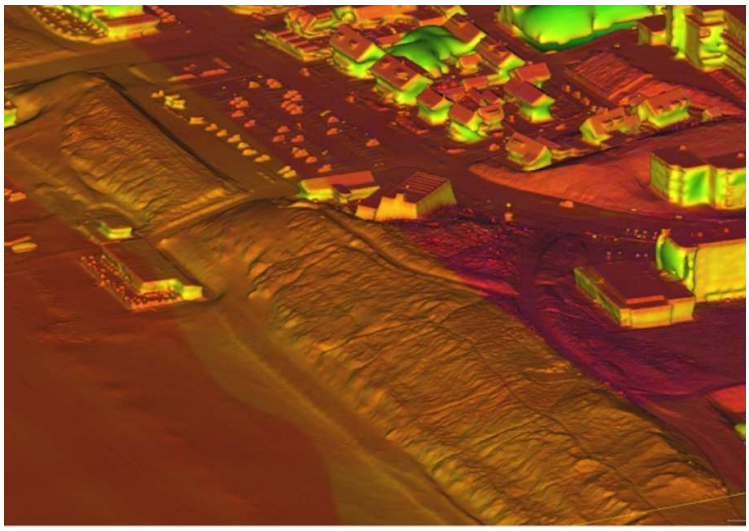

- **Sensordata**

Data from sensors is everywhere these days. Soundmeasurements, etcetera. This is also GIS-data.

1.2 GIS wor(l)ds

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1.3 GIS editing software

A GIS is generally hosted on a certain type of GIS-server. GIS-information can be edited with different types of software.
We are not going to have a look at the technical side of GIS-servers because thats to much information for here.

Below are some of the most used GIS editing software

- QGIS: very popular open source GIS editing software.
- ArcGIS: most popular GIS editing software and servers.
- BricsCAD Spatial Manager
- GrassGIS: Open source
- Autodesk AutoCAD Map 3D
- Autodesk Infraworks

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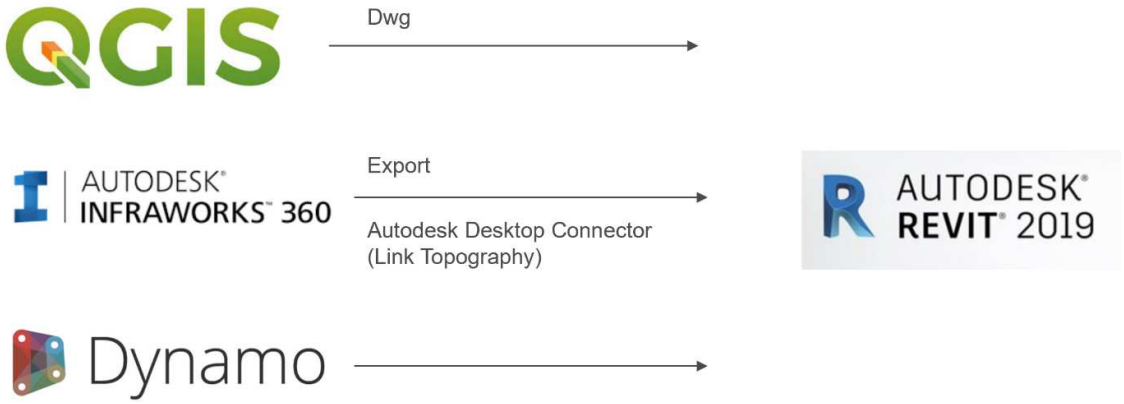
1.4 Some workflows to load GIS-data into Revit



There are quite some workflows to load GIS-data into Revit. In Revit 2019.1 we can link a topography from an Infraworks model into Revit. Other options are using QGIS or ArcGIS to load, analyse and present data. Then export this to Revit.

The workflow is off course very much dependent of the type of project. Some possible workflows.

1) Small housing projects(20 houses). The architect takes care of the siteplans and models. So he loads his environment in his BIM-model.
2) Big infrastructure project. Infra and civil engineers are around and take care of the site-engineering. The BIM-model are separated.

2.1 The two planets

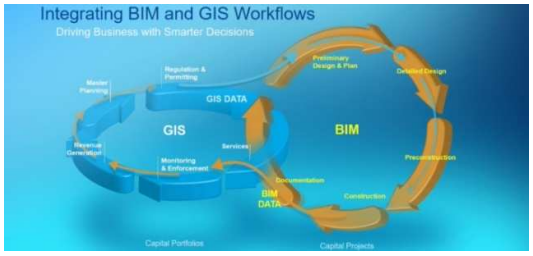
GIS and BIM are like 2 planets.

GIS	BIM
User defined file and server structure	More and more standardized(although still in progress)
Server based	File based
File & webservices	File based information exchange(this is changing)
Large number of users	Relative small number of users and contributors
Data	Geometry

2.2 GIS to BIM

There has been a lot of talking to integrate GIS and BIM. 10 years ago there are all these articles around of engineers looking for ways to integrate these 2 worlds. Some important innovations are:

- Import IFC-models in ARCGIS-servers.
- Conversionoperations for IFC to CityGML.
- ESRI-connector in Infraworks and Topography link to Revit.
- Exportfunction for ArcGIS to Revit.
- Flux Site Extractor(gone)
- Use Dynamo to load GIS-data into Revit(Landform, ELK, GIS2BIM)



3 Webservices

There are different sort of webservices around which you can use to load GIS-data into Revit. We will have a look at the most important ones.

- **Geocoding**: Geocoding webservices can be used to convert an address to coordinates. Reverse geocoding is the process of converting geographic coordinates into an address.
- **Web Map service(WMS):** This is a standard protocol(from the Open Geospatial Consortium) to download GIS-data in rasterformat.
- **Web Map Tile Service(WMTS)/Tile Map Service(TMS):** This is a standard protocol for downloading Images which are divided in tiles and zoomlevels from a webserver.
- **Web Feature Service(WFS):** This is a standard protocol for downloading vectordata and other data from a webserver.
- **Download:** Another way to collect GIS-data is via direct download. By example to obtain Open Street Maps vector data.
- **ArcGIS REST API:** ArcGIS has his own API for requests for geodata.

3.1 Geocoding

A very popular geocoding service is the Google API.

Google API

A practical example is:
https://maps.googleapis.com/maps/api/geocode/xml?address=Dunajska%20cesta+18+Ljubljana+Slovenia&key=

https://maps.googleapis.com/maps/api/geocode/
xml?
address=Dunajska%20cesta
+18
+Ljubljana
+Slovenia
&key=

%20 is used for a space.

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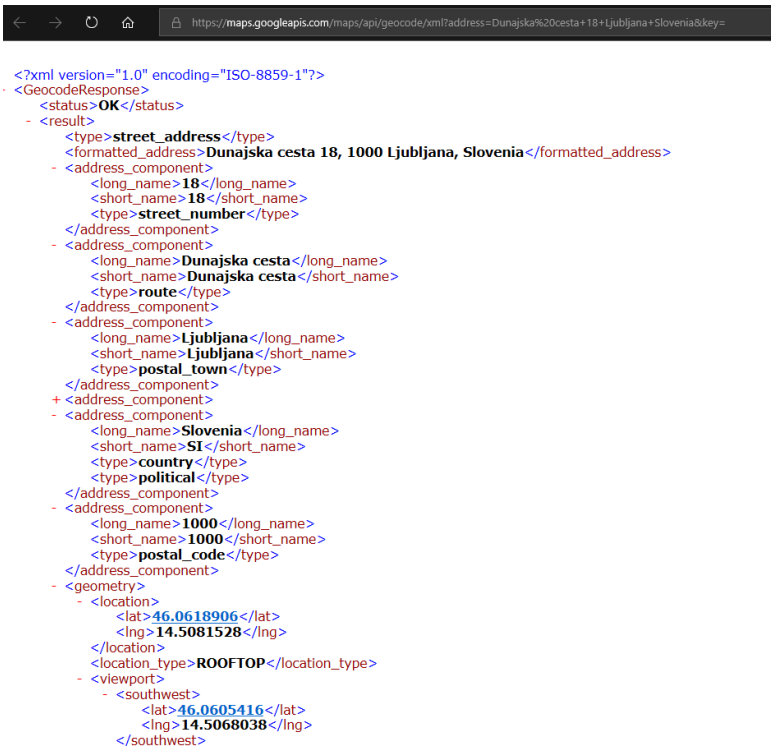

Google gives us an answer in xml. In Dynamo we can get the value of lat and lng.

Nominatim API

Another option is the API of Open Street Maps: Nominatim API.

https://nominatim.openstreetmap.org/search/
Dunajska%20cesta
%20
18
%20
Ljubljana
%20
Slovenia
?format=xml
&addressdetails=1
&limit=1
&polygon_svg=1

The result is:

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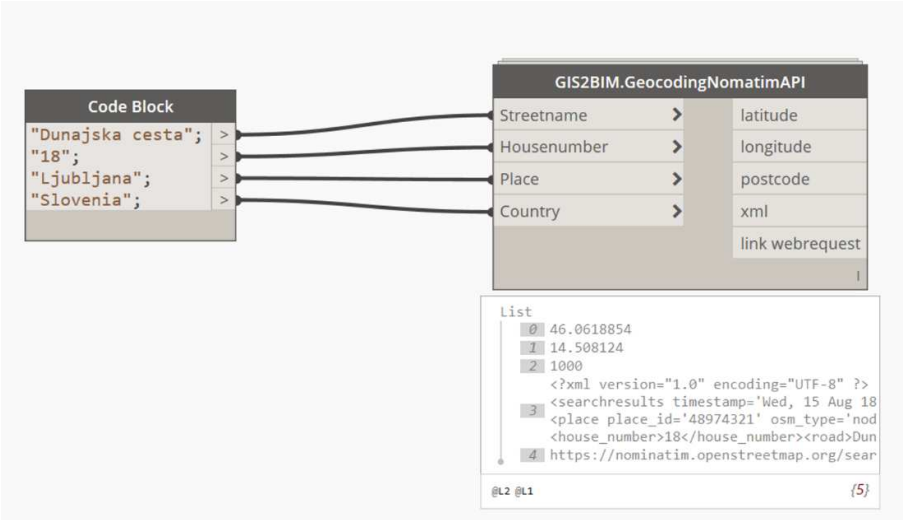
```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <searchresults more_url="https://nominatim.openstreetmap.org/search.php?
q=Dunajska+cesta+18+Ljubljana+Slovenia&addressdetails=1&polygon_svg=1&exclude_place_ids=48974321&format=xml&accept-language=en-NL" exclude_place_ids="48974321"
polygon="false" querystring="Dunajska cesta 18 Ljubljana Slovenia" attribution="Data © OpenStreetMap contributors, ODbL 1.0. http://www.openstreetmap.org/copyright"
timestamp="Wed, 15 Aug 18 20:05:39 +0000">
  - <place class="place" importance="0.531" type="house" display_name="18, Dunajska cesta, Županičičeva Jama, Bežigrad, Ljubljana, Upravna Enota Ljubljana, Osrednjeslovenska, 1000,
    Slovenia" lon="14.508124" lat="46.0618854" geosvg="cx="14.508124" cy="-46.061885400000001"" boundingbox="46.0618354,46.0619354,14.508074,14.508174" place_rank="30"
    osm_id="3788670827" osm_type="node" place_id="48974321">
      <house_number>18</house_number>
      <road>Dunajska cesta</road>
      <neighbourhood>Županičičeva Jama</neighbourhood>
      <suburb>Bežigrad</suburb>
      <city>Ljubljana</city>
      <county>Upravna Enota Ljubljana</county>
      <state_district>Osrednjeslovenska</state_district>
      <postcode>1000</postcode>
      <country>Slovenia</country>
      <country_code>si</country_code>
    </place>
</searchresults>
```


The Dynamopackage GIS2BIM has a node for this:



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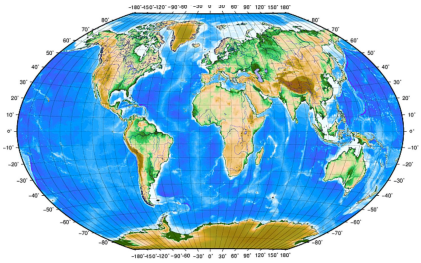
4 Coordinate Reference Systems(CRS)

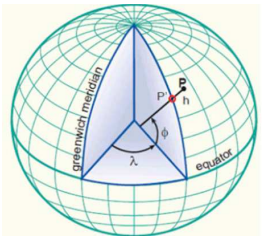
A spatial reference system (SRS) or coordinate reference system (CRS) is a coordinate-based local, regional or global system used to locate geographical entities. A spatial reference system defines a specific map projection, as well as transformations between different spatial reference systems (Wikipedia)

Every CRS has a projection, projected bounds and other information.

Most important Map Projections

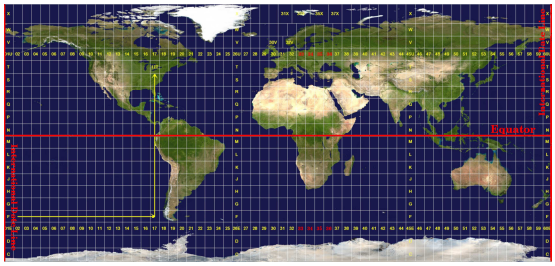
Geographical CRS(sphere, Latitude, Longitude)
Example: WGS-84 is most used CRS all over the world.





Projected(flat plane, X,Y)
Example: Slovenia Grid(EPSG 3911) is the local Slovenian grid.

Mercator: Global Map Projection
Example: Pseudo-Mercator(EPSG 3857) is very much used for web mapping applications.(Google Maps, OSM, Bing Maps, ESRI)



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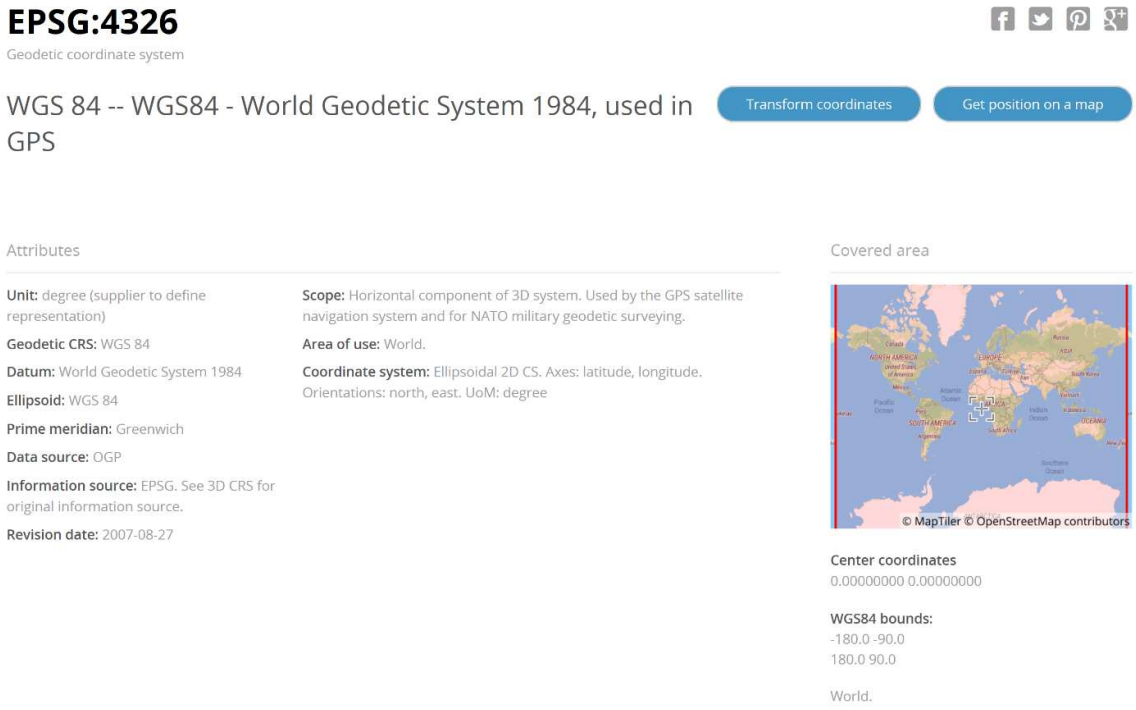
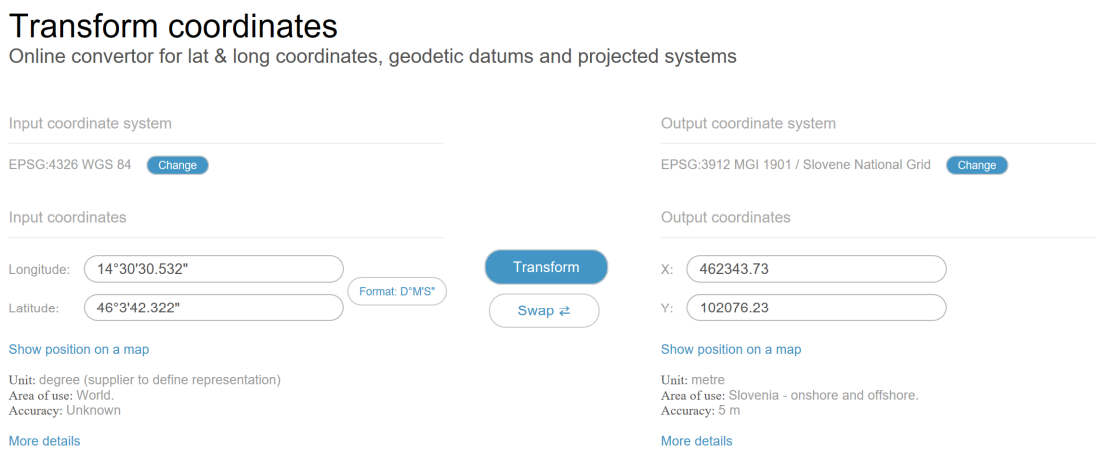
EPSG

The EPSG(European Petroleum Survey Group) has a database with more then 13000 Coordinate Reference Systems all over te world. Every CRS has a code and a lot of information about the specific CRS. www.epsg.io/

Most used in WGS-84(EPSG:4326)



To transform coordinates from one CRS to another is very easy using the free epsg converter:



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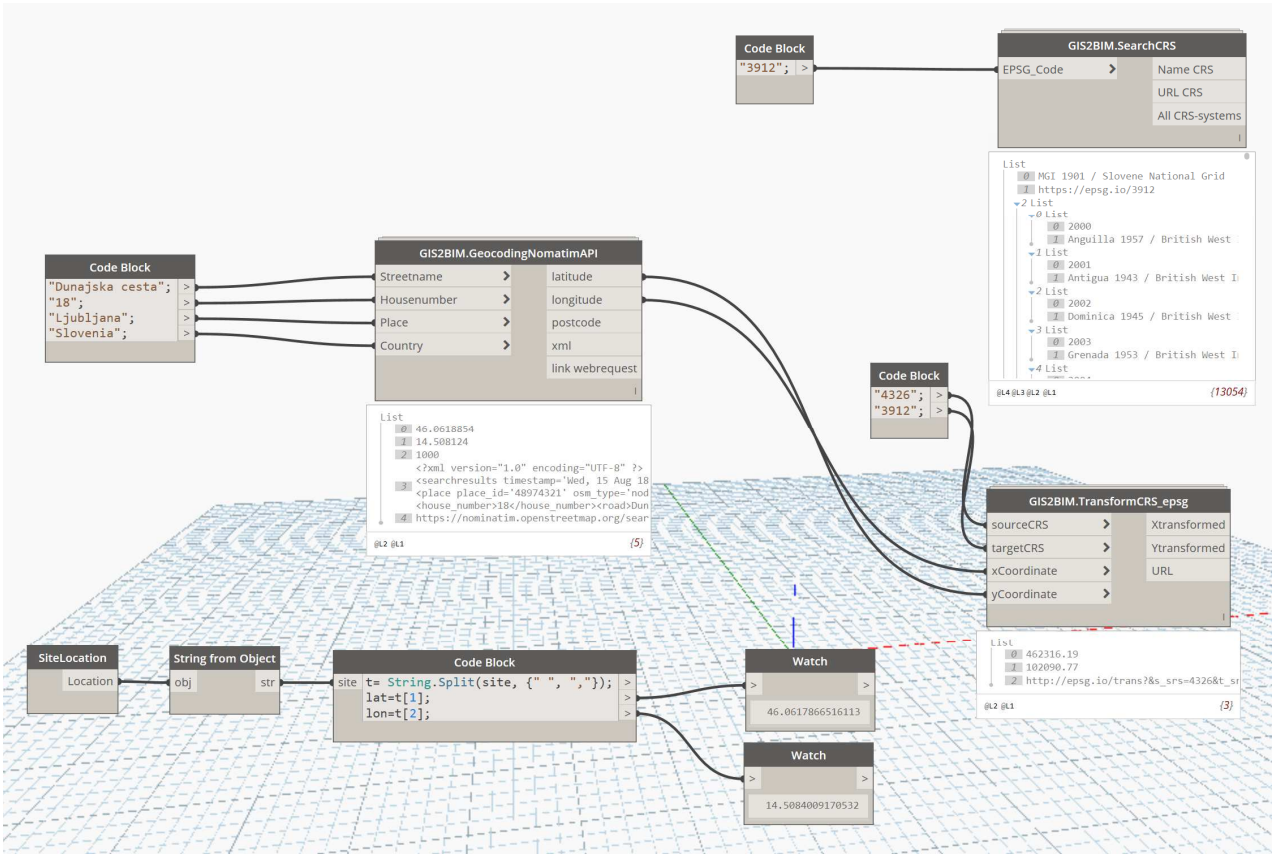
EPSG.io has also an API. So we put this into a dynamonode.
We put in a WGS-84 coordinate from OSM geocoding or via the Revit Site Location!

You put the coordinate and EPSG-codes in and you get the transformed coordinates!



Boundingbox

When we are going to use WFS/WMS webrequest we need to give a boundingbox.
Generally in the format X1,Y1,X2,Y2 for flat projection.
Example: **462116,101891,462516,102291**

Have a look at this webrequest. It's a aerialphoto of where I live. I you change the coordinate in the webrequest with 100 or 200 meter, you see the wms changing:

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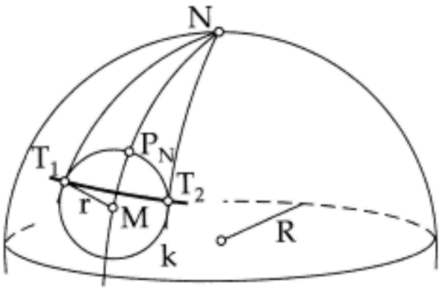
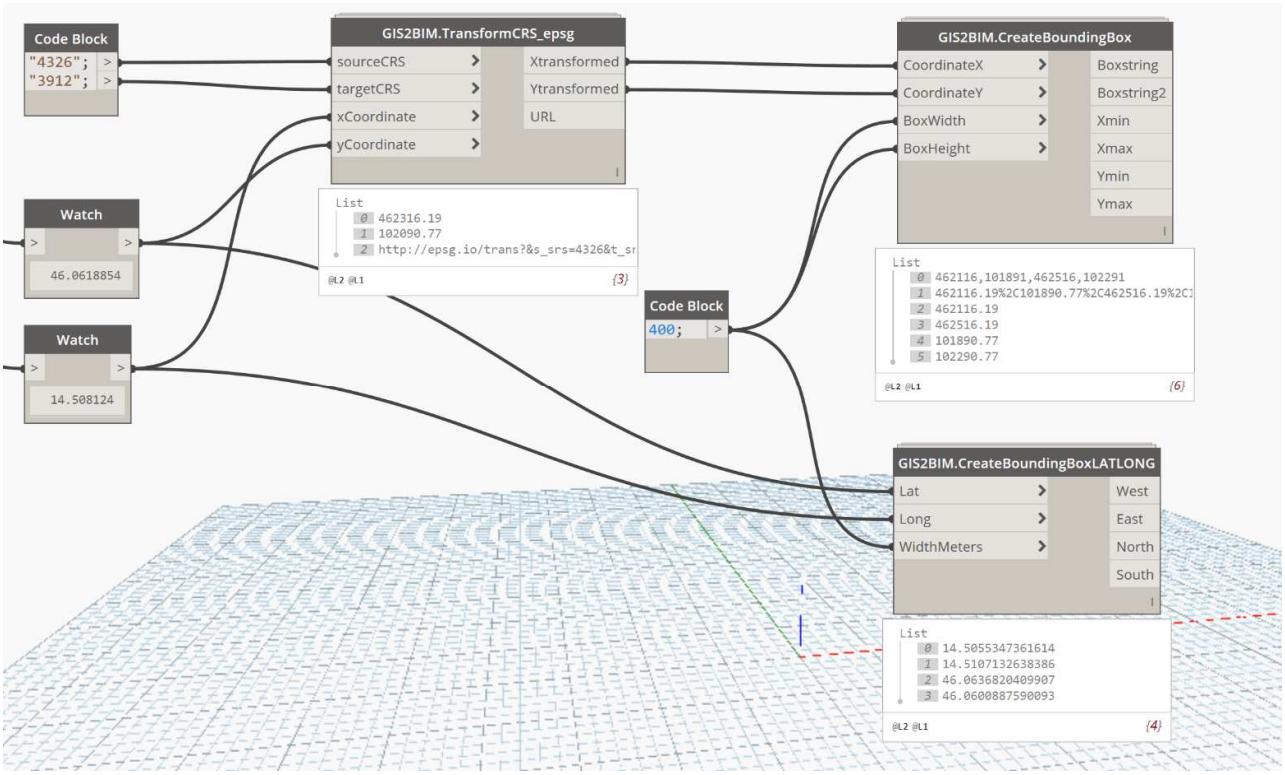
http://geodata.nationaalgeoregister.nl/luchtfoto/rgb/wms?&request=GetMap&VERSION=1.3.0&STYLES=default&layers=2017_ortho25&bbox=**106315,425588,106515,425788**&width=3000&height=3000&format=image/png&crs=EPSG:28992

For WGS-84 boundingboxes we need a piece of code to calculate the LAT/Lon bounds.



For a explanation about this code have a look at:
http://janmatuschek.de/LatitudeLongitudeBoundingCoordinates



5 Web Map Service(WMS)

Web Map Service(WMS) is a standard protocol developed by the Open Geospatial Consortium(OGC) in 1999 for serving georeferenced map images over the Internet. These images are typically produced by a map server from data provided by a GIS database(Wikipedia)

Thanks to the INSPIRE program a lot of European countries have webservices in WMS and WFS for the cadastral parcels and other GIS-data. We have a look at the cadastral services of Slovenia:

https://prostor4.gov.si/ows2-elf-m/elf_cp/ows?service=wms&request=**GetCapabilities**

By opening this link we have a look at the possibilities of this server. We can find out:

- Which layers we can query.
- Which Coordinate Reference System we can use.

And there are a lot of options and parameters. Below an example with comments.

Part of the request	**Comments**
https://prostor4.gov.si/ows2-elf-m/elf_cp/ows?	The GIS-server of the Slovenian Cadastre for the ELF-project
service=wms	The service we use(WMS)
&request=**GetMap**	The request: GetMap
&VERSION=1.3.0	The version of the WMS
&STYLES=**CP.CadastralParcel.ELFCadastre**	The style of the image
&layers=**CP.CadastralParcel**	The name of the layer
&bbox= 462116,101891,462516,102291	This is the left bottom corner and right top corner of the boundingbox of the requested area in the coordinates of the local CRS.
&width=3000	Width of the image in pixels
&height=3000	Height of the image in pixels
&format=**image/png**	Format of the request. Some options are: • Image/gif • Image/geotiff • Application/pdf

&crs=**EPSG:3912**	The EPSG-code of the used Coordinate Reference System

https://prostor4.gov.si/ows2-elf-m/elf_cp/ows?service=wms&request=GetMap&VERSION=1.3.0&STYLES=CP.CadastralParcel.ELFCadastre&layers=CP.CadastralParcel&bbox=462116,101891,462516,102291&width=3000&height=3000&format=image/png&crs=EPSG:3912

And the result:

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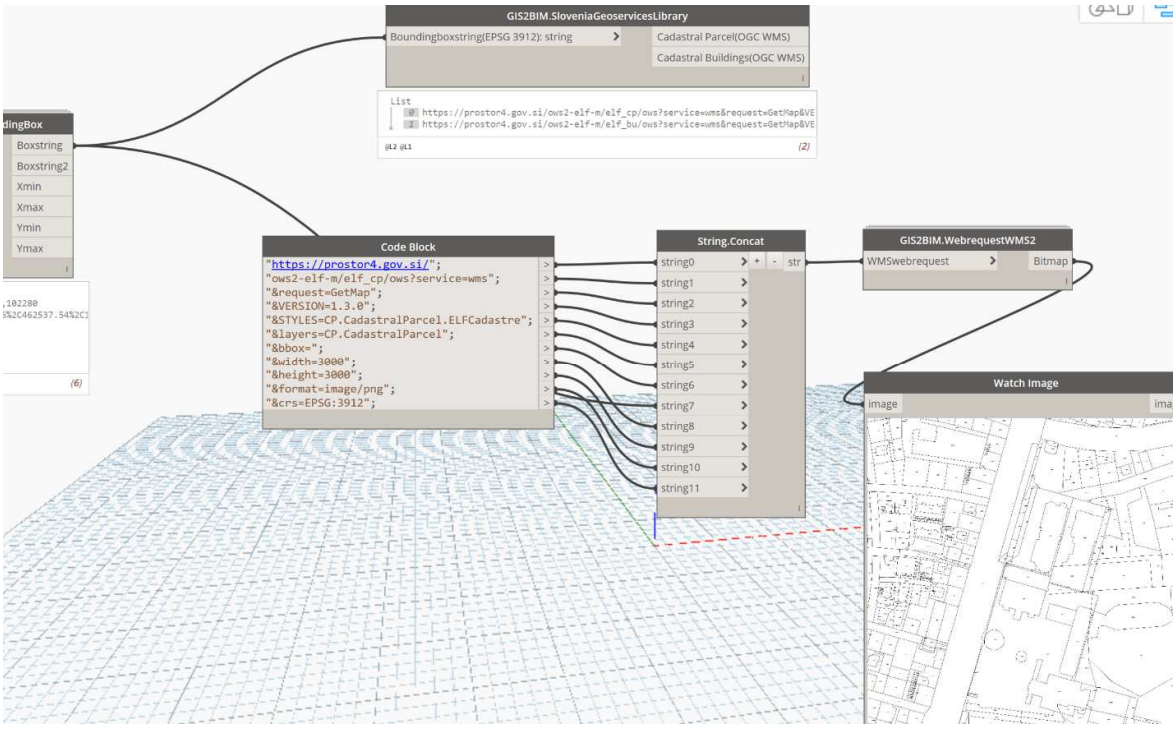
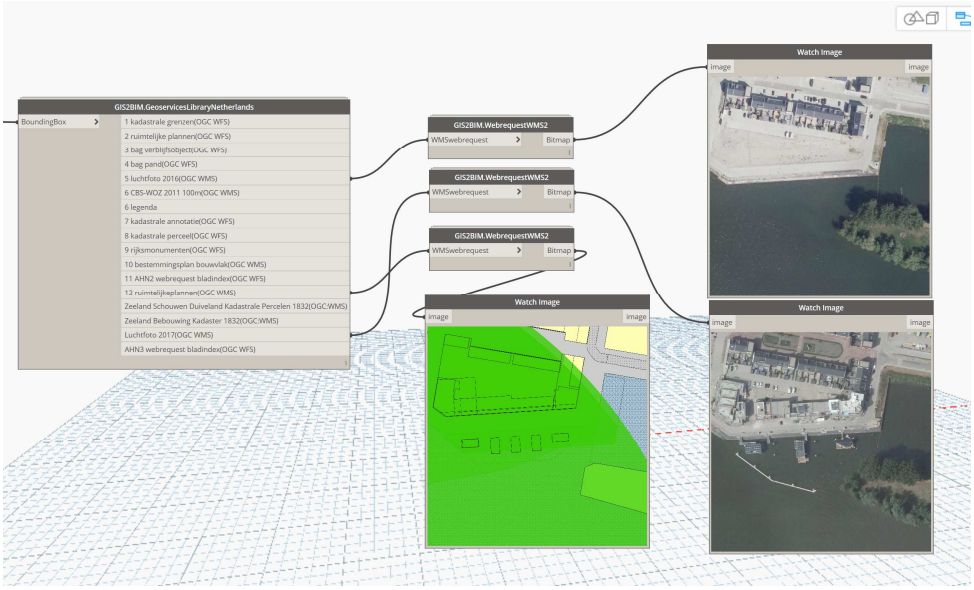
Within the GIS2BIM Dynamopackage we use the **webrequestWMS2** node to get the image into Dynamo.



There are loads of WMS-servers around. In the Netherlands by example we have an aerialphoto of the country of every year. So you can follow the building progress in some parts of the county:



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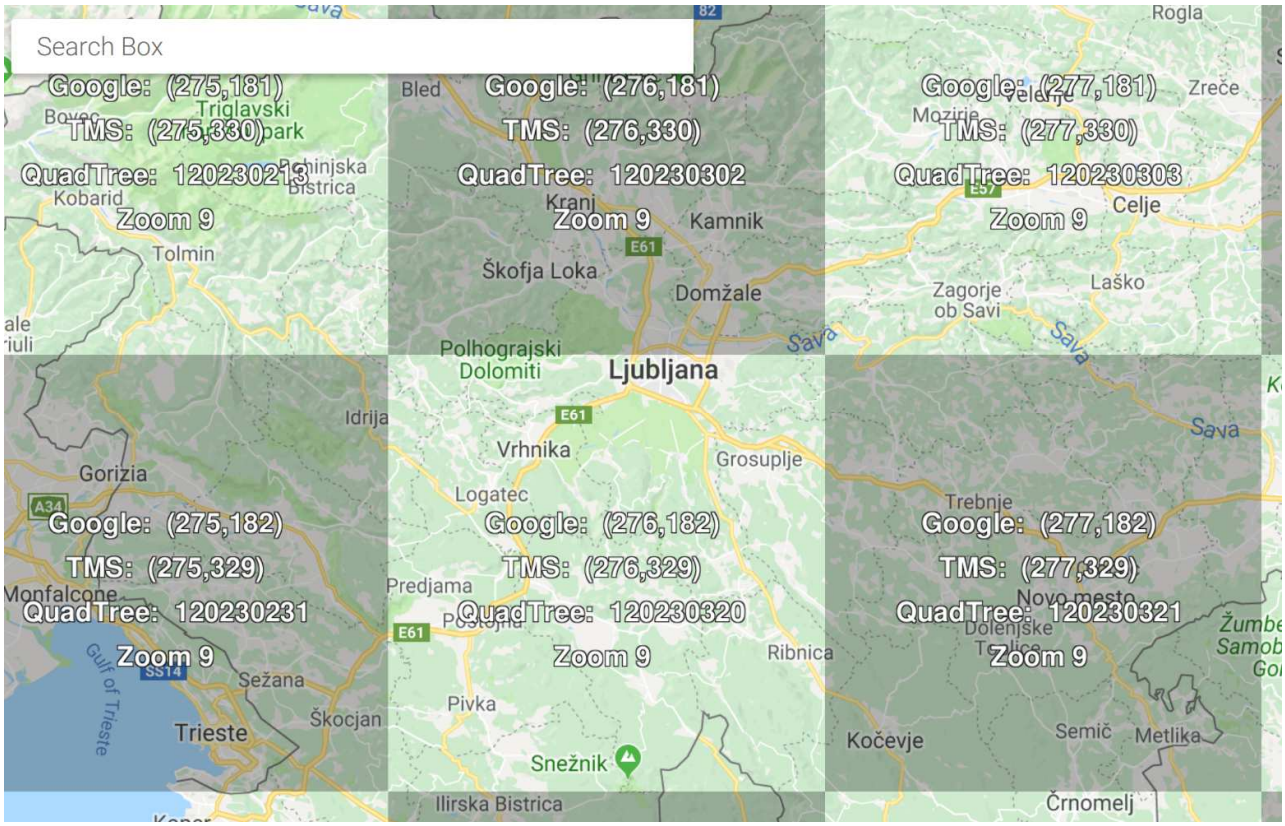
5.2 Web Map Tile Service(WMTS/TMS)

A Web Map Tile Service (WMTS) is a standard protocol for serving pre-rendered or run-time computed georeferenced map tiles over the Internet.(Wikipedia)

A Map is divided in tiles. Each Tile has a zoomlevel, number in x and y, latitude and longitude value(or another CRS).

On the website of maptiler there is this map which gives you a good view of the how this works and CPythoncode pieces to use in your code.
www.maptiler.org/google-maps-coordinates-tile-bounds-projection/



There are multiple methods for the calculation of the tilenumbers. From WGS-84 to a tilnumber you can use the pythoncode below.

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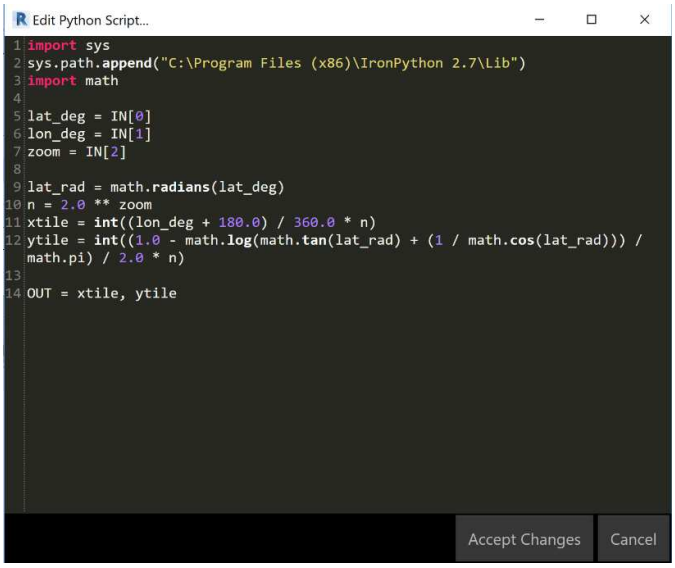
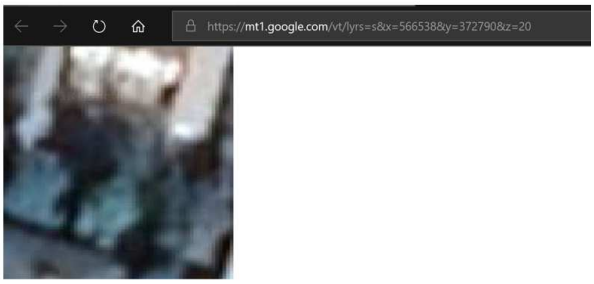
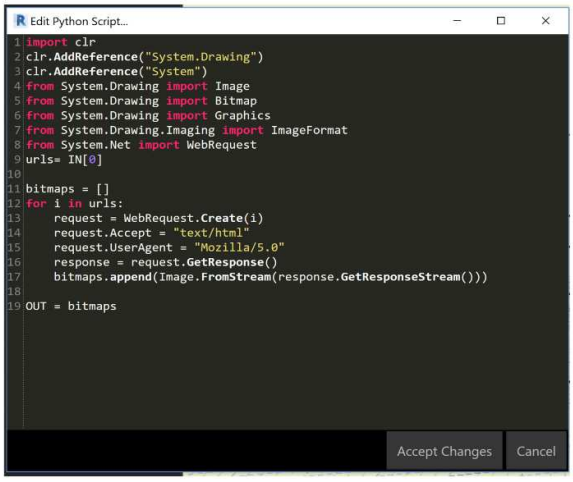
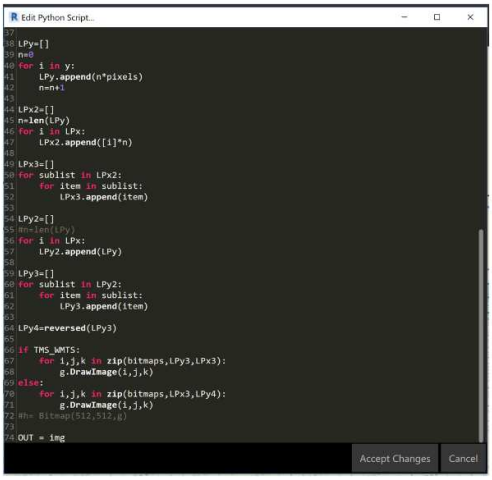


We can have a look at a certain google tile:
https://mt1.google.com/vt/lyrs=s&x=566538&y=372790&z=20



In Dynamo we create a piece of code to calculate all these tilenumbers and use .net framework to download and merge this al together to one image.





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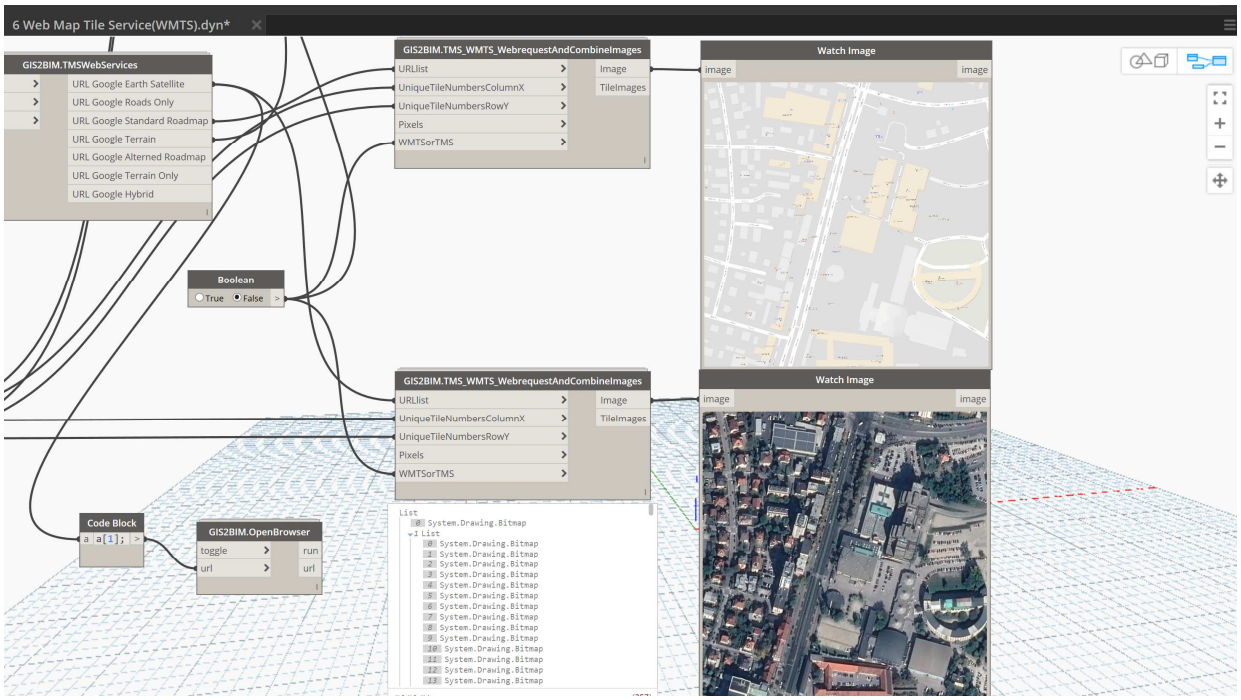

The result is a large image from a list of tiles.

You can also use this for downloading large images from google earth on the highest zoomlevel. We used it to plot a part of the City of Dordrecht of 2 by 2 km.

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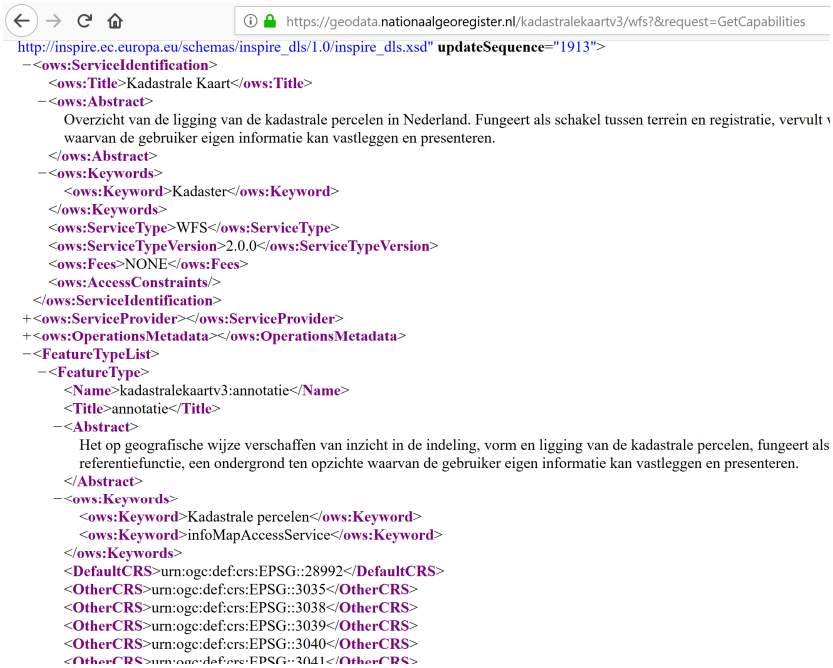
6 Web Feature Service(WFS)

*In computing, the Open Geospatial Consortium Web Feature Service (WFS) Interface Standard provides an interface allowing requests for geographical features across the web using platform-independent calls.(*Wikipedia)

With GetCapabilities we can see the features of the WFS-server.
https://geodata.nationaalgeoregister.nl/kadastralekaartv3/
wfs?
&request=GetCapabilities



Important:

- Operations:
  - GetFeature
  - OutputFormat
- Featuretype
  - Parcels
  - Annotation

We can construct a webrequest based on the same principle as the WMS-webrequest

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Part of the request	Comments
http://geodata.nationaalgeoregister.nl/kadastralekaartv3/	The GIS-server of the Dutch Cadastre
Wfs?	The service we use(WFS)
&request= **GetFeature**	The request: GetFeature
&VERSION=**2.0.0**	The version of the WFS
&typeName= **kadastralekaartv3:kadastralegrens**	The name of the layer
&bbox= **106236,425489,106636,425889**	This is the left bottom corner and right top corner of the boundingbox of the requested area
&crs=**EPSG:28992**	The EPSG-code of the used Coordinate Reference System EPSG:28992 is the dutch national grid

http://geodata.nationaalgeoregister.nl/kadastralekaartv3/wfs?&request=GetFeature&typeName=kadastralekaartv3:kadastralegrens&bbox=106236,425489,106636,425889


```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <wfs:FeatureCollection xsi:schemaLocation="http://www.opengis.net/wfs/2.0 http://schemas.opengis.net/wfs/2.0/wfs.xsd http://kadastralekaartv3.geonovum.nl
http://geodata.nationaalgeoregister.nl/kadastralekaartv3/wfs?service=WFS&version=2.0.0&request=DescribeFeatureType&typeName=kadastralekaartv3%3Akadastralegrens
http://www.opengis.net/gml/3.2 http://schemas.opengis.net/gml/3.2.1/gml.xsd" timeStamp="2018-09-03T05:21:46.127Z" numberReturned="719" numberMatched="719"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:wfs="http://www.opengis.net/wfs/2.0"
xmlns:kadastralekaartv3="http://kadastralekaartv3.geonovum.nl" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  - <wfs:member>
    - <kadastralekaartv3:kadastralegrens gml:id="kadastralegrens.21283704">
        <kadastralekaartv3:lokaalID>340382684</kadastralekaartv3:lokaalID>
        <kadastralekaartv3:logischtijdstipOntstaan>2000-03-02T10:19:37.000</kadastralekaartv3:logischtijdstipOntstaan>
        <kadastralekaartv3:type>Definitief</kadastralekaartv3:type>
      - <kadastralekaartv3:grenslijn>
        - <gml:LineString srsDimension="2" srsName="urn:ogc:def:crs:EPSG::28992">
            <gml:posList>106210.787 425498.259 106220.376 425494.568 106257.216 425480.386</gml:posList>
          </gml:LineString>
        </kadastralekaartv3:grenslijn>
      </kadastralekaartv3:kadastralegrens>
  </wfs:member>
  - <wfs:member>
    - <kadastralekaartv3:kadastralegrens gml:id="kadastralegrens.22370760">
        <kadastralekaartv3:lokaalID>340890942</kadastralekaartv3:lokaalID>
        <kadastralekaartv3:logischtijdstipOntstaan>2007-12-14T13:16:08.000</kadastralekaartv3:logischtijdstipOntstaan>
        <kadastralekaartv3:type>Definitief</kadastralekaartv3:type>
      - <kadastralekaartv3:grenslijn>
        - <gml:LineString srsDimension="2" srsName="urn:ogc:def:crs:EPSG::28992">
            <gml:posList>106257.539 425520.766 106256.24 425518.484 106253.499 425520.044 106254.797 425522.326 106257.539 425520.766</gml:posList>
          </gml:LineString>
        </kadastralekaartv3:grenslijn>
      </kadastralekaartv3:kadastralegrens>
  </wfs:member>
  - <wfs:member>
    - <kadastralekaartv3:kadastralegrens gml:id="kadastralegrens.22380225">
        <kadastralekaartv3:lokaalID>341329490</kadastralekaartv3:lokaalID>
        <kadastralekaartv3:logischtijdstipOntstaan>2007-12-14T13:16:08.000</kadastralekaartv3:logischtijdstipOntstaan>
        <kadastralekaartv3:type>Definitief</kadastralekaartv3:type>
      - <kadastralekaartv3:grenslijn>
        - <gml:LineString srsDimension="2" srsName="urn:ogc:def:crs:EPSG::28992">
            <gml:posList>106221.91 425510.19 106234.86 425503.87 106244.28 425499.22 106251.86 425495.44 106261.32 425490.79</gml:posList>
          </gml:LineString>
        </kadastralekaartv3:grenslijn>
      </kadastralekaartv3:kadastralegrens>
  </wfs:member>
  - <wfs:member>
    - <kadastralekaartv3:kadastralegrens gml:id="kadastralegrens.22395219">
        <kadastralekaartv3:lokaalID>340550908</kadastralekaartv3:lokaalID>
        <kadastralekaartv3:logischtijdstipOntstaan>2007-12-14T13:16:08.000</kadastralekaartv3:logischtijdstipOntstaan>
        <kadastralekaartv3:type>Definitief</kadastralekaartv3:type>
      - <kadastralekaartv3:grenslijn>
        - <gml:LineString srsDimension="2" srsName="urn:ogc:def:crs:EPSG::28992">
            <gml:posList>106141.474 425685.048 106206.33 425631.67 106246.75 425598.48 106247.53 425594.06 106245.29 425591.06 106245.34 425591</gml:posList>
          </gml:LineString>
```

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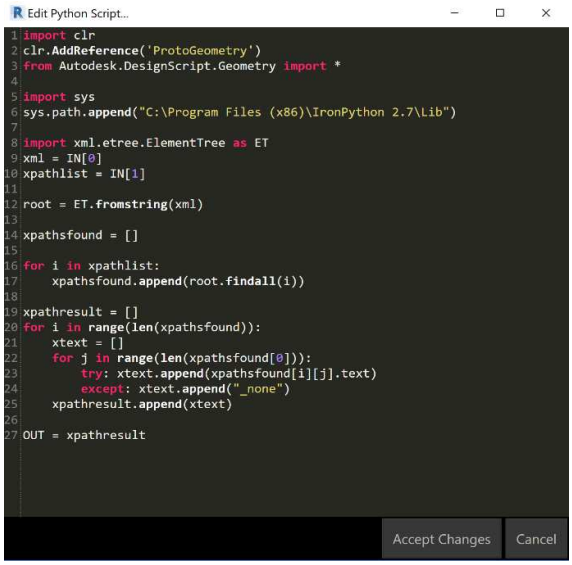
When we do this webrequest we receive a xml-file with geometrydata as LineString, Points etcetera. An easy way to query this XML is using XPath.



In this case we use the following XPathstring:

.//{http://www.opengis.net/gml/3.2}posList

```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <wfs:FeatureCollection xsi:schemaLocation="http://www.opengis.net/wfs/2.0 http://schemas.opengis.net/wfs/2.0/wfs.
http://geodata.nationaalgeoregister.nl/kadastralekaartv3/wfs?
service=WFS&version=2.0.0&request=DescribeFeatureType&typeName=kadastralekaartv3%3Akadastralegrens http:/
http://schemas.opengis.net/gml/3.2.1/gml.xsd" timeStamp="2018-09-05T05:11:01.1637" numberReturned="719" numb
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:wfs=
xmlns:kadastralekaartv3="http://kadastralekaartv3.geonovum.nl" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  - <wfs:member>
      - <kadastralekaartv3:kadastralegrens gml:id="kadastralegrens.21283704">
          <kadastralekaartv3:lokaalID>340382684</kadastralekaartv3:lokaalID>
          <kadastralekaartv3:logischtijdstipOntstaan>2000-03-02T10:19:37.000</kadastralekaartv3:logischtijdstipOntstaan>
          <kadastralekaartv3:type>Definitief</kadastralekaartv3:type>
        - <kadastralekaartv3:grenslijn>
            - <gml:LineString srsDimension="2" srsName="urn:ogc:def:crs:EPSG::28992">
                <gml:posList>106210.787 425498.259 106220.376 425494.568 106257.216 425480.386</gml:posList
              </gml:LineString>
          </kadastralekaartv3:grenslijn>
      </kadastralekaartv3:kadastralegrens>
  </wfs:member>
```

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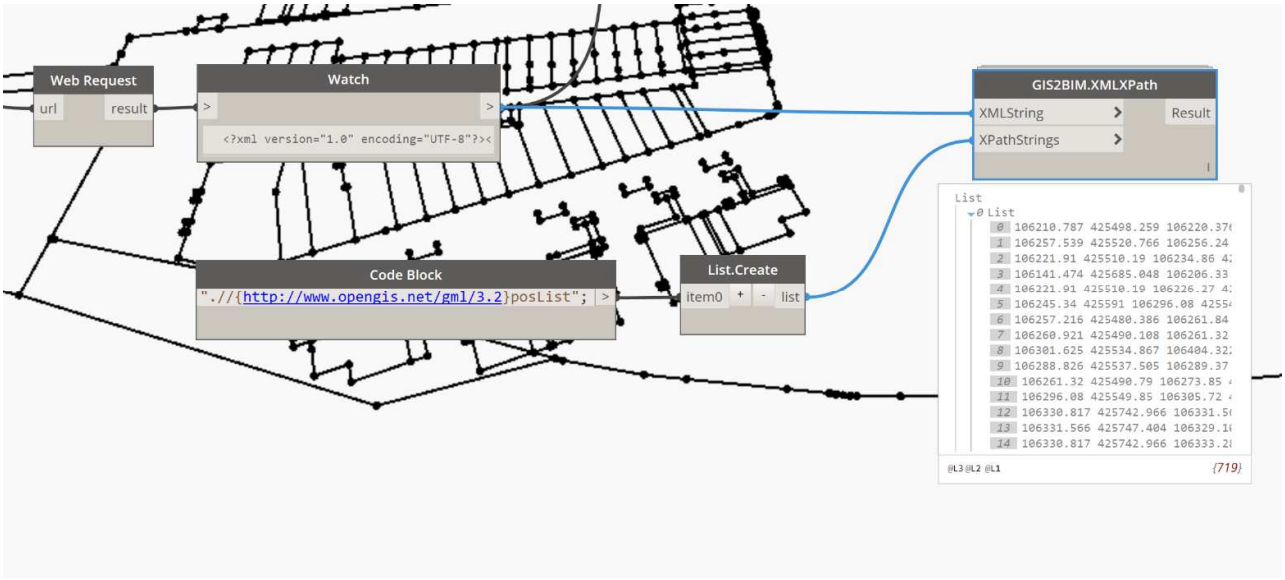
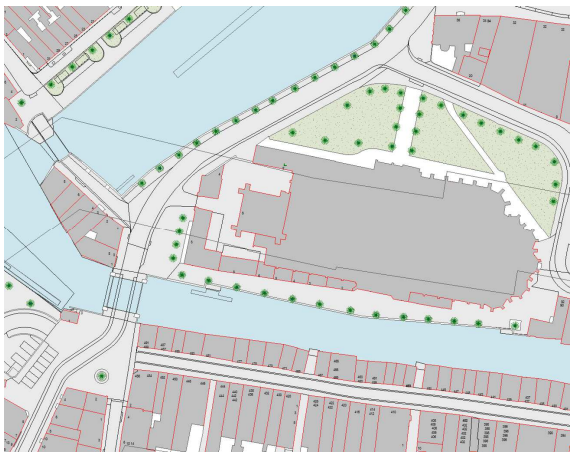


After that you can make a piece of code to:
-Split up the coordinates by space.
-Transform the coordinate to your local project coordinates.
The possibilities of WFS are endless. Because we retrieve geometry and data. We can build 3D-buildings of it.



Create beautiful maps in 3D or 2D

And visualize data like ‘year of construction’

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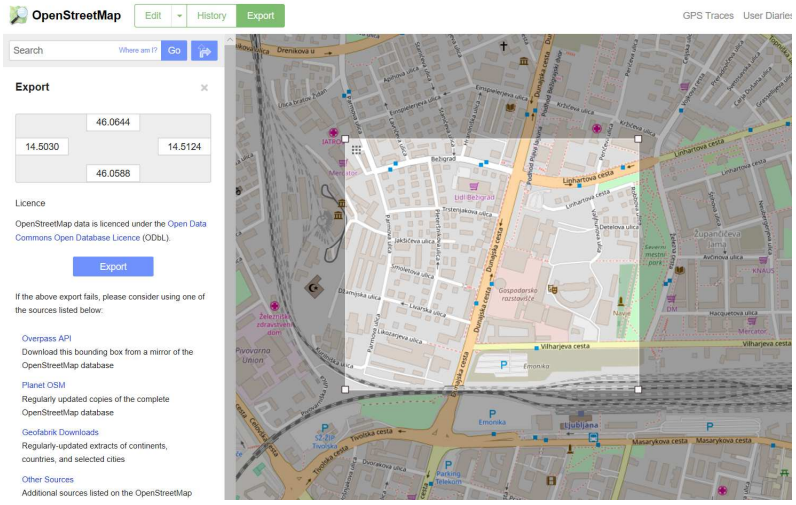
7 Direct Download

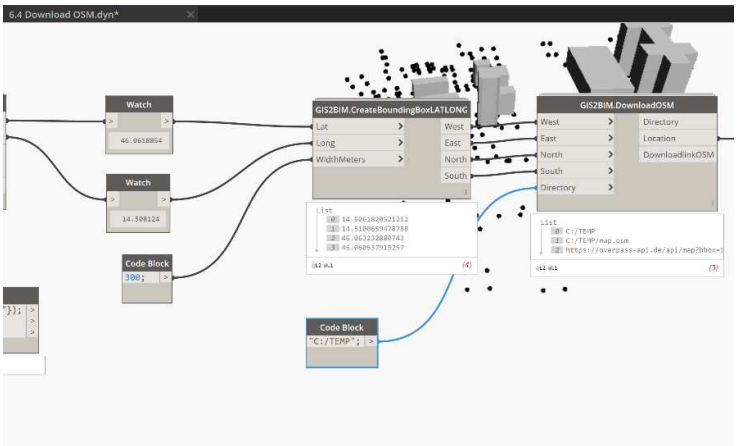
Another way to obtain GIS-data is direct download. As example we use Open Street Maps. You can do this manually via the website of openstreetmaps.org:



But you can also use the overpass API:
https://wiki.openstreetmap.org/wiki/Overpass_API

An example is:
https://overpass-api.de/api/map?bbox=14.5061820521,46.0605379193,14.5100659479,46.0632328807

The coordinates are the coordinates of the boundingbox in WGS-84. After the download we can use the ELK-package to obtain the geometry from the downloaded file.



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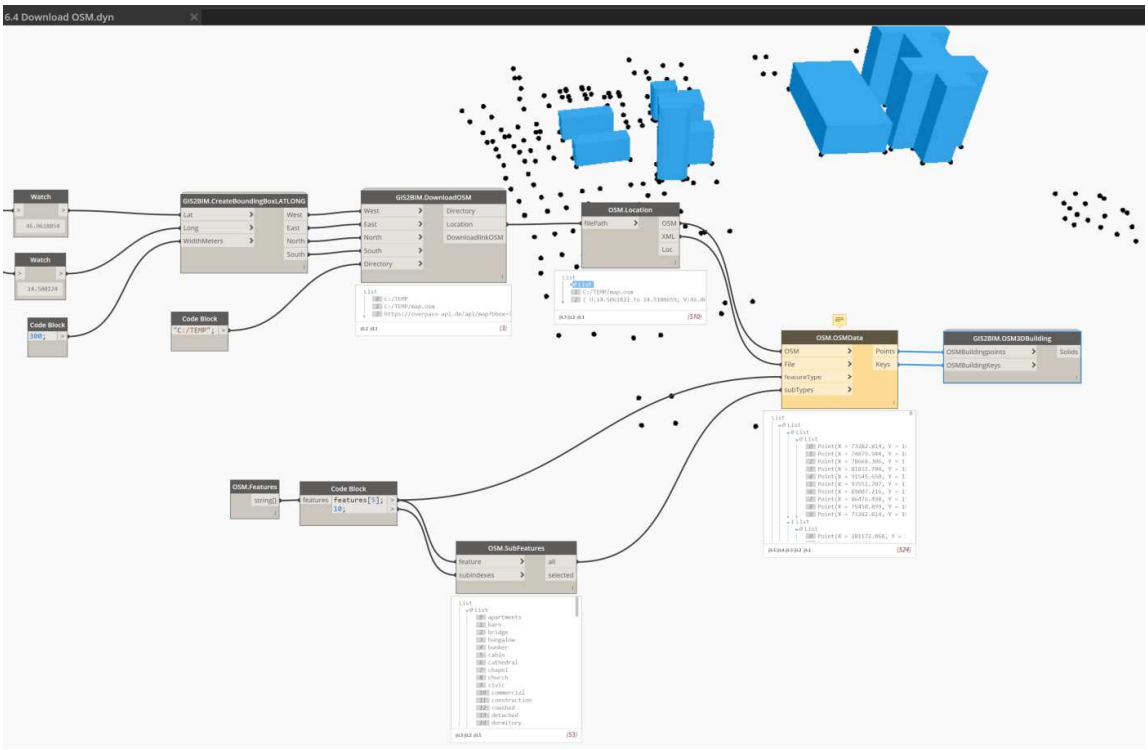

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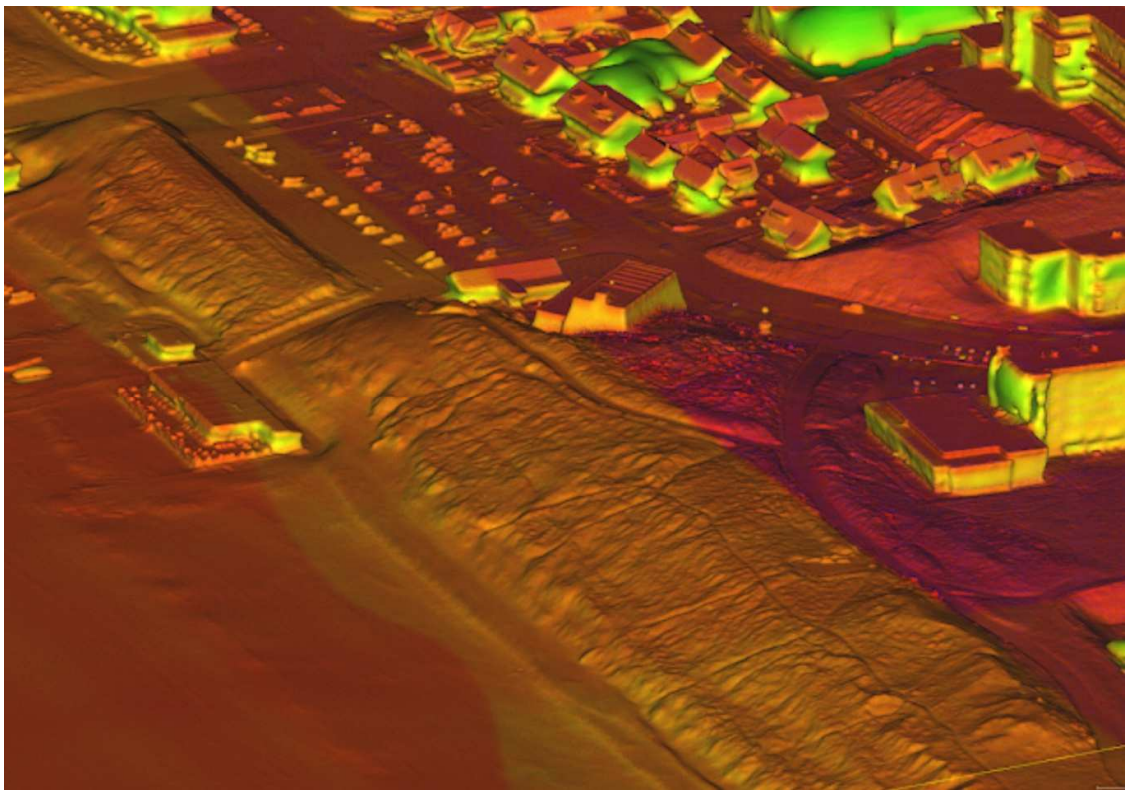
8 GEO Pointclouds

We see more and more geo pointclouds coming. Many countries provide pointclouds. In Holland this information is available for free.

http://ahn2.pointclouds.nl/#?camera_x=93016.7219189639&camera_y=435101.15833471075&camera_z=655.9781170573956&lookat_x=93016.7219189639&lookat_y=435171.8690140395&lookat_z=585.2674401489025



The country is divided in sections of 5 by 5 km. These pointclouds are quite heavy to load into revit and their coordinates are usually very large. You can modify the pointclouds easily with LASzip. https://laszip.org/

We can use this pointclouds on several ways:

1) Use Laszip to transform coordinates and crop the pointcloud and link the pointcloud into Revit.
2) Mesh a pointcloud with Cloudcompare, Meshlab or other programs. Create a directshape from this mesh in Dynamo.

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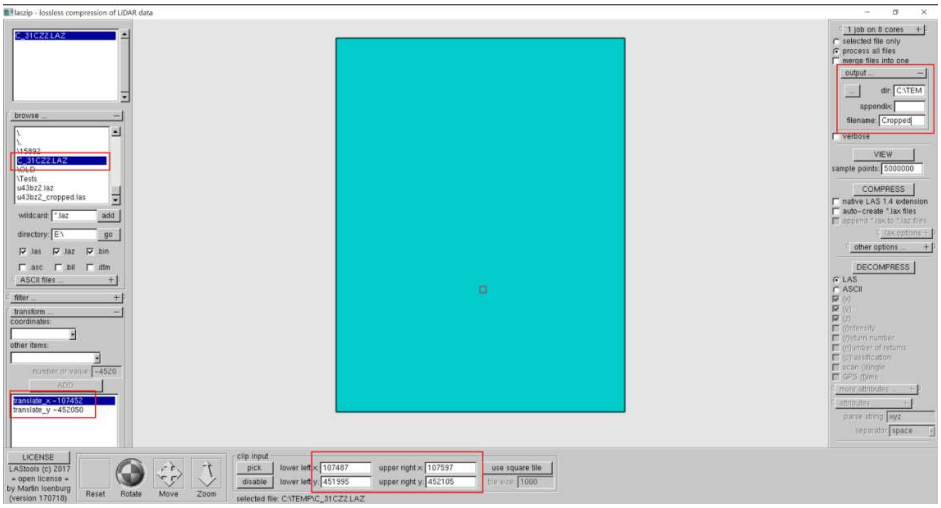
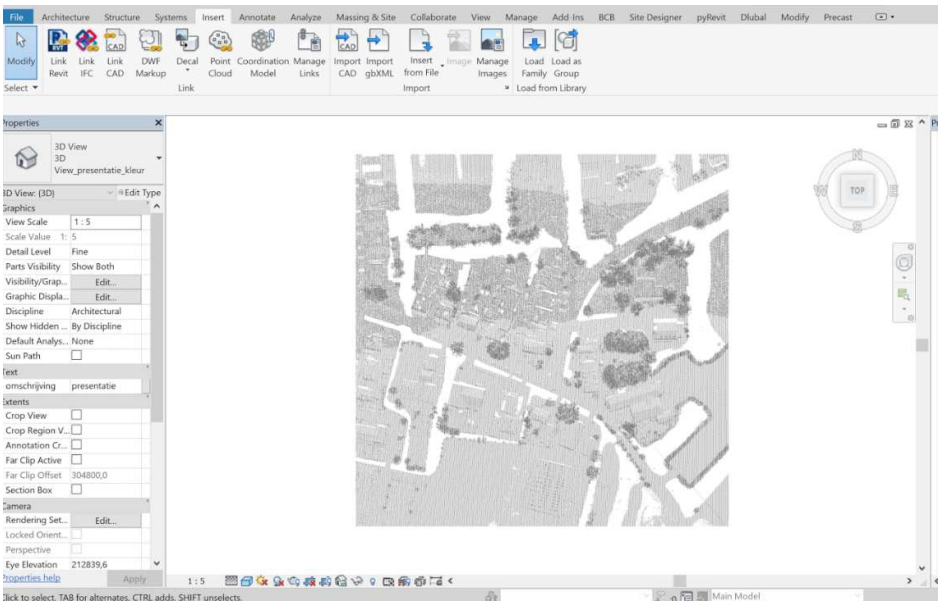
3) Read the heightinformation from a pointcloud and use this to extrude building outlines.
4) Convert the pointcloud to dynamopoints and build a toposurface from it.

1 Use Laszip to transform coordinates and crop the pointcloud and link the pointcloud into Revit.



You can use laszip with the GUI or via commandline. Create a LAZ-file.



Link the new LAZ-file into Revit.

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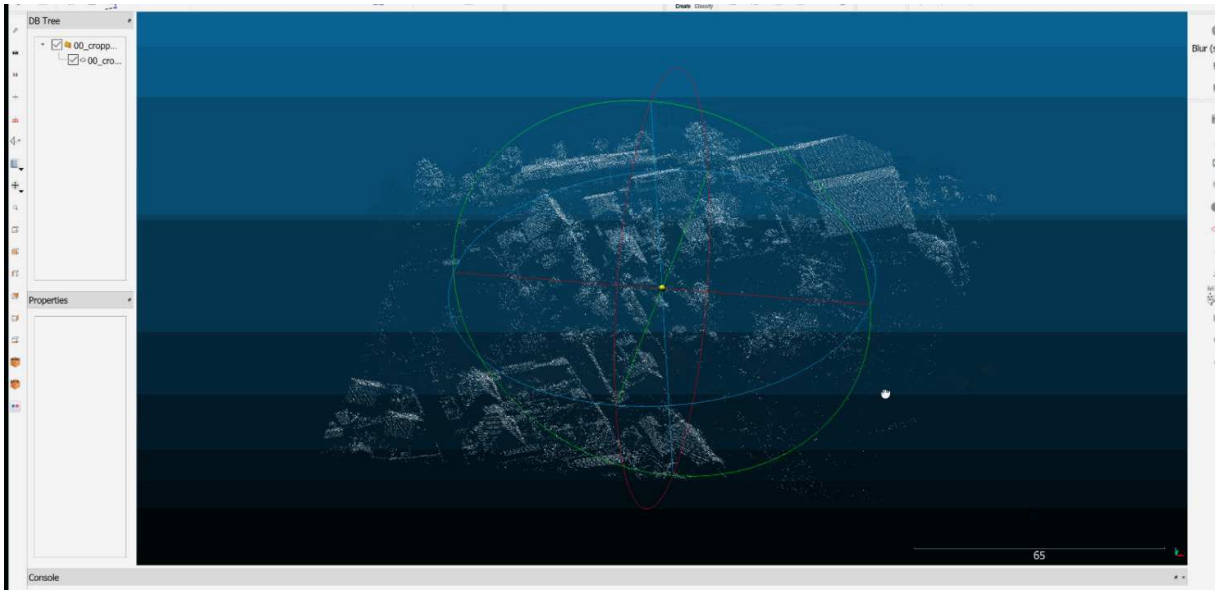
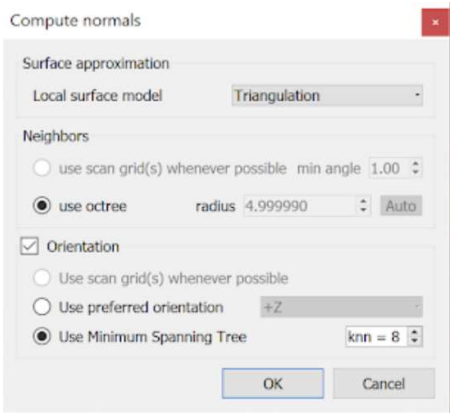
2. Mesh a pointcloud with Cloudcompare, Meshlab or other programs. Create a directshape from this mesh in Dynamo.



- First crop your pointcloud with laszip.
- Open in Cloudcompare
- Select the pointcloud.
- Choose Compute Normals. Use the settings below.



- Use the Poisson Surface Reconstruction for surface reconstruction:

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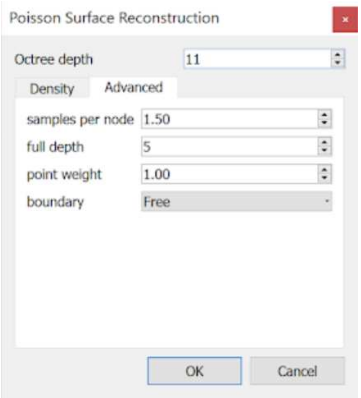


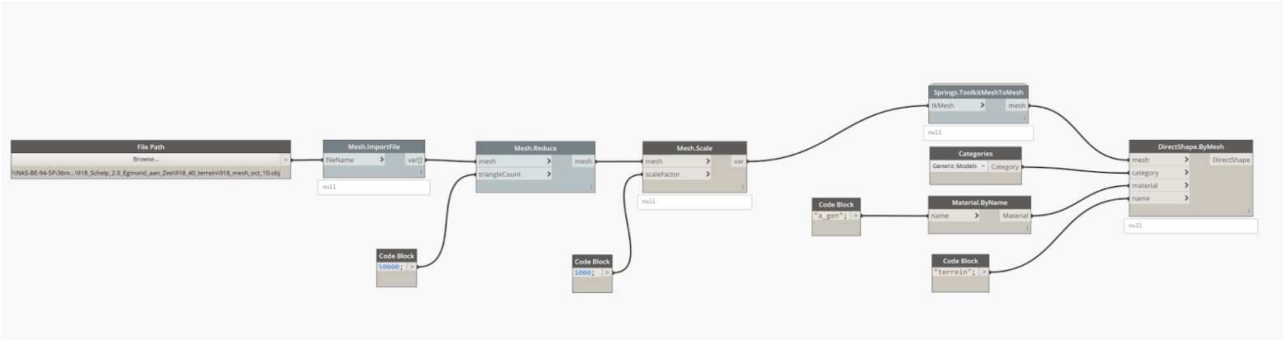
I tried a lot of settings and had a lot of Revit and Dynamo Crashes.

- AHN3-file 3D pointcloud: 1 GB
- Cropped to 500 by 500 meter(laz): 17 MB.
- Poisson Surface Reconstruction in CloudCompare with Octree 9 and save as .obj: 50 MB.
- Poisson Surface Reconstruction in CloudCompare with Octree 10 and save as .obj: 250 MB.
- Import in Dynamo as Mesh and reduce it 200.000-500.000 triangles. When I try more then 500.000 triangles Dynamo is not working anymore on my laptop(Dell XPS 15, 16GB, i7-7700HQ, GTX 1050)

So choose your Octree Depth dependent of the size of your pointcloud.

- Export the mesh as .obj.

Import the mesh in Dynamo.



- Assign a Revitmaterial with the aerialphoto as rendermaterial.
- And load your model into Lumion 3D.

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With results!