PART I: OPEN VISUALISATION ENVIRONMENT (OVE)

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INSTALLING OVE

- **Pre-requisites:** Docker, Docker-Compose
- **Optional:** Python, Git
- **Recommended:** Google Chrome

- https://ove.readthedocs.io/en/latest/docs/INSTALLATION.html#downloading-the-ove-installers
- Make the change suggested in **Running the installers**
- Install the **latest** version of OVE
- You need to **configure OVE before running it**

CONFIGURING OVE

- Open the location where you downloaded the OVE installer on a command line
- git clone https://github.com/dsi-icl/soton-wstnet-ss-2019
- Copy soton-wstnet-ss-2019/config/Spaces.json to config/Spaces.json
- Copy soton-wstnet-ss-2019/ove_maps_config.json to ove_maps_config.json (to the location where you downloaded the OVE installer)
- Edit docker-compose.setup.ove.yml and ove_maps_config.json

CONFIGURING OVE: DOCKER-COMP.

```
ovehub-ove-apps:
  image: ovehub/ove-apps:latest-unstable
  ...
  environment:
  ...
    OPENVIDU_SECRET: "MY_SECRET"
    OVE_MAPS_CONFIG_JSON: "/run/secrets/ove_maps_config.json"
  secrets:
    - ove_maps_config.json
```

CONFIGURING OVE: DOCKER-COMP.

... (bottom of the file)

```
secrets:
  ove_maps_config.json:
    file: ove_maps_config.json
```

CONFIGURING OVE: MAPS CONFIG

- Replace **localhost** with **<your_ip>** (this can be found out by running **ifconfig** or **ipconfig**)
- Familiarise yourself with the configuration of this file, as we will be making some changes in the future
- More information can be found in https://ove.readthedocs.io/en/latest/ove-apps/packages/ove-app-maps/docs/MAP_LAYERS_JSON.html

RUNNING OVE

- docker-compose -f docker-compose.setup.ove.yml pull
- docker-compose -f docker-compose.setup.ove.yml up -d

- To validate whether OVE is running open http://localhost:8080 on a web browser
- To restart OVE run:
  - docker-compose -f docker-compose.setup.ove.yml down
  - docker-compose -f docker-compose.setup.ove.yml up -d

HOSTING APPLICATION DATA

- Open soton-wstnet-ss-2019/web
- python -m server

- SimpleHTTPServer in Python does not work as it does not support CORS (Which is why we need the above script)
  - See https://stackoverflow.com/a/21957017 for more information
- Alternatively you could also install the http-server from Node.js/NPM and run “http-server --cors -p 8000”

LAUNCHING THE APPLICATION

- Open http://localhost:8080/ui/launcher on a web browser
- Step 1: Select **Maps** application
- Step 2: Use the **DO12** space with x: **0**, y: **0**, w: **5760**, h: **4320** (please type these in).
- Step 3: Select the **Southampton** state
- Step 4: Delete existing sections and open the controller (i.e. **Yes** and **Yes**)
- Step 5: Press **Launch**.
- Add **&layers=0,1,2** to the URL and reload page.

USING THE DATA OBSERVATORY

- Open http://<your_ip>:8080/view.html?oveViewId=DO12-0 (or http://<your_ip>:8080/view.html?oveViewId=DO16-0) in the respective Data Observatory section

- **Note:** The observatory can be anything and need not specifically be the one at Imperial, as OVE is designed to run on any client-side infrastructure with a web browser

MORE INFORMATION

- Other OVE Apps
  - Use the launcher to try out other apps such as Images, Videos, and HTML
  - For the videos app, if you are using YouTube videos, use the suggested URL format
  - See https://ove.readthedocs.io/en/latest/ove-apps/README.html for more information

- Python SDK - https://ove.readthedocs.io/en/latest/ove-sdks/python/README.html

MORE INFORMATION

- Developer Mailing List - https://mailman.ic.ac.uk/mailman/listinfo/ove-dev

- Installing OVE from source code
  - OVE can also be installed by cloning the source code of the OVE-* repositories
  - More information is available on the Documentation

PART II: WORKING WITH "GEO" DATASETS

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POPULAR PLATFORMS/LIBRARIES

- OpenLayers
- Leaflet
- CARTO/Torque.js
- ArcGIS
- OpenStreetMap
- Mapbox
- Google Maps

POPULAR STANDARDS

- Raster (Base Maps)
  - Several options publicly available
  - See https://wiki.openstreetmap.org/wiki/Tiles#Servers

- Vector
  - GeoJSON
  - TopoJSON (same authors of D3.js)
  - Open Geospatial Consortium – GML, KML, WKT CRS
  - Commercial – ArcGIS, Esri, IGC

GEOJSON

- Most popular format for Vector Maps
- A majority of the other formats can be converted to this format
- To convert OSM to GeoJSON use: https://tyrasd.github.io/osmtogeojson/
  - May need more memory to convert larger files (export NODE_OPTIONS=--max_old_space_size=3000000)
  - OSM files can be downloaded from https://download.geofabrik.de/europe/great-britain/england.html
- Read more at https://geojson.org/ and try http://geojson.io

OPENSTREETMAP (OSM)

- A collaborative project to create map of the world
- Contributed by many people all over the world
- Can be used to supplement other datasets (crime, housing, traffic, …, etc.)
- Provides a wide variety of services, https://wiki.openstreetmap.org/wiki/List_of_OSM-based_services
- Read more at https://www.openstreetmap.org

WORKING WITH OSM DATA

- Useful for us:
  - osmium – can be used to extract data or a geographical area from OSM files
  - osmosis – mainly used to generate dumps/changesets, but can also be used to extract certain types of objects (speed cameras, highways)

- Other popular options:
  - imposm – imports OSM into PostgreSQL/PostGIS databases
  - mkgmap – uses OSM data to produce maps for Garmin sat-nav devices

CSV TO GEOJSON

- Can be done easily using the Python GeoJSON library (https://pypi.org/project/geojson/)

- Sample code found inside soton-wstnet-ss-2019/crime
  - The code accepts a CSV file as input and produces a JSON file as the output (with the same name)
  - Currently it filters crimes and ignores everything other than "Criminal damage and arson"
  - Can be modified to process any CSV file or to output other types of GeoJSON features

- Sample datasets: https://www.kaggle.com/datasets

VIEWING GEOJSON WITH OVE

- Each GeoJSON feature collection needs to be configured as a layer on OVE (using the ove_maps_config.json)
- The OVE Maps application provides two libraries, OpenLayers and Leaflet; and both of them support GeoJSON
  - See https://ove.readthedocs.io/en/latest/ove-apps/packages/ove-app-maps/docs/MAP_LAYERS_JSON.html#openlayers-configuration-format and https://ove.readthedocs.io/en/latest/ove-apps/packages/ove-app-maps/docs/MAP_LAYERS_JSON.html#leaflet-configuration-format
- OpenLayers support many vector formats whilst Leaflet only supports GeoJSON and TopoJSON
- But, Leaflet also supports embedding GeoJSON within the OVE Map Layers configuration unlike OpenLayers, which is useful at times

VIEWING GEOJSON WITH OVE

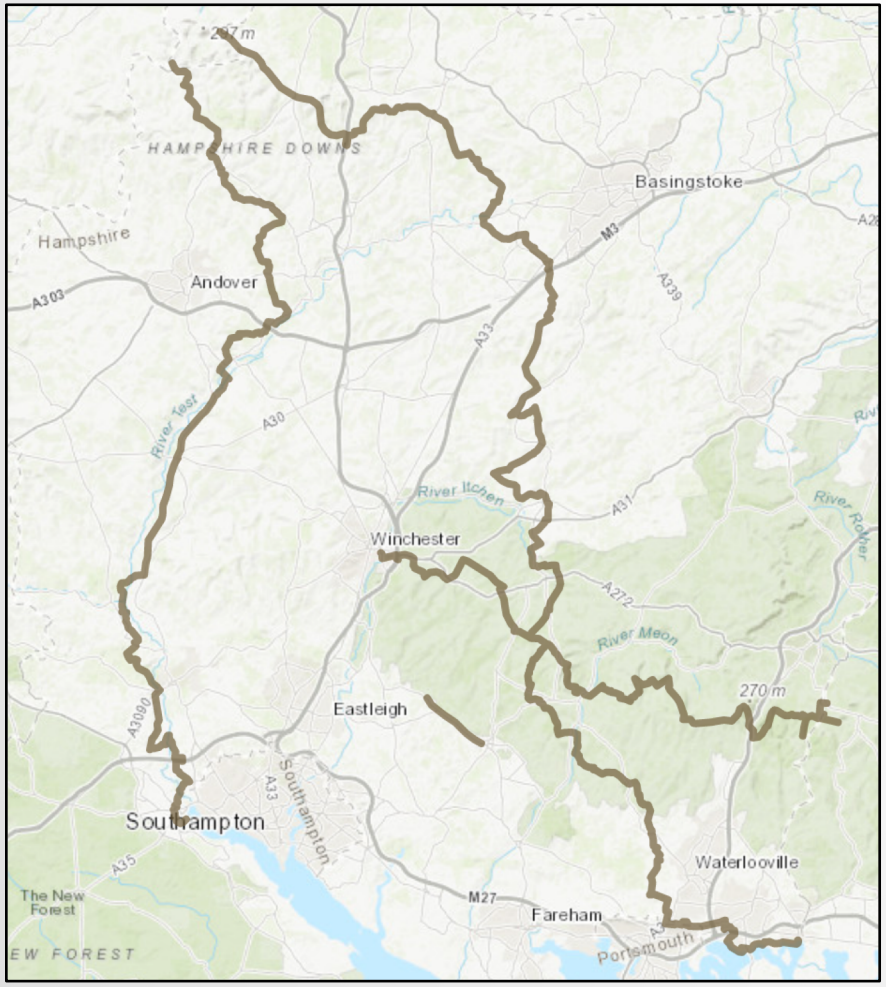
- Whenever the ove_maps_config.json file's content changes you need to restart the OVE Maps application
  - For simplicity, as this is not a production deployment, please restart OVE as explained earlier under **Running OVE**

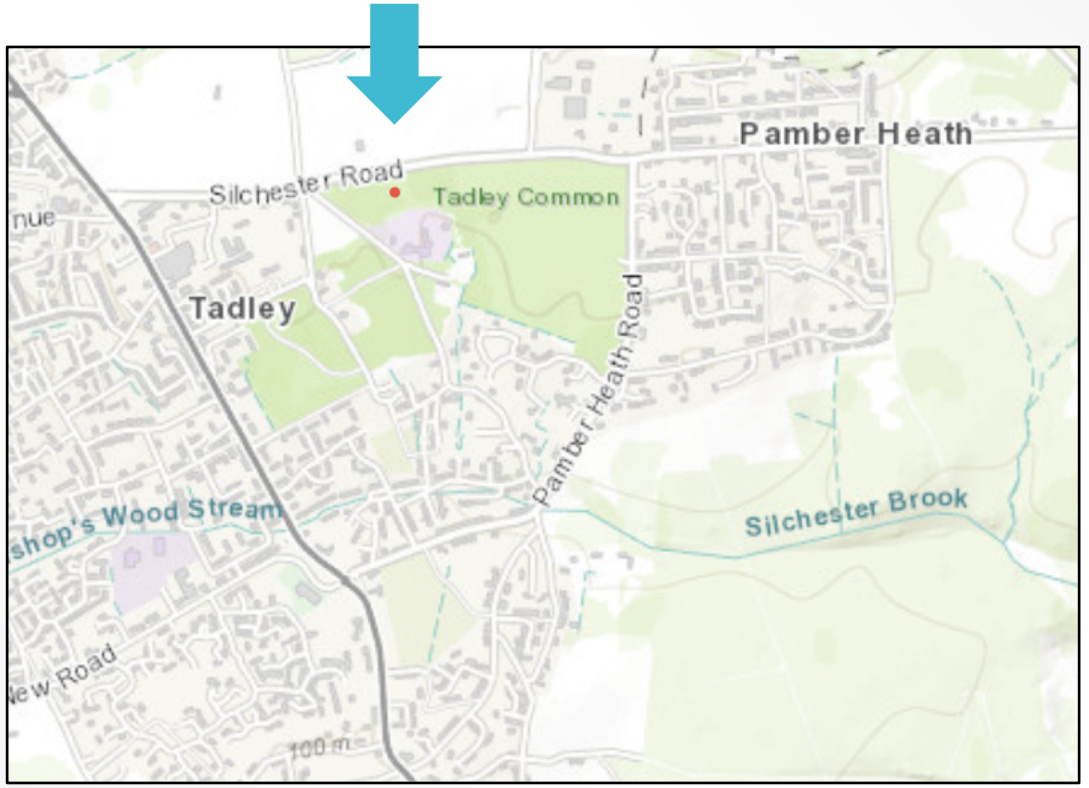
- **Please note:** OVE only stores URLs of GeoJSON files when using OpenLayers and therefore it is not required to restart OVE if only the contents of the GeoJSON file has changed
- You don't need to restart the viewers when you restart OVE, but you need to relaunch the application if you have not setup a configuration persistence service for OVE

CHANGING THE BASE MAP

- It is important to have an appropriate base map for us to be able to interpret the data
- By default OVE uses the ArcGIS World Topographic Map
- It is possible to change the base map to something else:
  - CARTO Dark (aka “dark matter”) – great for large screens
  - Stamen Toner – great for projectors
- It is also possible to use commercial providers (such as BingMaps)

EXAMPLES


HAMPSHIRE DOWNS
Basingstoke
Hampshire
Andover
A303
M3
A339
A33
River Test
A30
River Itchen
A31
River Rother
Winchester
A272
River Meon
270 m
Eastleigh
A3090
Southampton
A33
Southampton
A35
Waterlooville
The New Forest
M27
Fareham
EW FOREST
Portsmouth


Pamber Heath
Silchester Road
Tadley Common
Tadley
Pamber Heath Road
Silchester Brook
100 m

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