Flow Map eXplorer Quick User Guide

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1. Usage

1.1. Overview of the application interface

Flow map eXplorer can have several layouts, which you can configure. However the most typical layout looks like the one shown in Figure 1.

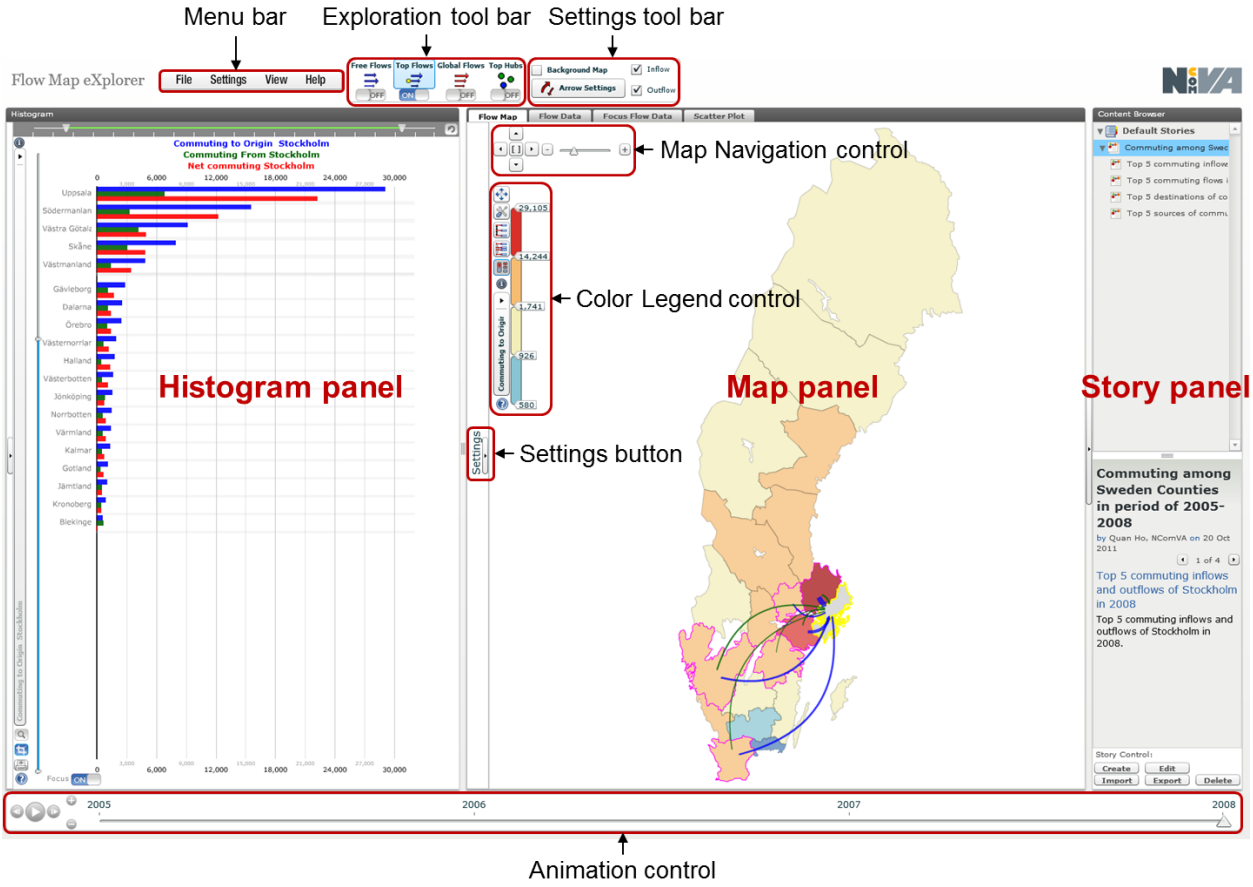


Figure 1: Start-up application in Full-Screen mode and Vertical Layout

The layout comprises three parts. The top part includes a menu bar (to the left) and two tool bars (to the right). The middle part includes three panels: a histogram panel (to the left), a map panel (in the center) and a story panel (to the right). The story panel is collapsed as default if there is no story loaded at start up. The bottom part is an animation control bar which is shown up if there is more than one time steps in the data input. Otherwise it will be disappeared.

1.2. Menu Bar

The menu bar contains four menus File, Settings, View and Help as described below.

- **File**
  - **Manage Data**. Normally this function is disabled. In most of the case you may ignore it. It is only enabled when (1) you stores flow data in many different files (e.g. one file for each country which store all trade flow data (export and import) of one commodity for a period from 1980 to 2010) and (2) loading flow data is done through a configuration file, named dataConfig.xml, which allows you select which files are loaded. For example, at start up you may load total trade flow data of three countries USA, Japan and Germany. Then after that you can use this function to load trade flow data of other countries.
- **Settings**
  - **Exploration** - Opens the Flows and Hubs Information panel which includes several tabs displaying information of active flows and hubs.
  - **Language** - Selects display language of the application.
  - **Map**
    - **Flow** - Opens the Flow Settings panel which allows you to set properties of flows such as flow width scale, flow indent as shown in Figure 2

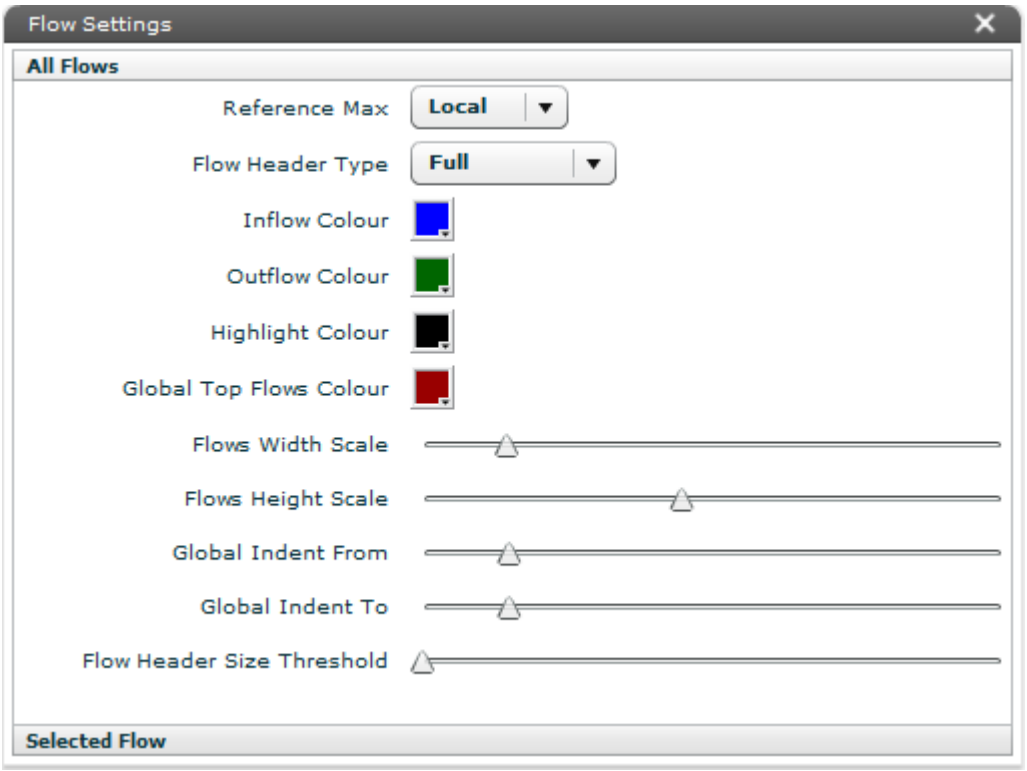


Figure 2: Flow Settings panel

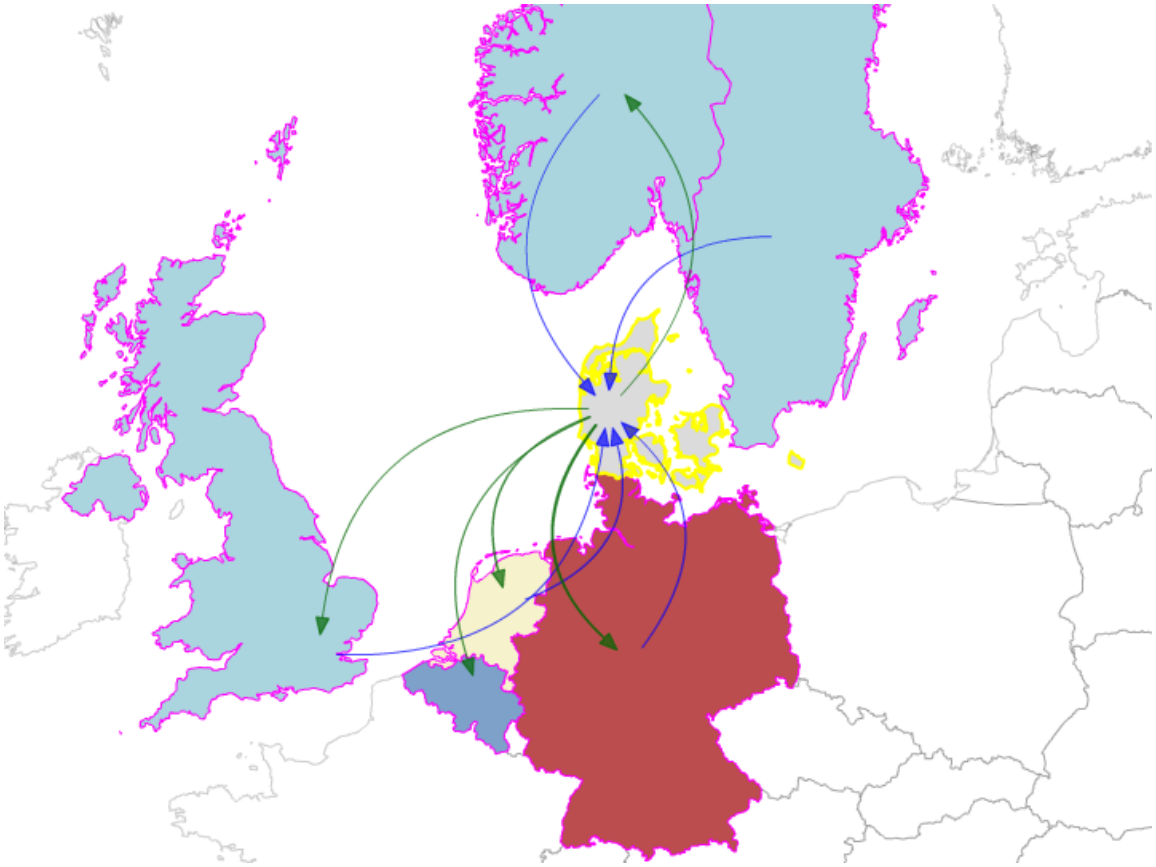


Figure 3: Flow headers are increased to be more visible by increasing the flow header size threshold

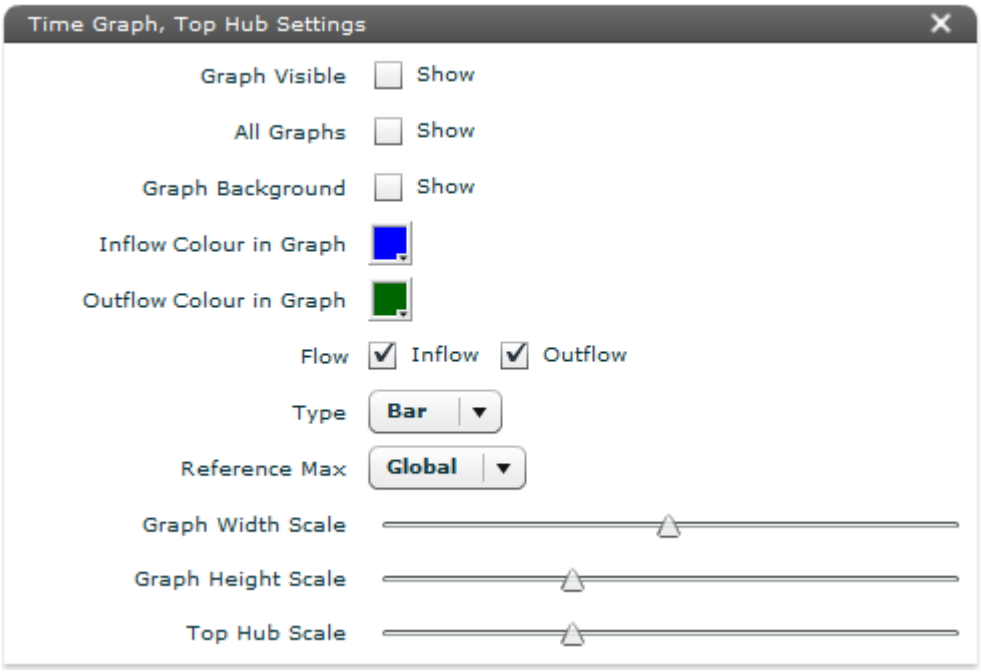


Figure 4: Time Graph, Top Hub Settings panel

- **Time Graph, Top Hubs** - Opens the Time Graph, Top Hubs Settings panel which allows you to set properties of time graph glyphs and circle glyphs as shown in Figure 4
- **Region, Background Map** - Opens the Region, Background Map Settings panel (as shown in Figure 5) which allows you to turn on/off the background map and set properties of regions such as the border colour of origins and destinations.

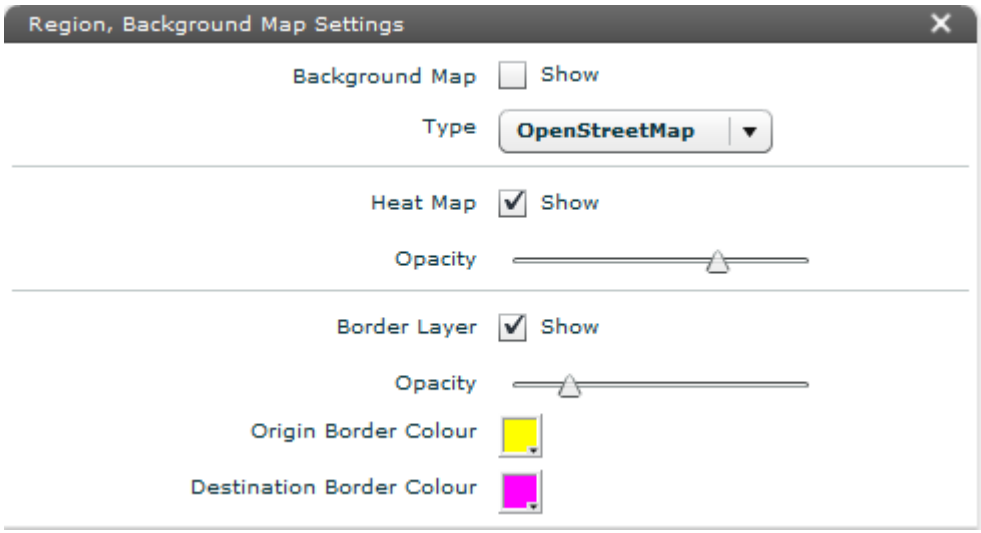


Figure 5: Region, Background Map Settings panel

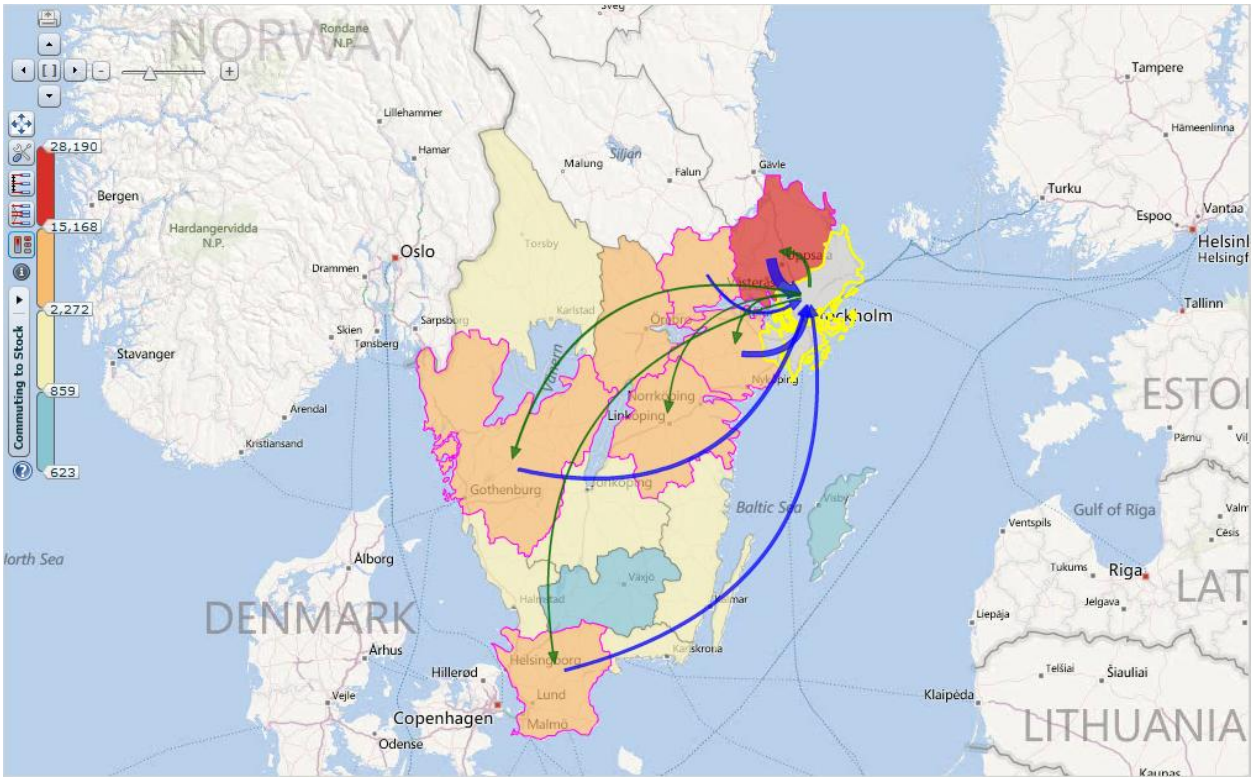


Figure 6: An example of choosing Microsoft Road as a background map

- **Regional Tooltip Indicators** – Opens the Regional Tooltip Indicators panel (as shown in Figure 7) which allows you to select which indicator values should be displayed in a region tooltip.

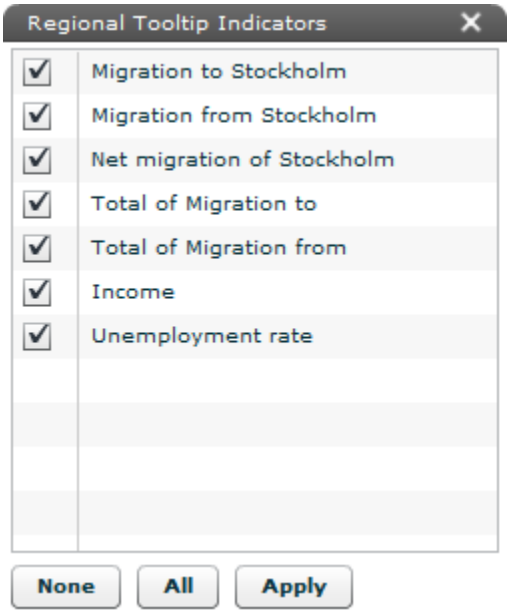


Figure 7: Regional Tooltip Indicators panel

- **Miscellaneous** – Opens the Miscellaneous Settings panel (as shown in Figure 8) which allows you to select if growth-rate data should be calculated and merged into the regional dataset.

Figure 8: Miscellaneous Settings panel

- **View**
  - **Map Widgets**
    - **Map Navigation** - Turns on/off the Map Navigation control.
    - **Colour Legend** - Turns on/off the Colour Legend control.
  - **Switch Layout**
    - **Single View** - Hides the histogram panel and expand the map panel.
    - **Double View**
      - **Horizontal** - Switches to horizontal layout.
      - **Vertical** - Switches to vertical layout.
  - **Full-screen** – Expands the application window to occupy the entire screen.
- **Help**
  - **Getting Started** – Opens Getting Started window which shows a brief overview about the application.
  - **About** – Opens About window which shows author and license information.

1.3. Exploration Tool Bar

The Exploration tool bar is one of the important controls of the application. It contains four icons which correspond to four main operations and three modes (*free flows* mode, *top flows* mode and *global flows* mode) in exploration of flow data as described below. The application can be in one of the three modes at a time.

1.3.1. Free Flows mode

Free flows mode is the mode which allows you to freely select flows to display on the map panel. To go into this mode, click on the Free Flows icon 

. When going into this mode, the application displays the Origin and Destination control 

to the right of the map panel. At the same time it displays the Free Flows panel which shows information of flows being displayed on the map in this mode as shown in Figure 9.

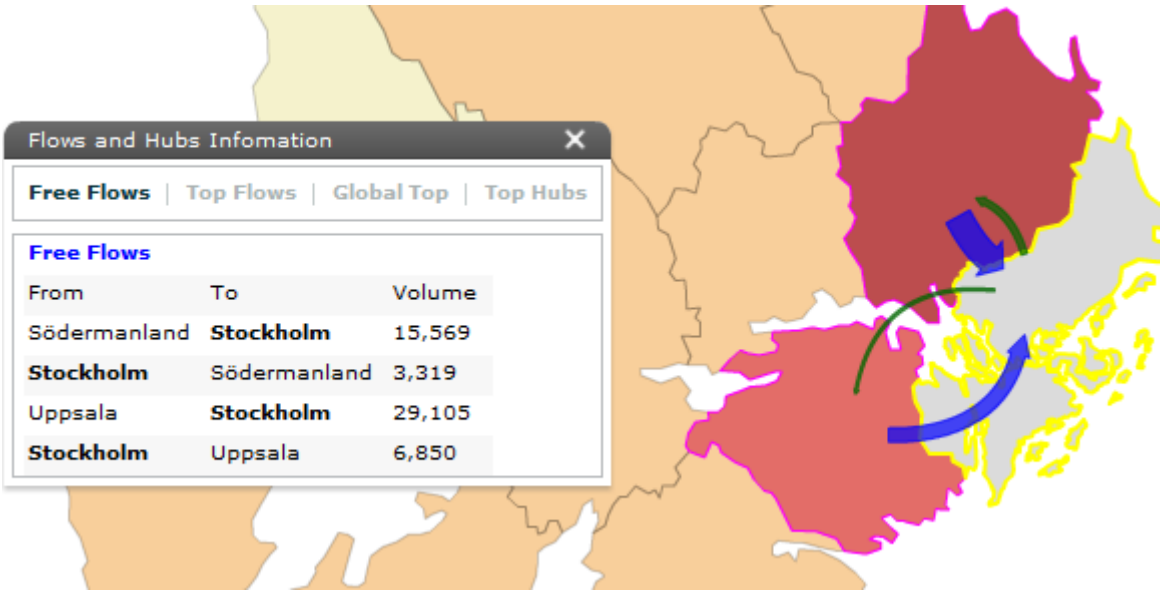


Figure 9: The Free Flows panel shows information of flows being displayed in the *free flows* mode.

By clicking on icons 

or 

then clicking on a region, you can specify one region as an origin or a destination. To select multiple origins or destinations hold Ctrl key while clicking on regions. Then flows connecting between origins and destinations will be displayed on the map.

In this mode the application also allows user to select flows to be displayed on the map by clicking on flows in the Flow Data tab (next to the 'Flow Map' tab).

To display or hide flows on the map panel in this mode, click on the On/Off button 

at the bottom of the Free Flows icon.

1.3.2. Top Flows mode

Top Flows mode is the mode which allows you to explore the top flows (or a range of flows) of one or many origins. To go into this mode, click on the Top Flows icon 

. When going into this mode, the application displays the top flows of selected origins on the map. At the same time it displays the Top Flows panel which shows information of these top flows as shown in Figure 10.

To select an origin for exploration of its top flows, click on a region on the map. To select multiple origins, hold Ctrl key while clicking on regions.

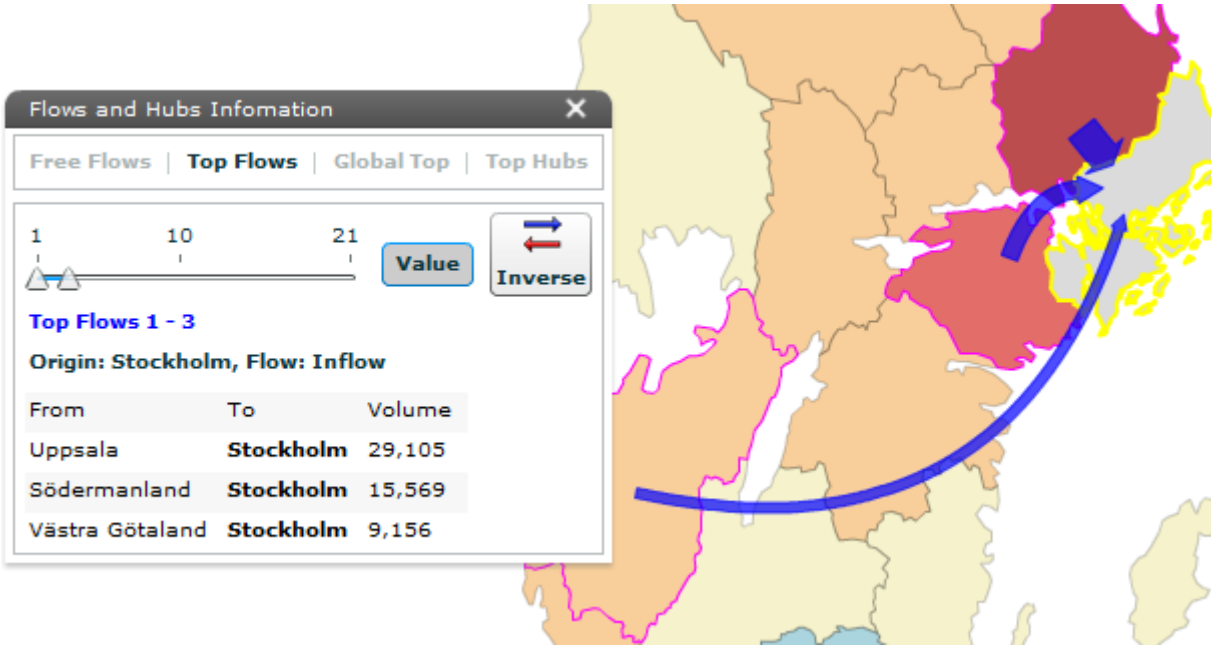


Figure 10: The Top Flows panel shows information of the top flows of an origin.

You then can use the slider bar on the top of the Top Flows panel to select the range of flows which should be displayed. To display/hide the inverse flows of the top flows, click on the Inverse button to the right of the Top Flows panel. To display or hide flows on the map panel in this mode, click on the On/Off button 

at the bottom of the Top Flows icon.

1.3.3. Global Flows mode

Global Flows mode is the mode which allows you to explore the global top flows (or a range of flows) instead of top flows of selected origins as in Top Flows mode. To go into this mode, click on the Global Flows icon 

. When going into this mode, the application displays the global top flows on the

map. At the same time it displays the Global Top panel which shows information of the global top flows as shown in Figure 11.

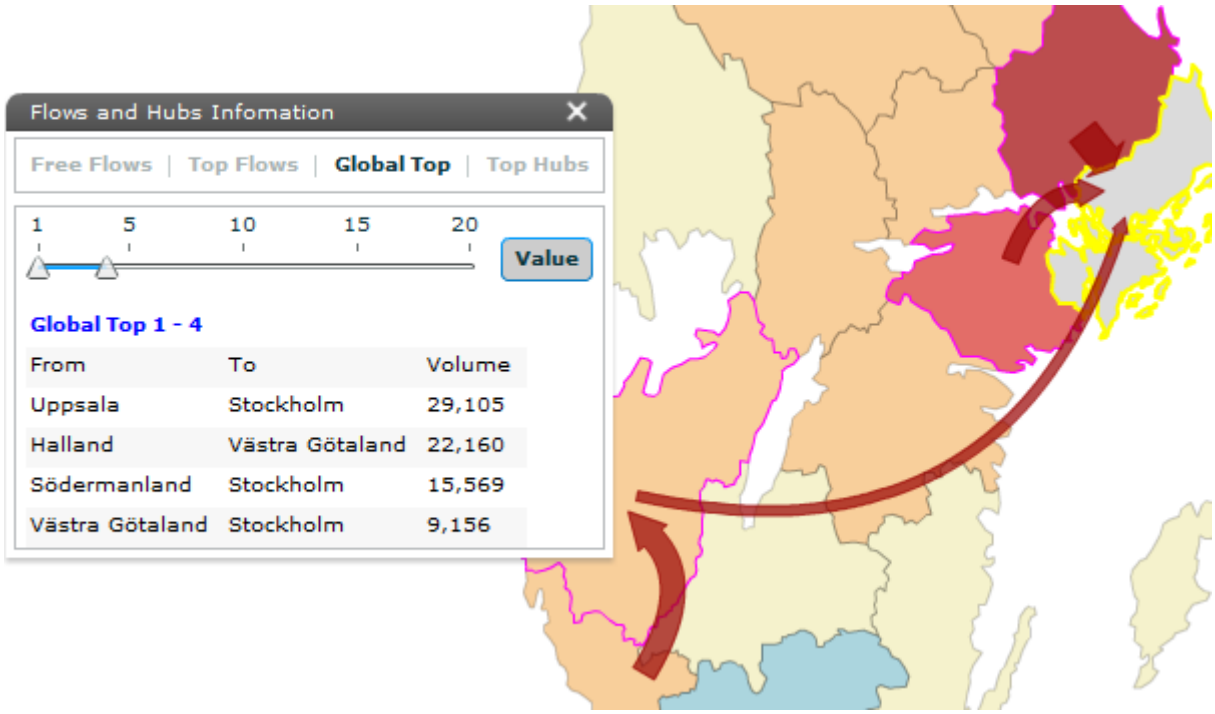


Figure 11: The Global Top panel shows information of global top flows.

You then can use the slider bar on the top of the Global Top panel to select the range of flows which should be displayed. To display or hide flows on the map panel in this mode, click on the On/Off button 

at the bottom of the Global Flows icon.

1.3.4. Top Hubs

Top Hubs is a function which allows you to explore the top regions, i.e. those are the largest sources or destinations of flows. When you click on the Top Hubs icon 

, the map panel will display circles which mark the top regions. The size of each circle represents the total volume of flows coming into or going out from the region on which the circle is placed. At the same time the application also displays the Global Top panel which shows information of the top regions as shown in Figure 12.

You then can use the slider bar on the top of the Top Hubs panel to select the range of regions which should be marked by circles. To display or hide circles on the map panel, click on the On/Off button 

at the bottom of the Top Hubs icon.

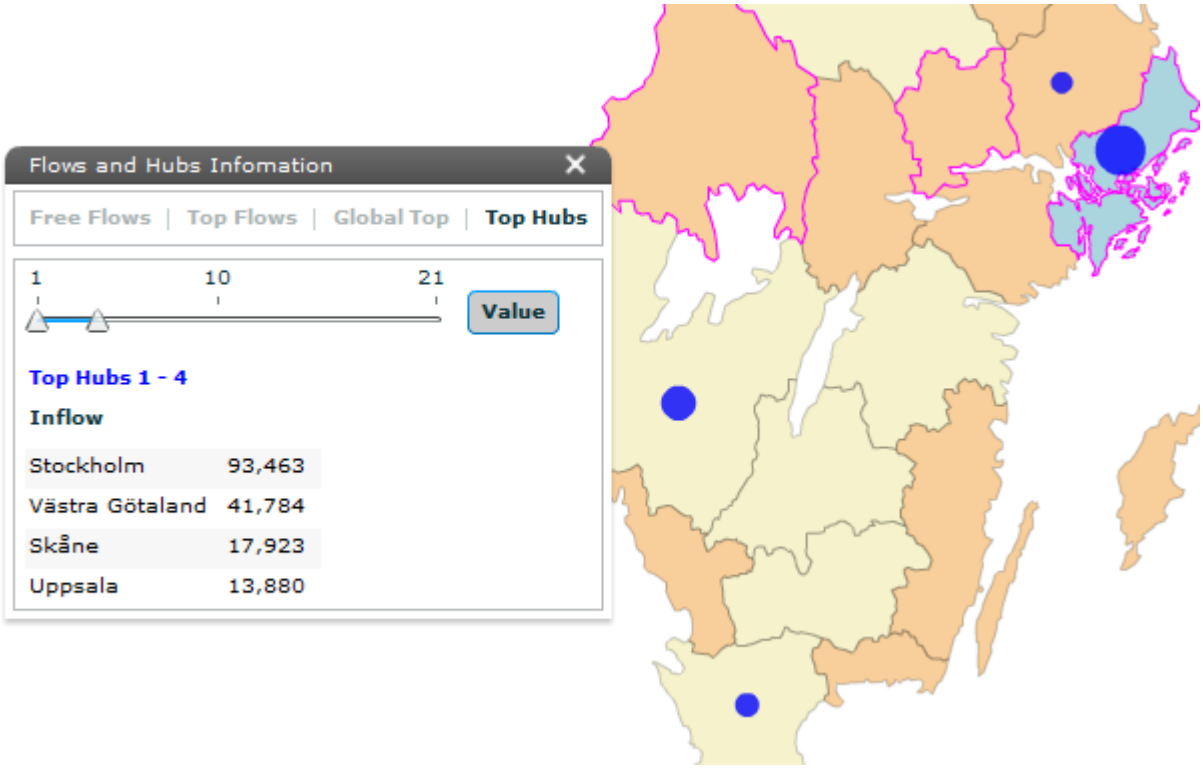


Figure 12: The Top Hubs panel shows information of top hub regions.

1.4. Settings Tool Bar

The Settings tool bar contains controls, as described below, corresponding to functions which you may use frequently.

Background Map check box allows you to turn on/off the background Google map.

Flow Settings button allows you to quickly access the Flow Settings panel to set properties of flows such as flow width scale, flow indent as shown in Figure 2.

Inflow and **Outflow** check boxes allow you to select which flow directions (in-coming or out-going or both) you want to see on the map. These settings only work when you are in one of the following modes: ***Free Flows***, ***Top Flows***, or ***Top Hubs***.

1.5. Map Panel

The Map Panel is one of most advanced components of Flow Map eXplorer. It allows you to visualize both flow data and regional data at the same time. This, in many cases, can support users searching answers to questions, for example, why people tend to move from one region to another region through finding the correlation between the flow data and the regional data. For example, users may find out that regions with high level of income attract more people from other regions commuting to work, or regions having many universities attract more people moving to for their education.

The Map Panel is implemented basing on our layered map architecture (see Figure 13). It includes several layers such as border map layer, region shape layer, flow layer, glyph layer and a back ground map layer which can be OpenStreetMap, Yahoo Map, Google Map or Bing Map. These layers can be turned on or off through setting panels according to the user's need.

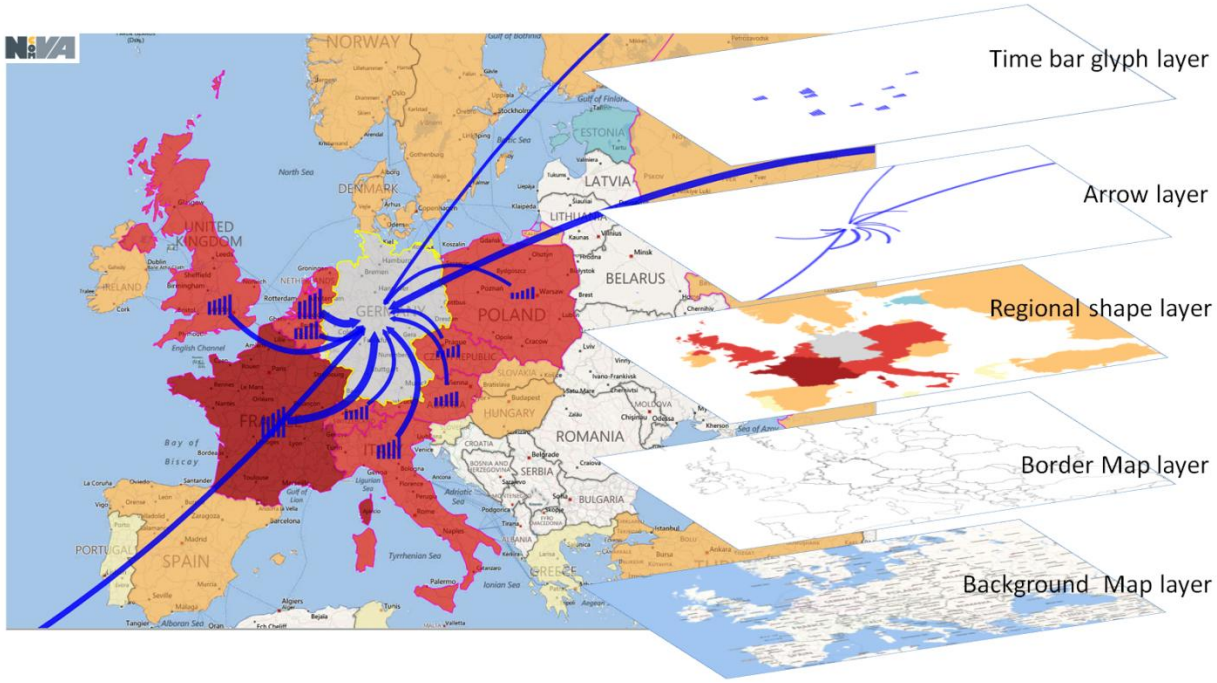


Figure 13: The Map Panel is based on the layered map architecture. It includes several map layers which can be turned on or off.

2. Data and Map Input

2.1. Flow Data

The main data input of Flow map eXplorer is a flow data file which can be stored in one of the following formats.

Format 1 – Interaction table format

In this format, flow data is stored as a matrix. Data of one time step is stored in one work sheet of an excel file. The first cell in the first column stores flow type name and unit if needed (e.g. “Migration (persons)”, or “Migration (persons)”). The first column stores the region/country identifications (IDs) of source regions and the first row stores the region/country IDs of destination regions. These region/country IDs should match with region/country IDs in the dbf file as explained further later. Figure 14 shows an example of flow data which are stored in interaction table format.

Commuting (persons)	01	03	04	05	06	07	08	09	10	12	13	14	17	18	19	20	21	22	23	24	25
01	0	6186	2957	1625	719	406	491	398	704	2506	472	3720	525	1054	1231	1158	888	670	429	470	482
03	25971	0	351	214	105	45	75	52	59	322	83	571	121	180	1759	309	2474	169	125	116	118
04	14244	425	0	1296	139	60	55	24	43	318	53	474	87	522	1771	125	75	56	35	53	31
05	3739	255	1416	0	1780	168	756	67	80	558	113	976	134	559	184	163	76	84	74	75	65
06	1387	110	70	1030	0	1378	524	23	50	515	536	2131	54	115	43	73	35	45	40	32	25
07	847	60	58	120	1151	0	807	15	694	1259	410	517	31	48	27	43	18	28	23	16	11
08	1283	91	102	856	852	1328	0	111	714	505	72	503	34	69	47	59	38	31	35	22	22
09	807	67	33	32	19	29	46	0	15	59	50	84	15	25	19	24	10	15	16	9	14
10	1043	51	29	66	102	912	899	25	0	2588	47	313	19	37	20	40	15	14	64	16	21
12	7032	522	286	586	737	3265	390	96	3056	0	2099	3086	154	327	160	256	117	135	128	124	130
13	1495	120	41	135	938	734	82	15	94	2488	0	20970	87	76	36	84	30	31	41	18	40
14	7933	553	336	641	2785	407	323	86	539	2237	6258	0	1578	729	310	446	205	290	204	166	215
17	1347	164	137	118	133	50	52	17	17	216	73	1913	0	2160	119	270	88	72	55	40	28
18	2286	205	609	631	173	48	38	16	50	283	84	862	1010	0	1095	493	74	70	42	45	45
19	4724	2971	1982	221	81	30	43	17	39	261	56	448	71	1028	0	1244	186	82	48	44	51
20	2364	461	150	125	103	40	40	11	12	205	46	514	233	335	1353	0	966	109	151	85	53
21	2500	1668	112	94	87	41	23	16	30	213	48	331	91	134	239	803	0	940	272	149	82
22	1741	175	64	70	70	37	25	11	23	180	40	365	46	63	79	124	384	0	540	721	214
23	926	157	36	38	63	22	17	9	10	77	40	257	41	41	55	134	178	798	0	254	90
24	1566	170	75	89	61	35	36	22	34	195	48	344	51	74	43	121	132	931	255	0	1117
25	1303	188	54	81	58	20	18	12	21	142	35	280	46	44	47	79	81	194	90	996	0

2005 2006 2007 2008

Figure 14: Commuting data among Sweden counties from 2005 to 2008 are stored in interaction table format

Format 2 – eXplorer Unicode format.

This format is the same format used in our Statistics eXplorer. The second column stores the region/country IDs of source regions and the third column stores the region/country IDs of destination regions. Next columns store values of flows from source regions to destination regions. With this format, you can store more than one flow data type in one file. For example you can store commuting data of men and women in one file, which we cannot do it with the interaction table format. Figure 15 shows an example of flow data stored in eXplorer Unicode format.

META	SOURCE CODE	DESTINATION CODE	Comutting	Comutting	Comutting	Comutting
ID	SOURCE CODE	DESTINATION CODE	Comutting	Comutting	Comutting	Comutting
DESCRIPTION	Region code in dbf file	Region code in dbf file	Comutting	Comutting	Comutting	Comutting
UNIT	NA	NA	persons	persons	persons	persons
PARSETYPE	S	S	F	F	F	F
SHEET	S	NA	2005	2006	2007	2008
PRECISION	NA	NA	0	0	0	0
	01	01	0	0	0	0
	01	03	6186	6652	7196	6850
	01	04	2957	2964	3155	3319
	01	05	1625	1456	1571	1703
	01	06	719	827	857	804
	01	07	406	430	533	490
	01	08	491	505	544	550
	01	09	398	349	423	400
	01	10	704	799	724	682
	01	12	2506	2754	3192	3083
	01	13	472	489	508	456
	01	14	3720	3881	4181	4216
	01	17	525	484	568	575
	01	18	1054	992	1064	1061
	01	19	1231	1257	1387	1395
	01	20	1158	1159	1114	1152
	01	21	888	957	1019	1115
	01	22	670	700	597	696
	01	23	429	444	424	505
	01	24	470	500	539	548
	01	25	482	513	634	617
	03	01	25971	26535	28190	29105
	03	03	0	0	0	0
	03	04	351	379	408	402
	03	05	214	202	236	233
	03	06	105	117	133	107

Figure 15: Commuting data among Sweden counties from 2005 to 2008 are stored in eXplorer Unicode format

Important note: Flow data in this format can be saved as an ***Excel file*** (.xls or .xlsx) or a ***Unicode text file*** (.txt) through Microsoft Excel.

Format 3 – Three-column list format.

This format stored flow data in a way which supports fast data reading of large datasets. Flow data in this format is saved as csv files. To be able to use this format, you can use our online conversion tool (http://www.ncomva.se/flash/projects/FlowMap/FlowDataConversionTool/) to convert Excel flow data files in interaction table format as mentioned above or in three-column list format (as described below) to Csv format.

Three-column list format is a format in which we stores flow data in three columns. The first column stores the region/country IDs of source regions, the second column stores the region/country IDs of

destination regions and the third column stores values of flows from source regions to destination regions. Data of one time step is stored in one work sheet of an excel file.

From	To	Comutting
01	03	6186
01	04	2957
01	05	1625
01	06	719
01	07	406
01	08	491
01	09	398
01	10	704
01	12	2506
01	13	472
01	14	3720
01	17	525
01	18	1054
01	19	1231
01	20	1158
01	21	888
01	22	670
01	23	429
01	24	470
01	25	482
03	01	25971
03	04	351
03	05	214

2005 2006 2007 2008

Figure 16: Commuting data among Sweden counties from 2005 to 2008 are stored in three-column list format

2.2. Regional Data (Optional)

To support better the analysis of flow data, the application allows you to input a regional data file. This file is optional and should be in our eXplorer Unicode format as shown in Figure 17. Note that when you use a regional data file, the region/country IDs (or codes) in the second column (i.e. **CODE** column) should match with the region/country IDs in the flow data file as well as the region/country IDs in the column of the dbf file which is specified for the region/country IDs (see Section 3.2). If the regional data file has a **Name** column at the third column (see Figure 17) then the names in this column are used for the names of regions/countries. Otherwise the application will base on what you specify in the *dbfNameField* attribute of the *shapeFile* tag in the configuration file to find out the column in the dbf file for region/country names as explained more in Section 3.2.

META	CODE	Name	Income	Income	Unemployment Rate	Unemployment Rate
ID	regID	name	Income	Income	Unemployment Rate	Unemployment Rate
DESCRIPTION	Regional ID	Region Name				
UNIT	NA	NA	SEK	SEK	%	%
PARSETYPE	S	S	F	F	F	F
SHEET	S	NA	2005	2006	2005	2006
PRECISION	NA	NA	0	0	1	1
	01	Stockholm	237300	245700	3.53	3.11
	03	Uppsala	202500	208400	3.81	3.21
	04	Södermanland	187400	193100	4.79	4.15
	05	Östergötland	186900	192200	4.80	4.24
	06	Jönköping	183800	190400	3.32	2.72
	07	Kronoberg	182600	188900	3.39	2.84
	08	Kalmar	175900	181200	4.14	3.48
	09	Gotland	165500	169400	4.76	4.22
	10	Blekinge	183000	188700	4.90	4.18
	12	Skåne	190100	196300	4.49	3.82
	13	Halland	190700	198100	3.92	3.39
	14	Västra Götaland	194400	201000	4.14	3.69
	17	Värmland	179100	184400	3.75	3.08
	18	Örebro	184100	190000	5.11	4.50
	19	Västmanland	191700	197000	4.33	3.78
	20	Dalarna	180400	186100	4.26	3.67
	21	Gävleborg	180900	186500	5.67	4.56
	22	Västernorrland	186700	192700	4.95	4.51
	23	Jämtland	173700	178800	4.49	3.92
	24	Västerbotten	180200	186300	4.47	3.98
	25	Norrbotten	182600	188600	5.29	4.60

Figure 17: An example of a regional data file in our Unicode eXplorer format. The second column is the CODE column (or ID column) and is compulsory. The third column is the Name column and it is optional.

2.3. Map Files

Flow map eXplorer uses the industry standard ESRI Shape file format as input for drawing maps. In this manual we give a short introduction to the files used, which are a subset of the full ESRI suite. ESRI shape maps are divided into several files, Flow map eXplorer uses only two of these, but we recommended to always keep the rest with eXplorer is alterations are needed using other software.

Files used by Flow map eXplorer are:

- .shp: The actual map file which contains all coordinates. It is used to draw shapes.
- .dbf: Data base file which contains information linked to each shape. It is used to link shapes to data.

Additional files, not use by Flow map eXplorer:

- .prj: Projection details
- .shx: Additional coordinate information

2.3.1. Projection

Although Flow map eXplorer does not use the .prj file, there are still restrictions in what coordinate space the shp file can be in. Flow map eXplorer can run in two different modes, either with a background map or without one. When the background map is enabled, the input shape projection has to match that of the Google API.

- With Background Map: Geographic Coordinate System, World, WGS 1984
    - A basic latitude/longitude un-projected setup.
- Without Background Map: Any projection without precision limitations.

2.3.2. DBF Fields

To allow Flow map eXplorer to match shape regions with data items there has to exist an identifier column in the dbf file. This column should contain the region/country IDs which are used in the ID column of the flow data file and regional data file (if any). For countries we commonly use the ISO 3166-1 alpha-3 (http://en.wikipedia.org/wiki/ISO_3166-1_alpha-3). The name of the identifier column must be specified in the *dbfIdField* attribute of the *shapeFile* tag in the configuration file as explained in Section 3.2.

3. Application Configuration File

Flow map eXplorer uses a configuration file, named **config.xml**, to specify its data input, map shape input, story input as well as to configure various aspects of the application such as the layout, projection, flow width scale factor. An example of the configuration file is shown in Figure 18.

```
<?xml version="1.0" encoding="utf-8"?>
<appConfig>
    <header>
        <title text="Flow Map eXplorer"/>
        <logo href="http://www.scb.se/" src="assets/logo.png" tooltip="Go to SCB website"/> <!-- optional -->
    </header>
    <dataSource>
        <flowDataFile fileName="data/FlowData.xlsx"/>
        <regionDataFile fileName="data/RegionalData.txt"/> <!-- optional -->
        <map>
            <shapeFile mapName="maps/Counties" dbfIdField="CODE" dbfNameField="NAME"/>
            <projection name="Mercator"/> <!-- optional! Projections: 'Mercator', 'Unit'; default: 'Mercator' -->
        </map>
    </dataSource>
    <layout> <!-- optional -->
        <view mode="vertical"/> <!-- modes: 'single', 'horizontal', 'vertical'; default: 'vertical' -->
        <settingsPanel extended="false" shownAtStartUp="false" width="200"/> <!-- width can be ignored -->
        <storyPanel policy="auto"/> <!-- policies: 'auto', 'on', 'off'; default: 'auto'-->
    </layout>
    <locales> <!-- optional -->
        <locale>en_US</locale>
    </locales>
    <!-- Specify  background map types you want. If you ignore it, only OpenStreetMap is supported -->
    <!-- Note: Except OpenStreetMap, you have to check the license term of other map types for commercial purpose -->
    <backgroundMapTypes> <!-- optional -->
        <mapType>OpenStreetMap</mapType>
        <mapType>Microsoft Road</mapType>
        <mapType>Microsoft Aerial</mapType>
        <mapType>Microsoft Hybrid</mapType>
        <mapType>Yahoo Road</mapType>
        <mapType>Yahoo Aerial</mapType>
        <mapType>Yahoo Hybrid</mapType>
        <mapType>Blue Marble</mapType>
        <mapType>Google Street</mapType>
        <mapType>Google Satellite</mapType>
        <mapType>Google Hybrid</mapType>
        <mapType>Google Terrain</mapType>
    </backgroundMapTypes>
    <!-- googleMapKey tag is optional -->
    <!-- If you have registered a Google Maps API key for your website you can put it here -->
    <googleMapKey>ABQIAAAA6WZ0imYjTo8SByoQQTnbLRQc8WrQmzEfsKOBjknyBMoVoNv0TRQ...</googleMapKey>
    <backgroundMap enabled="false" mapType="Microsoft Road" visible="true"/> <!-- optional -->
    <stories> <!-- optional -->
        <story>stories/sample-story.xml</story>
    </stories>
    <presets> <!-- optional -->
        <selectedFocus code="01"/>
        <selectedIndicator index="0"/>
        <selectedFlows indices="0, 1"/>
        <arrow indentFrom="0.30" indentTo="0.30" widthScaleMin="0.2" widthScaleMax="40" widthScaleInterval="0.2" widthScale="6"/>
        <hub scale="1"/>
        <netValueMethod method="0-1"/>
        <usingNumberAbbreviation value="false"/>
        <enableBilateralTrades value="false"/>
        <barChartPanel focusStartIndex="0" numFocusBars="5"/>
        <regionTooltip netIndicators="hide" totalIndicators="hide"/> <!--values: 'show', 'hide', 'free'; default: 'free' -->
    </presets>
    <vislet> <!-- optional! This tag only for publishing vislets-->
        <dataProviderModule>
            FlowMapDataProviderModule.swf
        </dataProviderModule>
    </vislet>
</appConfig>
```

Figure 18: An example of the configuration file

The configuration file contains a number of parts as described below.

3.1. Header

In this part, there are two tags: *title* and *logo*. The *title* tag allows you to specify the title of the application while the *logo* tag allows you to specify the logo which should be displayed to the top left corner of the application. The *logo* tag is optional; this means it can be removed if you do not need it.

```
<header>
    <title text="Flow Map eXplorer"/>
    <!-- logo tag is optional -->
    <logo href="http://www.scb.se/" src="assets/logo.png" tooltip="Go to SCB website"/>
</header>
```

Figure 19: An example of the header part

3.2. Data Source

This part includes several tags which allow you to specify flow data input, regional data input (which is optional) and map data input. First, you can specify the flow data input, which is compulsory, through the *filename* attribute of the *flowDataFile* tag as shown in Figure 20. Second, you can specify the regional data input, through the *filename* attribute of the *regionDataFile* tag. However, this tag is optional. This means if you do not have a regional data file you can remove this tag from the config.xml file. Third, you can then specify the map shape input, which is compulsory, through the *shapeFile* tag. This tag has the following three attributes:

- *mapName* which is used for specifying the map file name (no file extension included),
- *dbfIdField* which is used for specifying the column in the dbf file for region/country IDs, and
- *dbfNameField* which is used for specifying the column in the dbf file for region/country names

Note: You can use the same column in dbf file for both region/country IDs and region/country names.

The last tag in this part is the *projection* tag where you can specify which projection should be used through the *name* attribute. The projection specified in this tag will be applied when the background map such as Google map, Bing Map, Open Street map are not used or disabled. There are two projections supported in Flow map eXplorer: **Mercator** projection and **Unit** projection.

```
<dataSource>
    <flowDataFile fileName="data/FlowData.xlsx"/>
    <regionDataFile fileName="data/RegionalData.txt"/> <!-- this tag is optional -->
    <map>
        <shapeFile mapName="maps/Counties" dbfIdField="CODE" dbfNameField="NAME"/>
        <projection name="Mercator"/> <!-- This tag is optional.Projections supported:
                                           'Mercator', 'Unit'; default is 'Mercator' -->
    </map>
</dataSource>
```

Figure 20: An example of the dataSource part

3.3. Layout

```
<!-- layout tag is optional -->
<layout>
    <view mode="vertical"/> <!-- view modes supported: 'single', 'horizontal', 'vertical';
                                default is 'vertical' -->
    <settingsPanel extended="true" shownAtStartUp="true" width="200"/>
    <storyPanel policy="auto"/> <!-- policies supported: 'auto', 'on', 'off';
                                    default is 'auto' -->
</layout>
```

Figure 21: An example of the layout part

This part includes three tags: *view* tag, *settingsPanel* tag and *storyPanel* tag. With the *view* tag, you can specify which layout you want to use. There are three layouts supported in Flow map eXplorer: **single** layout, **horizontal** layout and **vertical** layout which are described above in Section 1.2. You should specify the layout based on the shape of the map used. If the map has horizontal shape, e.g. world map, then the horizontal layout is suitable for this type of map. If the map has vertical shape, e.g. Sweden map, then the vertical layout is suitable for this type of map. If you do not specify the layout, the **vertical** layout will be used.

The *settingsPanel* tag has three attributes: *extended*, *shownAtStartUp*, and *width*. The *extended* attribute, which can be set to "true" or "false", allows you to specify if the Exploration tool bar should be placed in the Settings panel or not (see Figure 22).

Note: The Settings panel can be shown or hide through clicking on the small button in the middle of the left edge of the map panel in Figure 1.

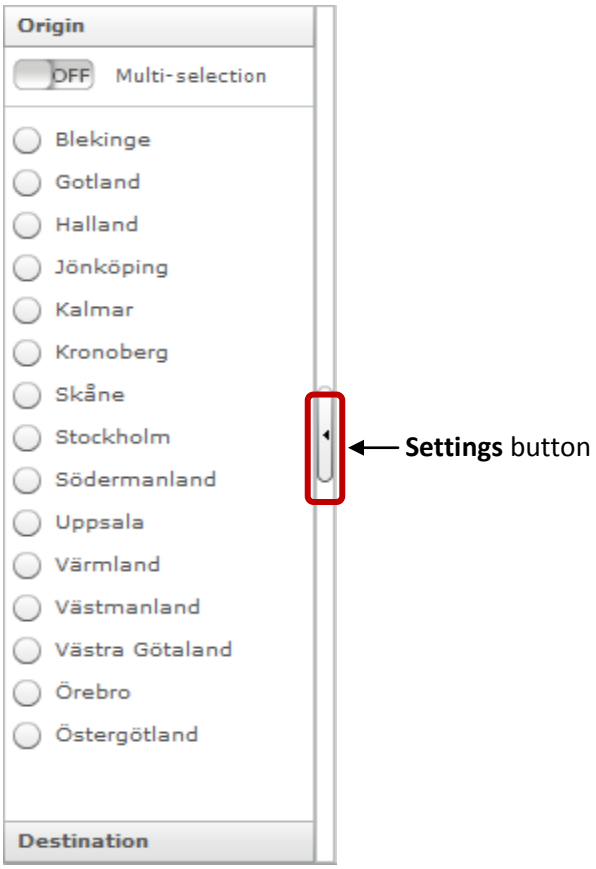


Figure 22: An example of the Settings panel without Exploration tool bar integrated

Similarly, the *shownAtStartUp* attribute, which can be set to true or false, allows you to specify if the Settings panel should be shown at start-up or not; and the *width* attribute allows you to specify the width of the Settings panel. If this attribute is not specified the width of the Settings panel is measured based on its content.

The *storyPanel* tag has only one attribute *policy*, which can be set to one of the following three values: "auto", "on", "off", to specify if the story panel (which is to the right of the application as shown in Figure 1) should be shown or not. If this tag is not specified the default policy is "auto". This means the story panel is shown if there is a story specified in the story part (see Section 3.6).

The layout part is optional. This means you can remove this part totally from the file or remove some tags inside this part.

3.4. Locales

This part allows you to specify locales (or languages) that the application should use. Currently Flow map eXplorer supports only English. Other languages (e.g. French, Swedish) will be supported in near future.

```
<!-- locales tag is optional -->
<locales>
    <locale>en_US</locale> <!-- English language -->
    <locale>sv_SE</locale> <!-- Swedish language -->
</locales>
```

Figure 23: An example of the locales part

3.5. Using Background Map and Google Maps API Key

Flow map eXplorer supports a number of background maps as listed below: OpenStreetMap, Microsoft Road, Microsoft Aerial, Microsoft Hybrid, Yahoo Road, Yahoo Aerial, Yahoo Hybrid, Blue Marble, Google Street, Google Satellite, Google Hybrid, Google Terrain.

To be able to use Google Map in Flow map eXplorer on your website, you need to register for a Google Maps API key and put it in this part. Note from Google: The Google Maps API for Flash has been officially deprecated as of September 2, 2011. The API will continue to work until September 2, 2014. https://developers.google.com/maps/documentation/flash/intro. Please follow the instructions on the Maps API for Flash Key Request website if you need a new key.

Once you have a google Maps API key from Google for your website you can specify it in the *googleMapKey* tag (see Figure 24).

Please keep in mind that each of background maps comes with a specific license that needs to be understood.

Open Street Map: http://www.openstreetmap.org/copyright

Microsoft Bing Maps: http://www.microsoft.com/maps/product/licensing.aspx

Yahoo Maps: http://info.yahoo.com/legal/us/yahoo/maps/mapsapi/mapsapi-2141.html

IMPORTANT, READ THIS:

Generally speaking, what these licenses say are that Open Street map can be used freely with no limitations, so if you are unsure, only use this one by removing the *backgroundMapTypes* tag (see Figure 24) from the config.xml file. Microsoft, Yahoo and Google all basically comes with the same terms of

use, that the site needs to be publically available and that you do not charge anyone for viewing the specific site. For any larger scale usage a contact has to be made to the specific provider. We urge you to look at the licenses so that you are aware of what they mean.

If you do not want to use any background map type listed in Figure 24, just remove it from the list.

The *backgroundMap* tag has three attributes: *enabled*, *mapType*, and *visible*. The *enabled* attribute, which can be set to "true" or "false", allows you to specify if the application should have a background map or not. If the *enabled* attribute is set to "false" this means the application have no background map and the projection which is specified in the dataSource part will be used (see Section 3.2). The *mapType* attribute, which can be set to one of the background maps listed above, allows you to specify which map type you want to use as default; and the *visible* attribute, which can be set to "true" or "false", allows you to specify if the background map is visible or not at start-up.

```
<backgroundMapTypes> <!-- optional -->
    <mapType>OpenStreetMap</mapType>
    <mapType>Microsoft Road</mapType>
    <mapType>Microsoft Aerial</mapType>
    <mapType>Microsoft Hybrid</mapType>
    <mapType>Yahoo Road</mapType>
    <mapType>Yahoo Aerial</mapType>
    <mapType>Yahoo Hybrid</mapType>
    <mapType>Blue Marble</mapType>
    <mapType>Google Street</mapType>
    <mapType>Google Satellite</mapType>
    <mapType>Google Hybrid</mapType>
    <mapType>Google Terrain</mapType>
</backgroundMapTypes>
<!-- googleMapKey tag is optional -->
<!-- If you have registered a Google Maps API key for your website you can put it here -->
<googleMapKey>ABQIAAAA6WZ0imYjTo8SByoQQTnbLRQc8WrQmzEfsKOBjknyBMoVoNv0TRQ...</googleMapKey>
<backgroundMap enabled="false" mapType="Microsoft Road" visible="true"/> <!-- optional -->
```

Figure 24: An example of the background map part

3.6. Stories

In this part, you can specify a list of stories you want to load into the application. Use *story* tag to specify each story. The first story in the list will be active (i.e. used) at start-up. This part is optional. This means you can remove it from the file.

```
<!-- stories tag is optional. Here you can specify the list of stories;
     the first one will be loaded at start-up -->
<stories>
    <story>stories/SwedenCountiesCommuting2005_2008.xml</story>
</stories>
```

Figure 25: An example of the stories part

3.7. Presets

This part allows you to specify some **presets** when the application starts. However it is optional. This means you can remove it or some tags of it from the file (in that case, the application will use the default values instead).

```
<!-- presets tag is optional -->
<presets>
    <selectedFocus code="01"/>
    <selectedIndicator index="0"/>
    <selectedFlows indices="0, 1"/>
    <arrow  indentFrom="0.30" indentTo="0.30" widthScaleMin="0.2" widthScaleMax="40"
            widthScaleInterval="0.2" widthScale="6"/>
    <hub scale="1"/>
    <netValueMethod method="0-1"/>
    <usingNumberAbbreviation value="false"/>
    <enableBilateralTrades value="false"/>
    <barChartPanel focusStartIndex="0" numFocusBars="5"/>
    <regionTooltip netIndicators="hide" totalIndicators="hide"/>
    <!--values allowed:'free', 'show', 'hide'; default is 'free'-->
</presets>
```

Figure 26: An example of the *presets* part

The *selectedFocus* tag allows you to specify which region is selected as an origin at start-up. The DBF-code of the region should be used in this tag.

The *selectedIndicator* tag allows you to specify which indicator of the merged regional dataset is selected at start-up. (The merged regional dataset is the dataset which is combined from a flow dataset and a regional dataset.). Index 0 means the first indicator; index 1 means the second indicator and so on. This tag is optional. This means if you do not use this tag then the default index selected at start-up is 0.

The *selectedFlows* tag allows you to specify which flow directions are used. 0 means in-coming flow (or inflow) and 1 means out-going flow (or outflow). This tag is optional. If it is not used then the default selected flow is inflow.

The *arrow* tag allows you to specify the distance from the centre of a region to two ends of a flow (i.e. an arrow in this application) coming in or going from that region and the scale factor of the flow width.

You should specify the values in this part based on the geographic type of map. For example:

- If regions are municipalities, the distance can be 0.05 and the scale is 0.5.
- If regions are counties, the distance can be 0.3 and the scale is 2.
- If regions are countries, the distance can be 1 and the scale is 3.

The *hub* tag allows you to specify the scale factor for circles representing hubs.

The *netValueMethod* tag allows you to specify the way of calculation of net values. An example is "**0-1**" which means that net value is computed by the following formula:

Net value = In-coming flow value – Out-going flow value

And "**1-0**" means that

Net value = Out-going flow value – In-coming flow value

The *usingNumberAbbreviation* allows you to specify if the application should use number abbreviation in displaying number values. If this value is set to true, a number like "123,456,789" will be displayed as "123M" for short.

The *enableBilateralTrades* tag allows you to specify if flow data is bilateral data. Bilateral flow data means the same flow from a region A to a region B has two different values; one is reported by A and another one is reported by B.

The *barChartPanel* tag allows you to specify the start index and the number of bars in the focus area of the bar chart.

The *regionTooltip* tag allows you to specify which group of indicators should be shown in the region tooltip.

4. Basic steps to configure Flow Map with Your Data and Map

Step 1 – Prepare map files

If you want to use Flow map eXplorer with a new map you should put files (including a shape file and a dbf file) of the new map in the map folder of the application as shown in Figure 27. The shape file and the dbf file should have their file name extension as **.bin** (see Figure 27).

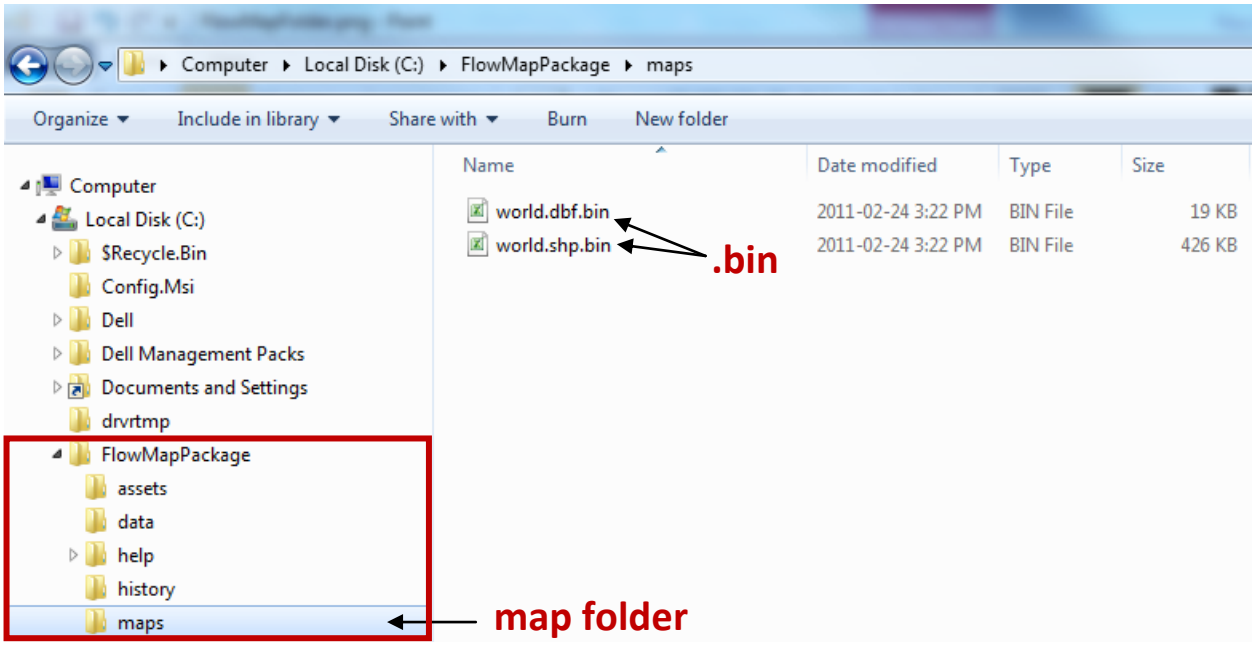


Figure 27: the 'maps' folder in Flow map eXplorer folder

Step 2 – Prepare a flow data file

Flow data should have one of three formats as described in Section 2.1 Flow Data. If your dataset is not so large you should use either interaction table format or our eXplorer Unicode format. The csv format which is quite tricky should be only used when you have a very large dataset.

Notes:

1. If you use the interaction table format you have to save your flow data as an ***Excel file*** (.xls or .xlsx).
2. If you use our eXplorer Unicode format you can save your flow data as an ***Excel file*** (.xls or .xlsx) or as a ***Unicode text file*** (.txt) through Microsoft Excel.

You specify the flow data file in config.xml through <flowDataFile> tag as the following examples

```
<flowDataFile fileName="data/flowData.xlsx"/>
```

or

```
<flowDataFile fileName="data/flowData.txt"/>
```

Note: To edit config.xml file, you can use Notepad or Notepad++ (a free tool which can be downloaded at http://notepad-plus-plus.org/).

Step 3 – Select a dbf field for region codes (source region codes and destination region codes)

Code column | Name column

	A	B	C	D	E
1	CODE	CNTRY_NAME	POP_CNTRY	CURR_TYPE	CURR_CODE
2	BE	Belgium	10032460	Franc	BEF
3	DK	Denmark	4667750	Danish Krone	DKK
4	DE	Germany	81436300	Mark	DEM
5	NL	Netherlands	15447470	Guilder	NLG
6	NO	Norway	4328519	Krone	NOK
7	SE	Sweden	8728217	Krone	SEK
8	UK	United Kingdom	56420180	Pound Sterling	GBP
9	IS	Iceland	267240	Krona	ISK
10	IT	Italy	57908880	Lira	ITL

Figure 28: Columns of country codes and country names in a dbf file of a world map

Code column

	A	B	C	D	E	F
1	OBJECTID	NUTS_ID	STAT_LEVL_	LEN	Shape_Leng	Shape_Area
2	1041	NO07	2	0.00000000000	252.99332277800	24.60109154180
3	1042	IS00	2	0.00000000000	74.01574094970	19.49215640550
4	1043	FI1A	2	0.00000000000	46.63461960230	28.98296393580
5	1044	SE33	2	0.00000000000	42.36153100510	32.84441890040
6	1045	NO06	2	0.00000000000	56.50158292380	7.37162668929
7	1046	FI13	2	0.00000000000	24.36235037420	15.22175845550
8	1047	SE32	2	0.00000000000	28.81934247550	13.70989707570
9	1048	NO02	2	0.00000000000	17.94710433130	8.84151403237
10	1049	FI19	2	0.00000000000	30.28497867920	11.06722349290

Figure 29: Code column in a dbf file of a NUTS2 map

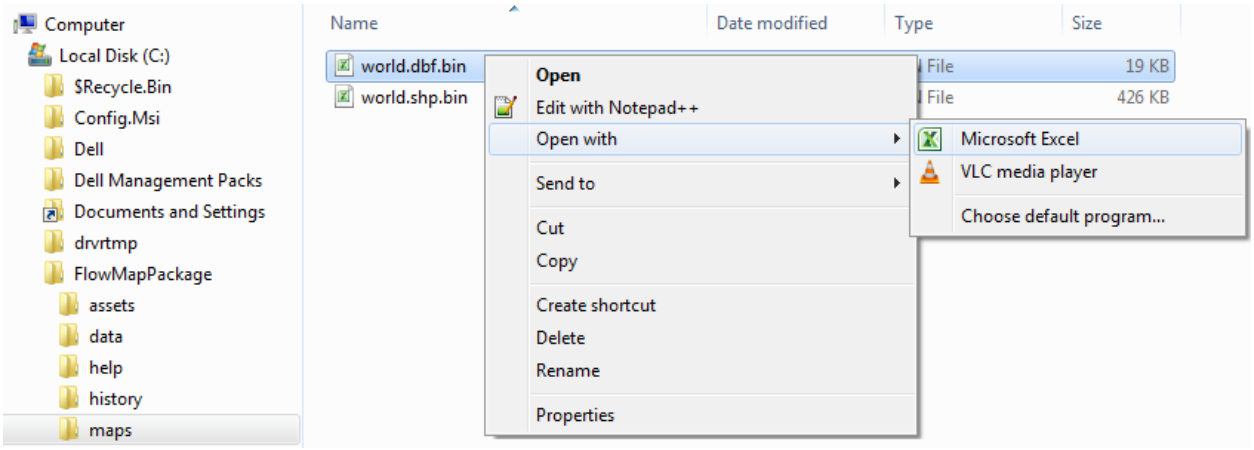


Figure 30: Right click on a *.dbf.bin* file and select Microsoft Excel to open it

A dbf file normally has a region code column, which contains region codes, and a region name column, which contains region names, as shown in Figure 28. Some dbf file has a region code column but does not have a region name column, for example the dbf file of a NUTS2 map shown in Figure 29.

Note: To open a dbf file, you can use Microsoft Excel as shown in Figure 30.

You have to choose a column in the dbf file for region codes and a column for region names. These two columns can be different or be the same. Region codes are used in the flow data file to specify flows from a source region to a destination region. Region names are used to show the name of region codes to users. Then you have to specify the column code and the column name in config.xml file through <shapeFile> tag as shown in the following examples.

META	SOURCE CODE	DESTINATION CODE	Some commodity
ID	SOURCE CODE	DESTINATION CODE	Some commodity
DESCRIPTION	Region code in dbf file	Region code in dbf file	Some commodity
UNIT	NA	NA	(millions dollars)
PARSETYPE	S	S	F
SHEET	S	NA	2010
PRECISION	NA	NA	0
	Belgium	Belgium	
	Belgium	Germany	2768
	Belgium	Denmark	4781
	Belgium	United Kingdom	3909
	Belgium	Netherlands	3233
	Belgium	Norway	1742
	Belgium	Sweden	2332
	Germany	Belgium	1914
	Germany	Germany	
	Germany	Denmark	3099

Figure 31: Country names specified in CNTRY_NAME column in the dbf file of a world map are used to specify source codes and destination codes in a flow data file under eXplorer Unicode format

Some commodity (millions dollars)	Belgium	Germany	Denmark	United Kingdom	Netherlands	Norway	Sweden
Belgium		2768	4781	3909	3233	1742	2332
Germany	1914		3099	3309	1260	1894	3650
Denmark	4574	4977		3866	2156	4003	1987
United Kingdom	4698	4471	1559		2004	2628	1113
Netherlands	2007	3666	1217	2820		3272	3358
Norway	4842	4231	2005	2118	1201		1979
Sweden	3367	1844	4465	2717	1536	3010	

Figure 32: Country names specified in CNTRY_NAME column in the dbf file of a world map are used to specify source codes and destination codes in a flow data file under interaction table format

***Example 1*:**

The following example uses CNTRY_NAME column in the dbf file of a world map (see Figure 28) for both dbfIdField and dbfNameField.

```
<shapeFile mapName="maps/world" dbfIdField="CNTRY_NAME" dbfNameField="CNTRY_NAME"/>
```

Then source code column and destination code column in the flow data file under eXplorer Unicode format should use country names in CNTRY_NAME column in the dbf file to specify countries as shown in Figure 31. Figure 32 shows the flow data file under interaction table format.

***Example 2*:**

The following example uses CODE column for dbfIdField and CNTRY_NAME column for dbfNameField.

```
<shapeFile mapName="maps/world" dbfIdField="CODE" dbfNameField="CNTRY_NAME"/>
```

Then source code column and destination code column in the flow data file under eXplorer Unicode format should use country codes in CODE column in the dbf file to specify countries as shown in Figure 33. Figure 34 shows the flow data file under interaction table format.

META	SOURCE CODE	DESTINATION CODE	Some commodity
ID	SOURCE CODE	DESTINATION CODE	Some commodity
DESCRIPTION	Region code in dbf file	Region code in dbf file	Some commodity
UNIT	NA	NA	(millions dollars)
PARSETYPE	S	S	F
SHEET	S	NA	2010
PRECISION	NA	NA	0
	BE	BE	
	BE	DE	2768
	BE	DK	4781
	BE	UK	3909
	BE	NL	3233
	BE	NO	1742
	BE	SE	2332
	DE	BE	1914
	DE	DE	
	DE	DK	3099

Figure 33: Country codes specified in CODE column in the dbf file of a world map are used to specify source codes and destination codes in a flow data file under eXplorer Unicode format

Some commodity (millions dollars)	BE	DE	DK	UK	NL	NO	SE
BE		2768	4781	3909	3233	1742	2332
DE	1914		3099	3309	1260	1894	3650
DK	4574	4977		3866	2156	4003	1987
UK	4698	4471	1559		2004	2628	1113
NL	2007	3666	1217	2820		3272	3358
NO	4842	4231	2005	2118	1201		1979
SE	3367	1844	4465	2717	1536	3010	

Figure 34: Country codes specified in CNTRY_NAME column in the dbf file of a world map are used to specify source codes and destination codes in a flow data file under interaction table format

Step 4 – (Optional) Prepare a regional data file

If you want to use a regional dataset with a flow dataset to support analysis of flow data it is possible. The regional data file should be in eXplorer Unicode format.

You specify the regional data file in config.xml through <flowDataFile> tag as the following example

```
<regionDataFile fileName="data/regionData.txt"/>
```

Step 5 – Choose a region which will be selected at start-up

Flow map eXplorer normally starts in the top flow mode in which it shows top inflows and outflows of a region. You can specify the region you want the application focus on at start-up by using <selectedFocus> tag as shown in the following examples:

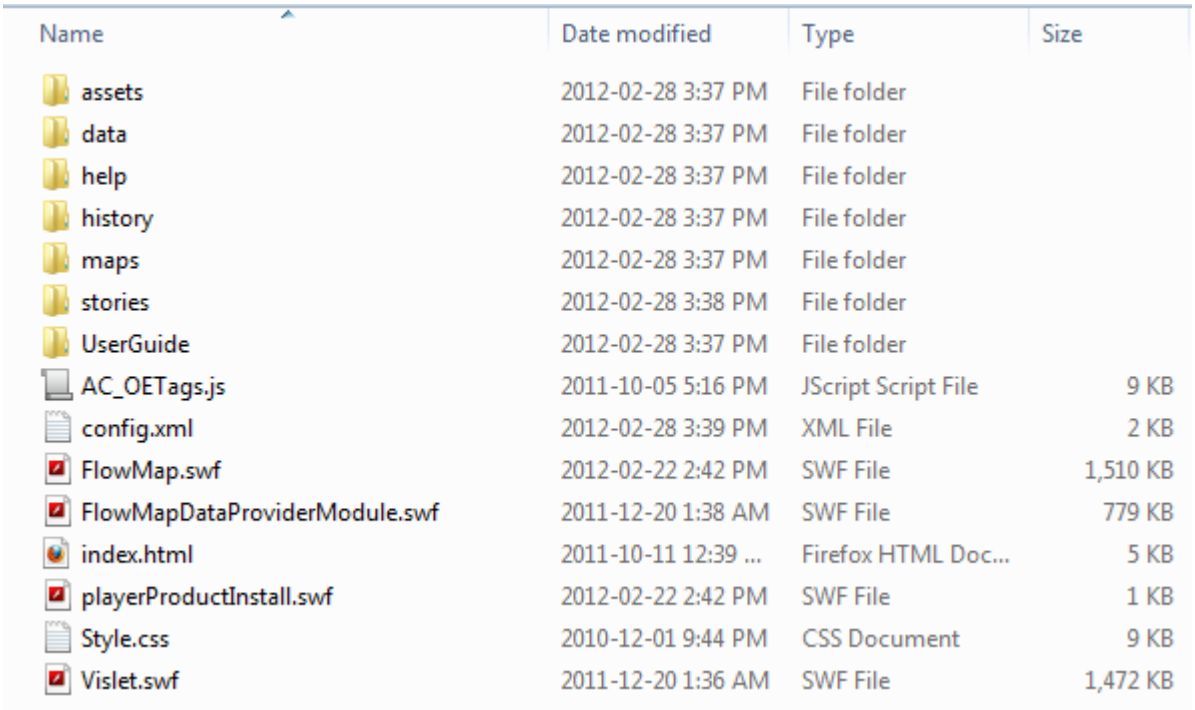
```
<selectedFocus code="Belgium"/> (if dbfIdField="CNTRY_NAME")
```

or

```
<selectedFocus code="BE"/> (if dbfIdField="CODE")
```

5. The Flow map Package

The distributed Flow map eXplorer package contains several files and folders as shown in Figure 35. The most important file is the .swf Flash file, which contains the actual Flow map eXplorer Flash application. Here, all the logic of Flow map eXplorer is processed. All content, from maps and data to application title and logo are defined outside of the compiled swf, allowing these features to be changed without the recreation of the application .swf Flash file. The main folders include 'data', 'maps', and 'stories'. The 'data' folder is where you can put flow data files and regional data files. The 'maps' folder is where you can put map files (.shp.bin and .dbf.bin). The 'stories' folder is where you can put story files.



Name	Date modified	Type	Size
assets	2012-02-28 3:37 PM	File folder	
data	2012-02-28 3:37 PM	File folder	
help	2012-02-28 3:37 PM	File folder	
history	2012-02-28 3:37 PM	File folder	
maps	2012-02-28 3:37 PM	File folder	
stories	2012-02-28 3:38 PM	File folder	
UserGuide	2012-02-28 3:37 PM	File folder	
AC_OETags.js	2011-10-05 5:16 PM	JScript Script File	9 KB
config.xml	2012-02-28 3:39 PM	XML File	2 KB
FlowMap.swf	2012-02-22 2:42 PM	SWF File	1,510 KB
FlowMapDataProviderModule.swf	2011-12-20 1:38 AM	SWF File	779 KB
index.html	2011-10-11 12:39 ...	Firefox HTML Doc...	5 KB
playerProductInstall.swf	2012-02-22 2:42 PM	SWF File	1 KB
Style.css	2010-12-01 9:44 PM	CSS Document	9 KB
Vislet.swf	2011-12-20 1:36 AM	SWF File	1,472 KB

Figure 35: Typical files and folders of a Flow map package

6. Server Installation

Flow map eXplorer is mainly independent of the type of server. It uses no server side backbone and no database. The only sensitive settings are the allowance of loading certain MIME types as files from the server to the application. These are common file types, .swf (flash application), .bin (maps), .xml (Meta data) and .txt (data), which by default are allowed by almost all web servers. This makes installation of Flow map eXplorer as simple as placing the files in a web enabled folder, and it will work immediately. Flow map Statistics eXplorer is distributed in a packaged form, commonly as a single .zip file, which contains all files needed by the application – see Figure 35.

7. Requirements for Running Flow Map eXplorer on Client Side

Flow map eXplorer is developed with the GAV Flash toolkit and framework that use Adobes' Flash and Flex library. Flow map eXplorer requires Adobe Flash Player, a plug-in that is often automatically prompted when visiting Flash based websites. Statistics eXplorer requires Flash version 10, and it is highly recommended to always have the latest update installed. This manual gives an introduction and overview of the Statistics eXplorer package that is sent to the operator for installation on a web server.

Adobe Flash Player: http://www.adobe.com/products/flashplayer/

Adobe Flex: http://www.adobe.com/products/flex/

8. Running Flow Map eXplorer Locally

If you want to test Flow map eXplorer locally (by opening index.html files in the package with some web browser such as Internet Explorer or Firefox), you should first go to the web site below to register the location (e.g. C:\FlowMap) where you will run the application (see Figure 36).

http://www.macromedia.com/support/documentation/en/flashplayer/help/settings_manager04.html

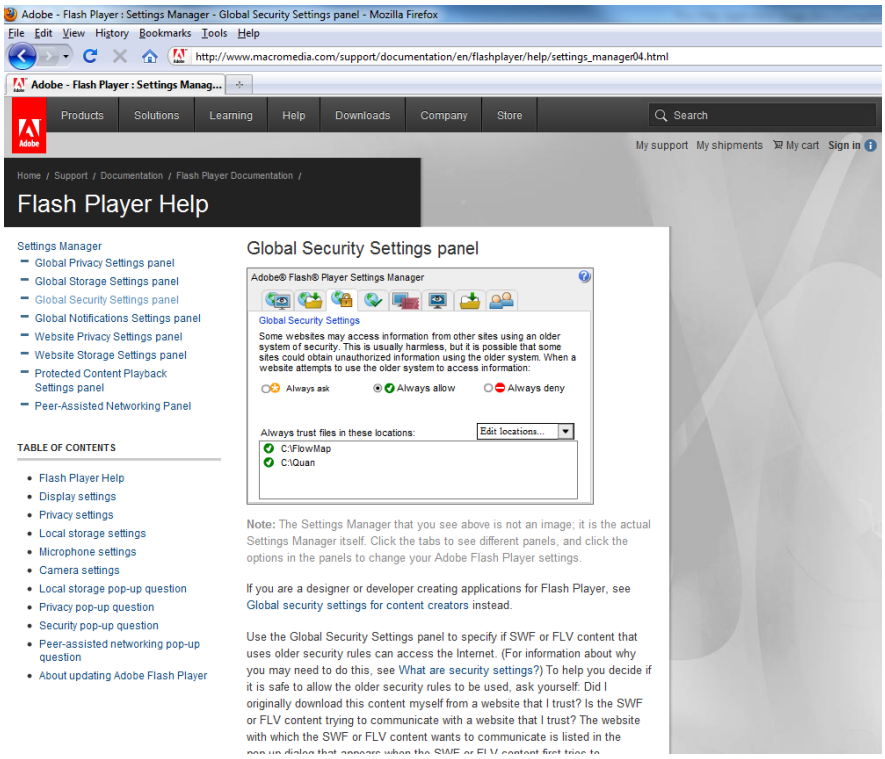


Figure 36: Sign up for running a flash application locally