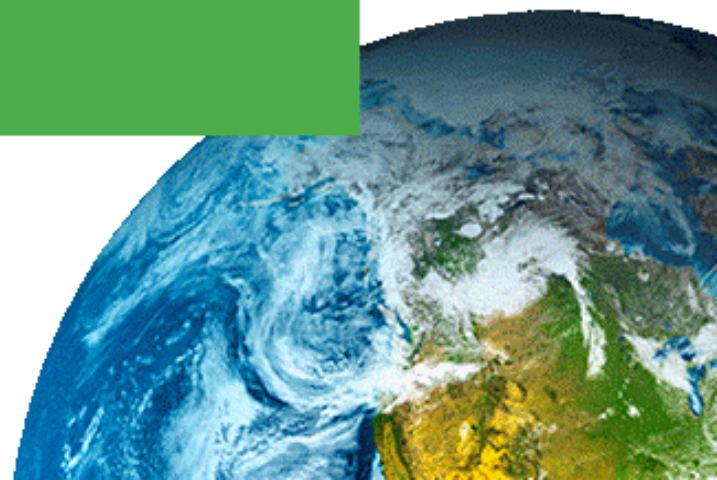


MapStore at *geOcom 2022*

Tobia Di Pisa
GeoSolutions





About GeoSolutions



- Founded in late 2006
- Offices in Italy & US
- Supporting/Developing FOSS4G projects
 - MapStore, GeoServer, GeoNode, GeoNetwork, CKAN

- Offer

- Enterprise Support Services
 - Deployment Warranty
 - Professional Training
 - End-To-End Projects (Integration)



- Clients

- UN FAO (CIOK, FIGIS, NRL, FORESTRY, ESTG), UN WFP, World Bank, DLR, EUMETSAT, JRC, NATO CMRE, UNESCO, UNEP, etc..
 - BAYER, DigitalGlobe, MDA, TOPCON, SwissRE, Halliburton, etc..

- <https://www.geosolutionsgroup.com>



GeoSolutions
your one-stop-shop for geospatial open source software



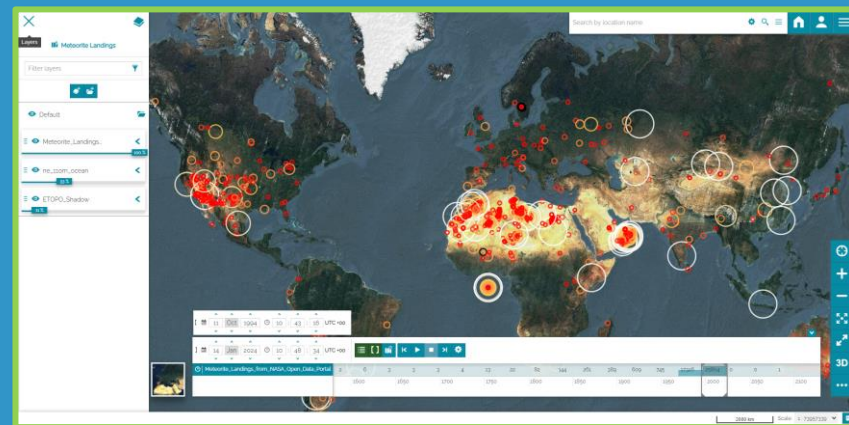
- What is MapStore ?
- Who uses MapStore ?
- MapStore at work
- MapStore roadmap

What is MapStore?



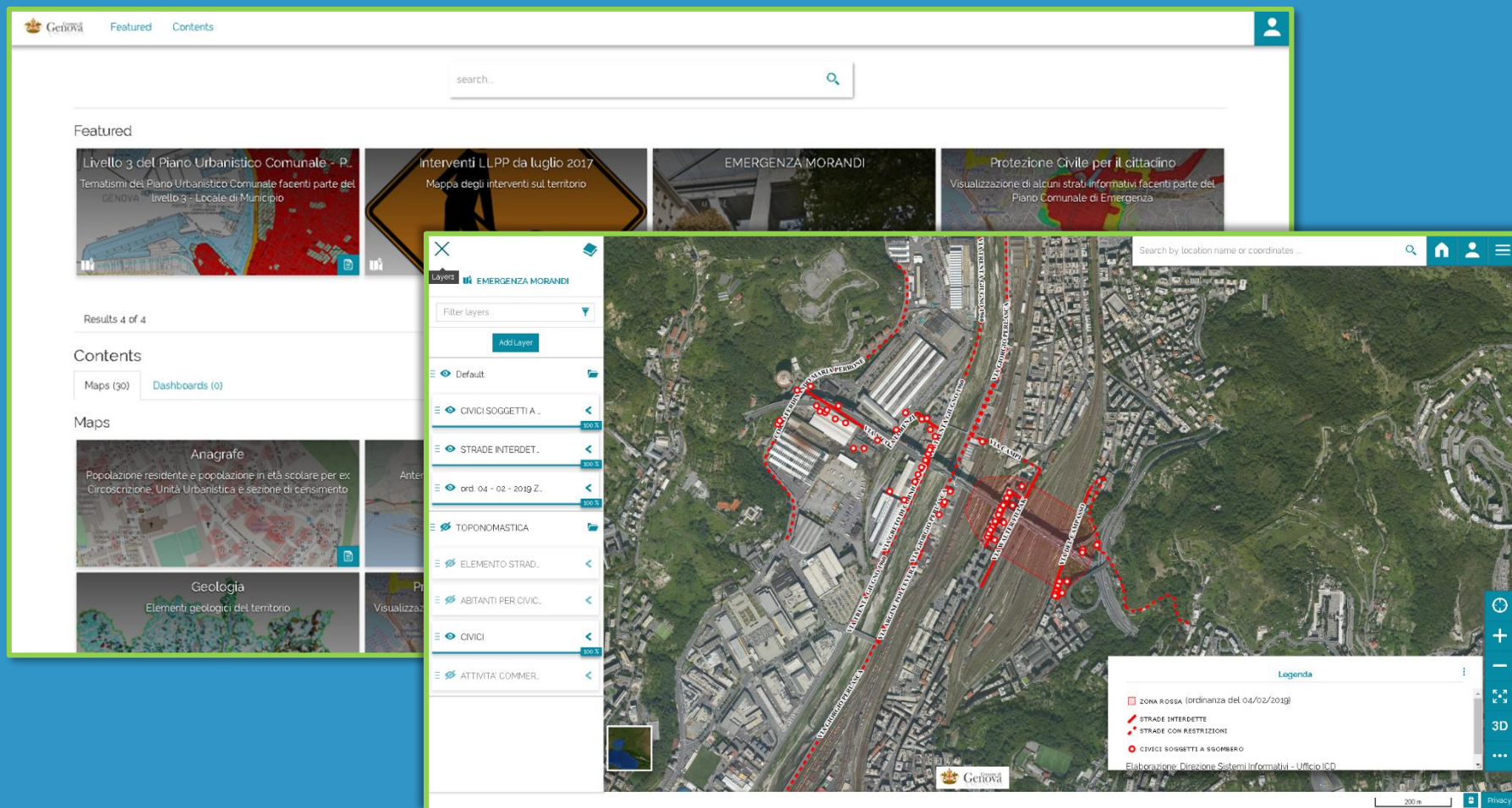
What is MapStore?

- Create and share maps, charts, dashboards and stories online
- Mobile first | Responsive
- Mapping engine agnostic
 - OpenLayers|Leaflet|Cesium
- Leveraging React ecosystem
- Pluggable Look & Feel
- Consume data from many sources
 - OSM, Bing, WFS, CSW, WMS, WMTS
- License is Simplified BSD
 - Commercial friendly!



What is MapStore?

It is a Product

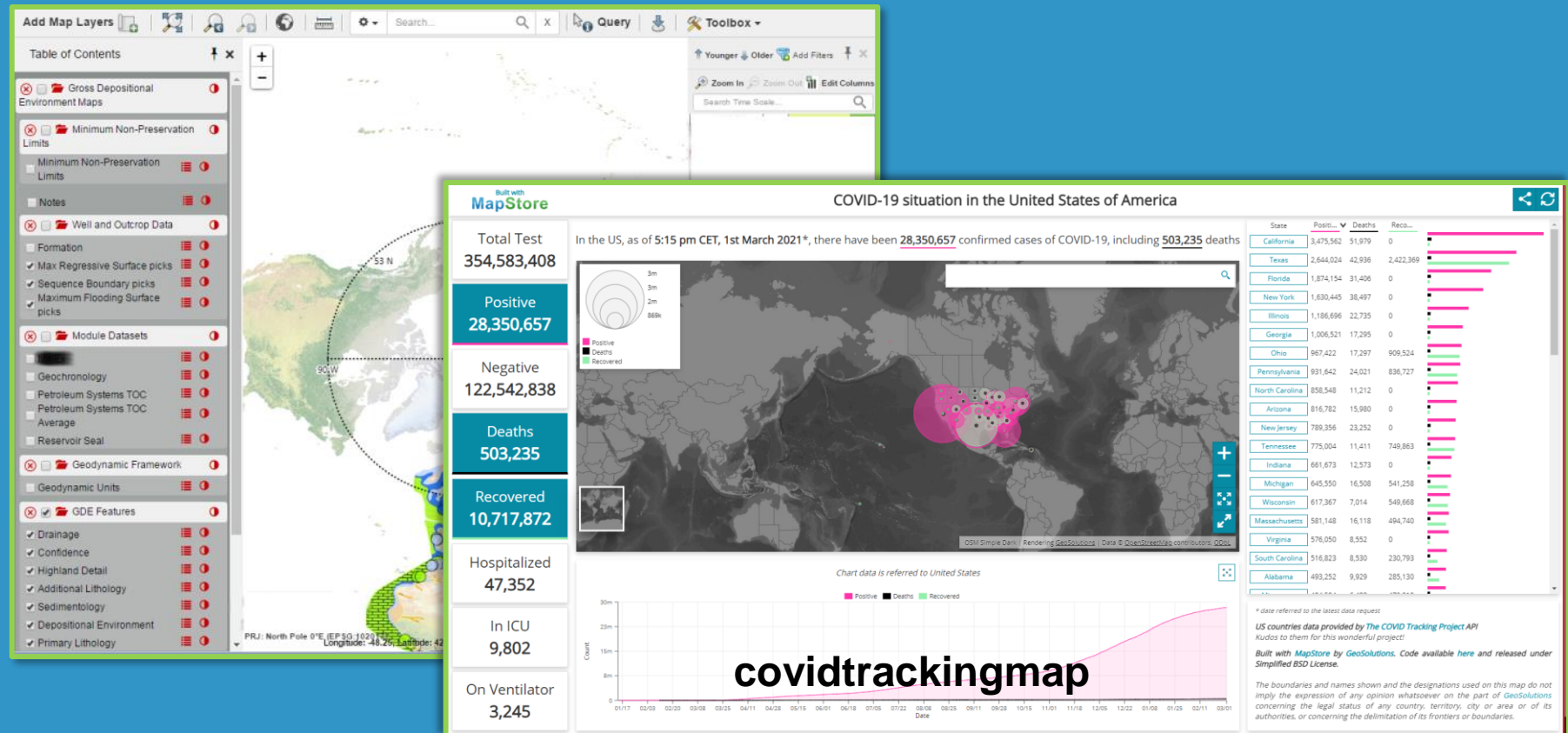


Use it as is and customize the look&feel

17th of May 2022 - geOcom

What is MapStore?

It is a Framework



You can build many different applications with its plugins (and by developing your own)

Who uses MapStore?

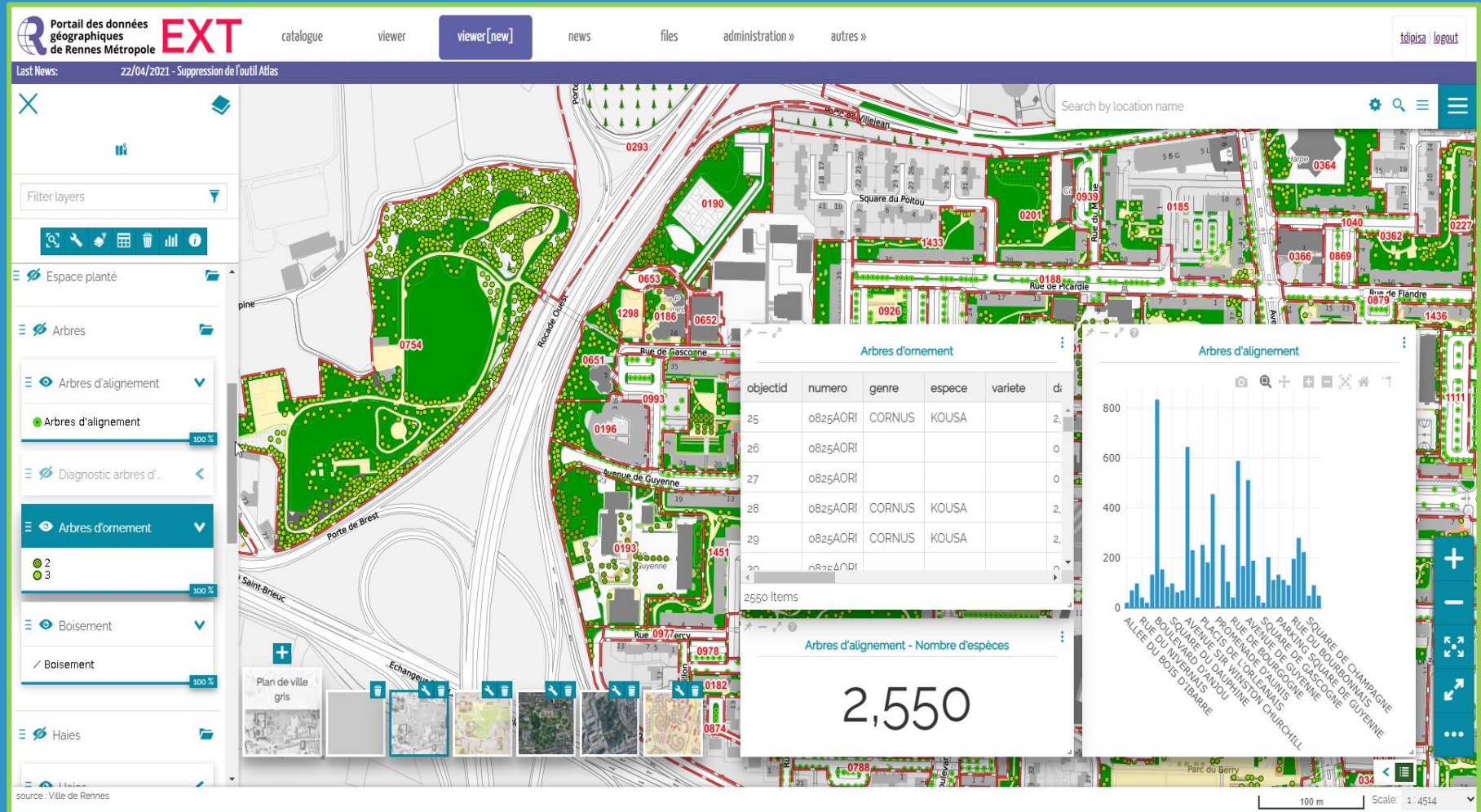
- Halliburton
- Austrocontrol
- MapStand
- UN FAO
- EMSA
- World Bank (via GeoNode)
- Unesco (via GeoNode)
- EARTH-I
- Arno river basin authority
- Region of Tuscany (Hydrologic Service)
- Region of Tuscany (Urbanistic Department)
- LaMMA
- BRGM
- City of Munich
- City of Florence
- City of Genova
- City of Bozen
- City of Brussels
- IGB (via GeoNode)
- **Rennes Métropole (via geOrchestra)**

**As well as many other
clients and users around
the world!**



Who uses MapStore?

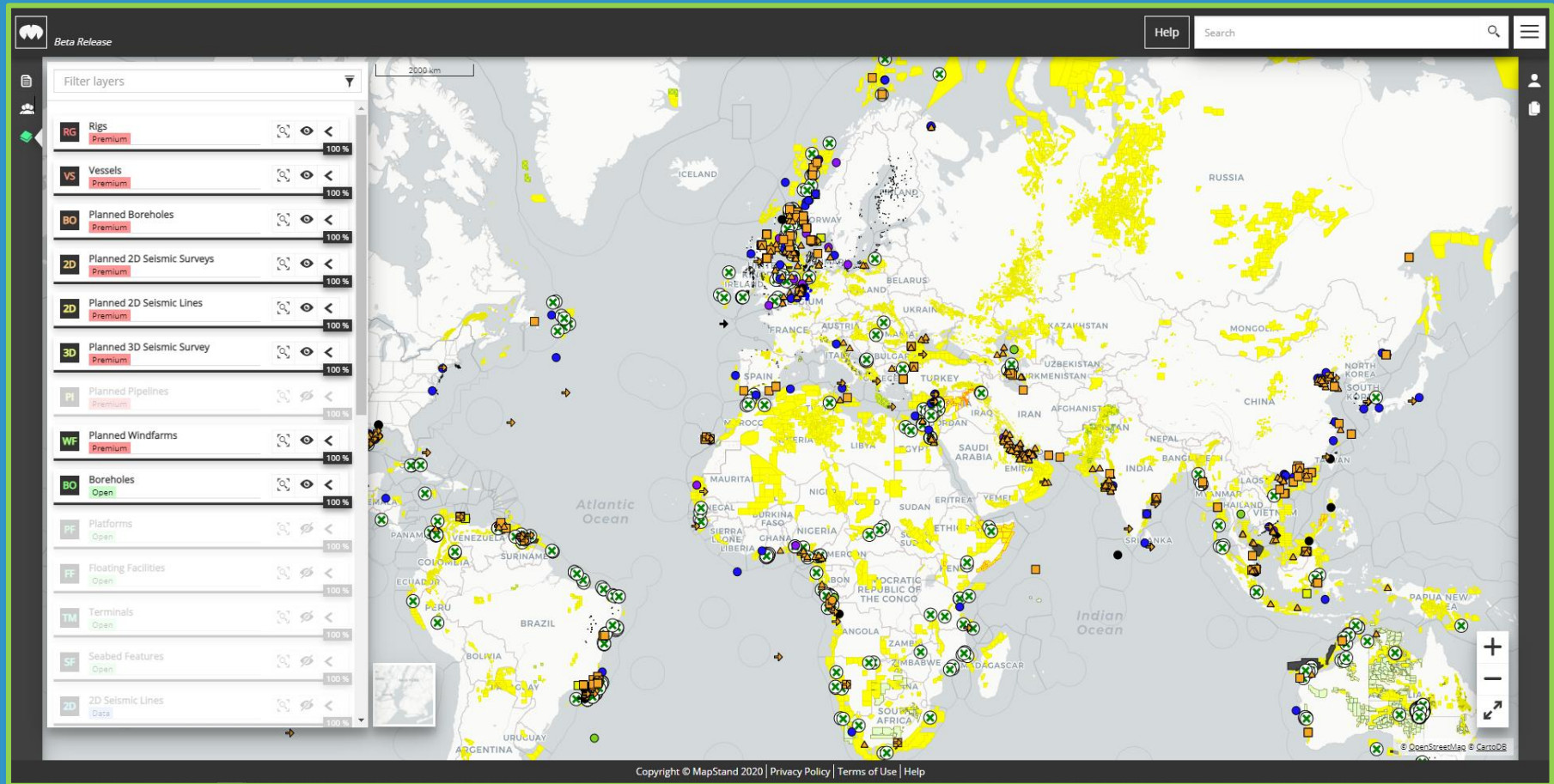
Rennes Métropole - geOrchestra



Who uses MapStore?

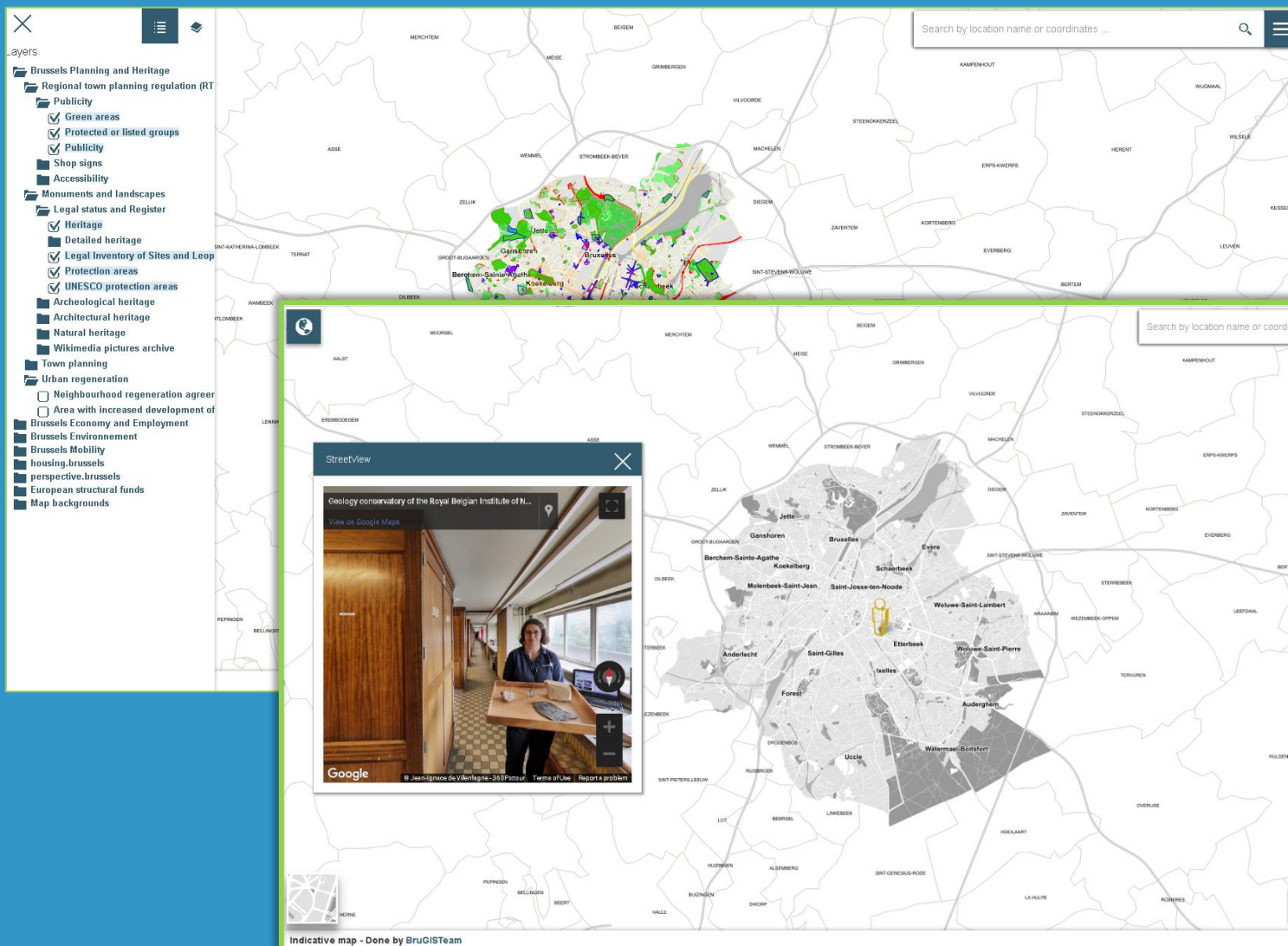


MapStand



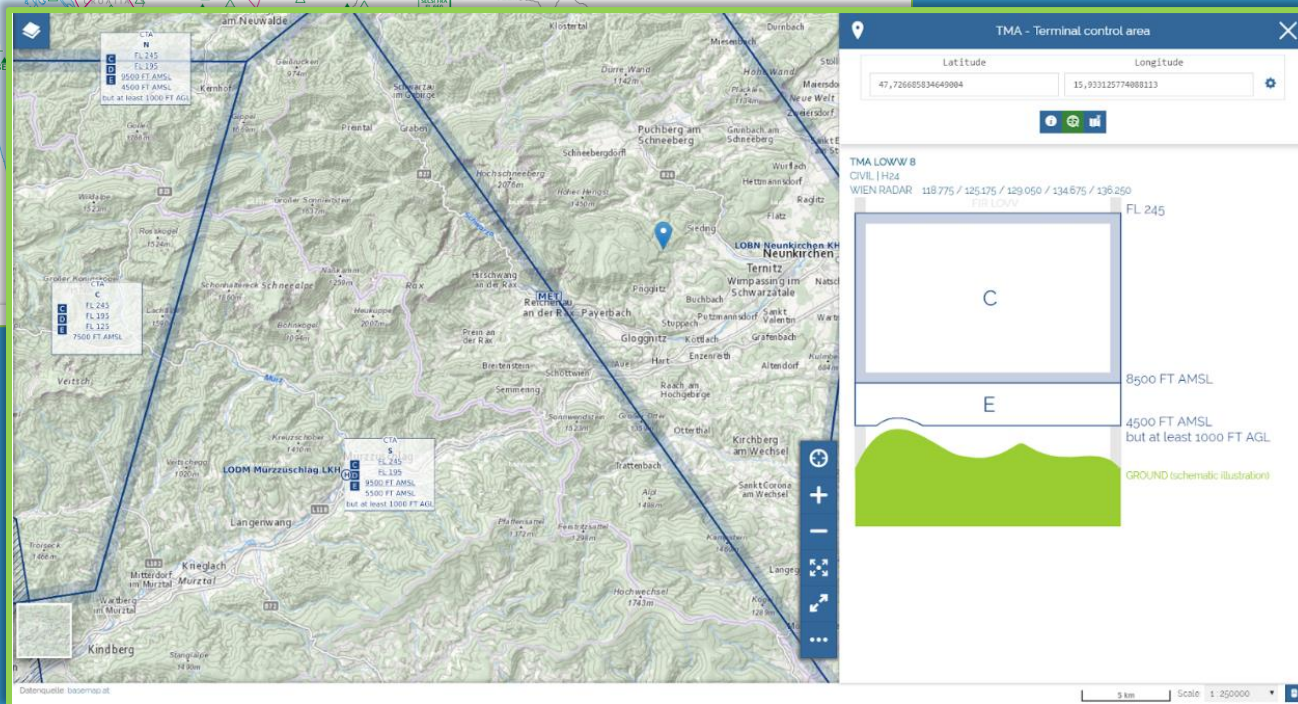
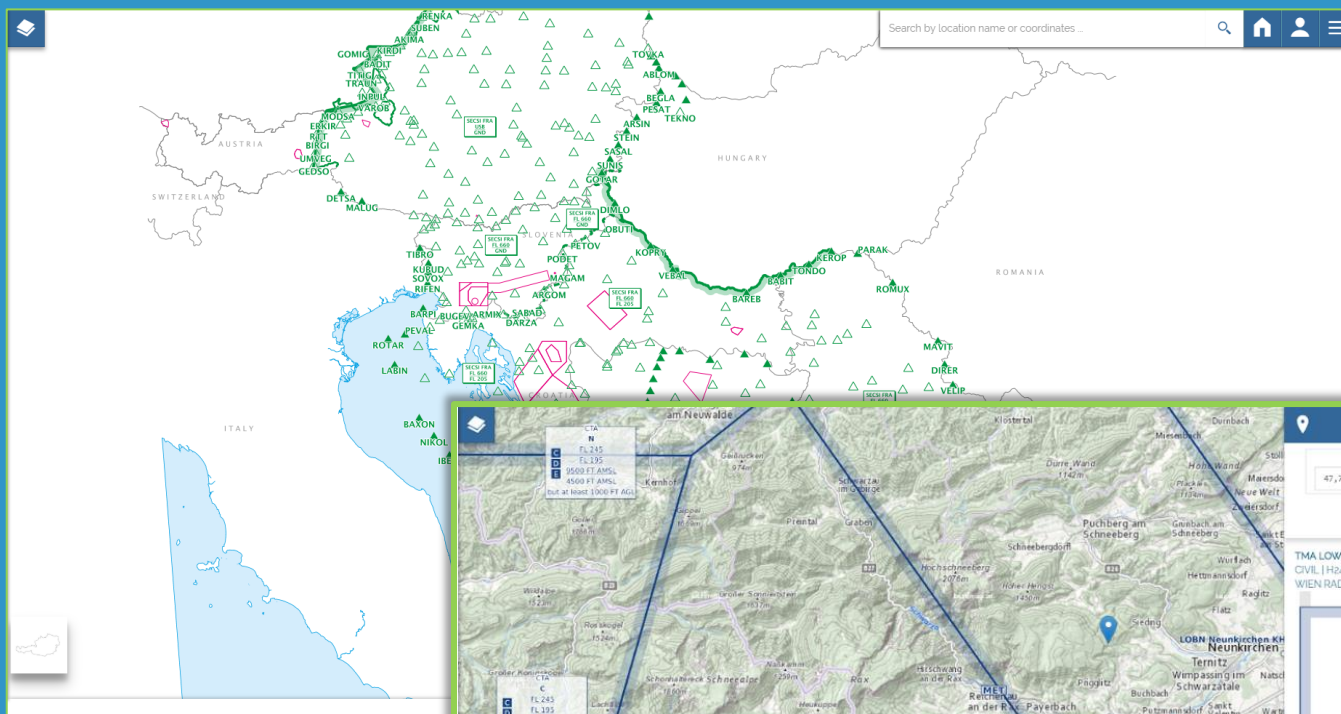
Who uses MapStore?

City of Brussels



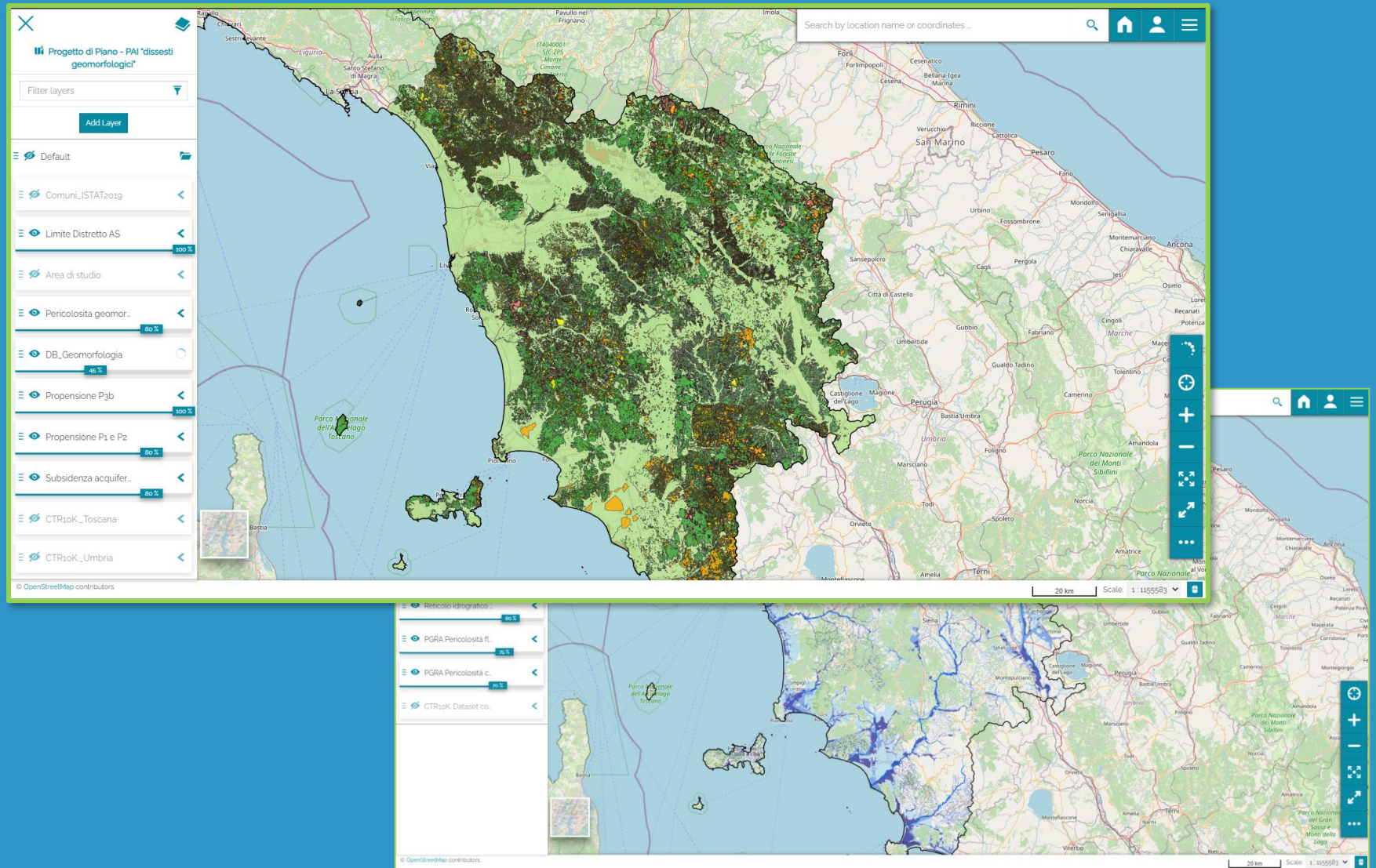
Who uses MapStore?

Austrocontrol



Who uses MapStore?

Arno river basin authority



Who uses MapStore?

City of Genova

The screenshot shows the MapStore web application interface for the City of Genova. The top navigation bar includes the City of Genova logo and links for 'In Evidenza' and 'Contenuti'. The main content area is divided into two columns. The left column, titled 'In Evidenza', features four featured maps: 'Protezione Civile per il cittadino', 'Livello 3 del Piano Urbanistico C...', 'Interventi LLPP da luglio 2017', and 'EMERGENZA MORANDI'. The right column, titled 'Contenuti', shows a list of maps, including 'Mappe (38)' and 'Dashboard'. The main map area displays an aerial view of a city area with red dashed lines indicating restricted zones. A legend in the bottom right corner explains the symbols: 'ZONA ROSSA (ordinanza del 04/02/2019)', 'STRADE INTERDETTE', 'STRADE CON RESTRIZIONI', and 'CIVICI SOGGETTI A SGOMBERO'. The map also includes a search bar, navigation controls, and a scale bar.

- **Demo** → <https://mapstore.geosolutionsgroup.com>
- **User Docs** → <https://mapstore.readthedocs.io/en/latest/user-guide/home-page/>
- **Dev Docs** → <https://mapstore.readthedocs.io/en/latest/developer-guide/requirements/>
- **GitHub Repo** → <https://github.com/geosolutions-it/MapStore2>
- **Youtube Videos** → https://www.youtube.com/playlist?list=PLe2yzutVrnZ5tjYGYYcKmZzo_M9ku5l9X
- **Mailing Lists** → <https://groups.google.com/g/mapstore-users>
<https://groups.google.com/g/mapstore-developers>

MapStore at work

17th of May 2022 - geOcom



- Many features available out-of-the box
- Many scenarios are covered
- Works with of OGC standards
- Easy to set up and configure
- Easy to customize and extend
- Open Source project
- Compatible with the most common browsers: FF, Edge, Chrome and Safari

MapStore at work

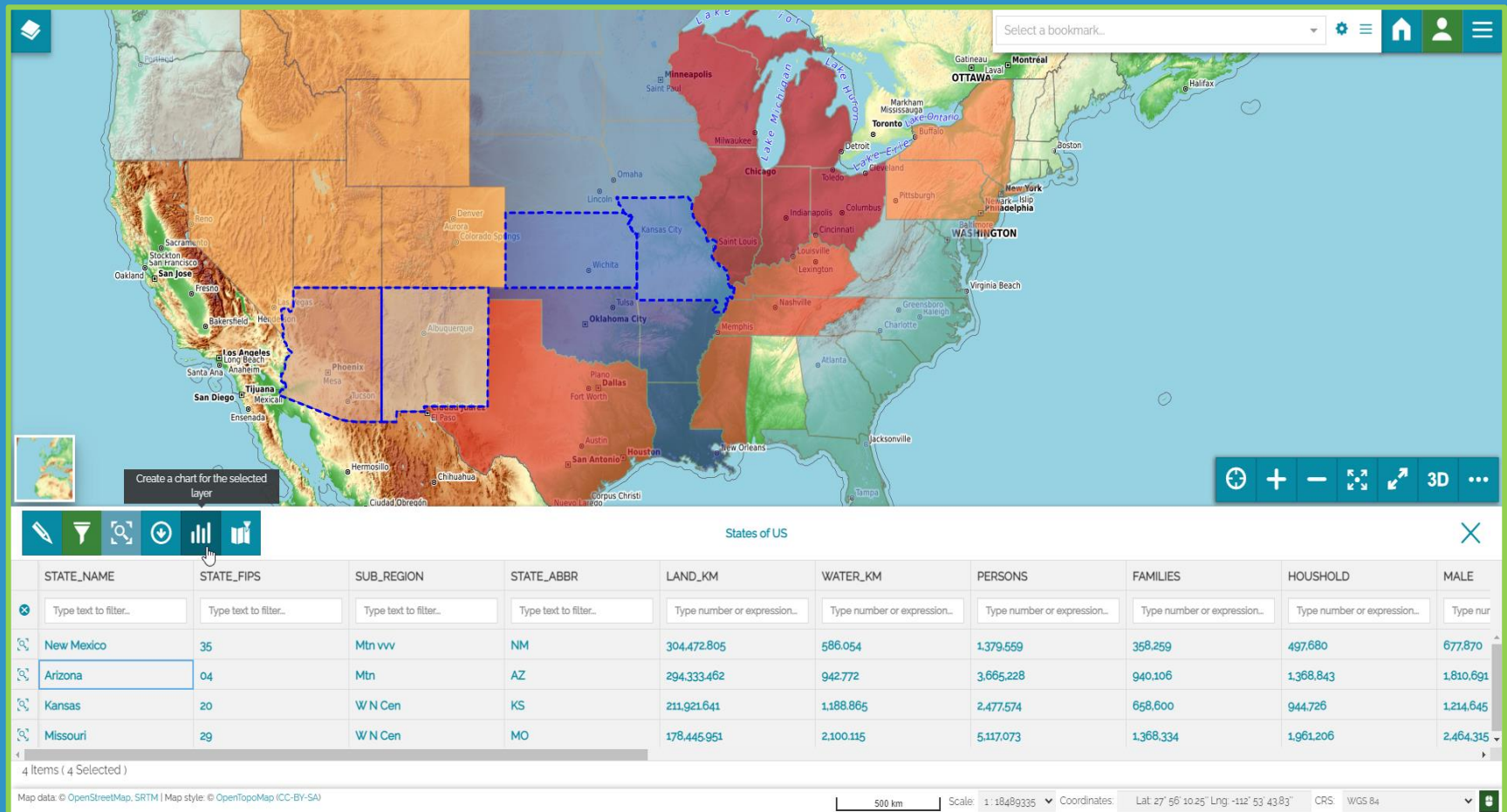


MapStore Map Viewer: overview

The screenshot shows the MapStore Map Viewer interface with several components highlighted by callouts:

- Options Menu:** Located in the top right corner, containing options like PRINT, EXPORT, IMPORT, CATALOG, MEASURE, SAVE, SAVE AS..., ANNOTATIONS, SETTINGS, ABOUT THIS MAP, SHARE, DOCS, TUTORIAL, and ABOUT.
- Search Tool:** A search bar at the top center with a dropdown menu for bookmarks.
- TOC tools:** Tools for managing the Table of Contents (TOC) on the left side.
- Widgets & Charts:** A central area displaying various widgets and charts, including a pie chart titled 'test pie' and a bar chart titled 'test chart'.
- Layers with legend:** A list of layers on the left side, including 'Default', 'LayerGroup of roads...', 'poi', 'poly_landmarks', 'ny_roads', 'States of US', and 'Annotation Group'.
- Backgrounds:** A section at the bottom left showing different map backgrounds.
- Footer tools:** Tools at the bottom of the interface, including a scale bar (1000 m), scale (1:72224), coordinates (Lat 40° 47' 00.48" N, Lng -073° 50' 37.49" W), and CRS (WGS 84).

Attribute Table: browse features of a vector layer through a tabular view and access advanced utilities (**Filters**, **Data Exports**, **Charts**, **Editing of features** and more).



Visual Style Editor: editing layers styles in MapStore with an advanced user interface

The screenshot displays the MapStore Visual Style Editor. On the left, the 'States of US' panel shows vector styling options for a map layer, including legend labels, fill color, outline color, and outline width. On the right, the 'SLD Service to classify styles' panel shows raster styling options, including a color ramp, contrast enhancement, and a table of values for classification. The background shows a map of the United States with states highlighted in red and yellow.

SLD Service to classify styles

Work on top of the GeoServer REST APIs

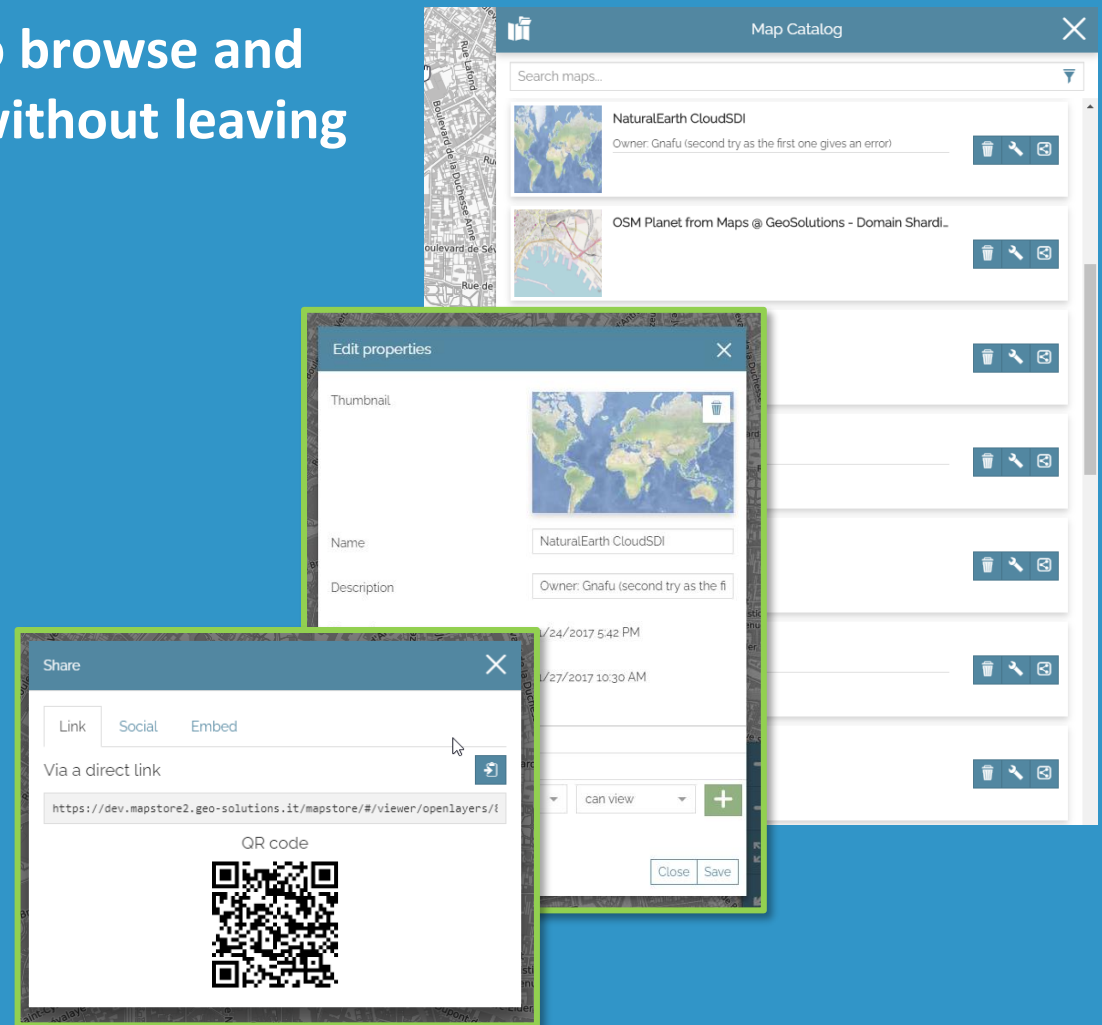
Both **Vector** and **Raster** styles!

Annotations tool: provide a great user experience in creating/drawing map annotations with a powerful user interface and styling capabilities.

The screenshot displays the MapStore web application interface. On the left, a map of a coastal region is shown with several annotations: a yellow polygon, a red dashed rectangle, a blue circle, and a red pin. The right sidebar contains the 'Annotations' panel. The 'Style' tab is active, showing settings for 'Polygon Style', 'Fill' (Color: yellow, Opacity: 64%), 'Stroke' (LineDash: dashed, Color: green, Opacity: 100%, Width: 3 px), and 'Geometries' (Polygon, Text, Circle). The bottom status bar shows map details like scale, coordinates, and CRS.

The **Map Catalog** allows to browse and manage MapStore maps without leaving the viewer

- **Search for maps** you have access to
- **Manage** map properties and permissions
- **Share** a map



Thanks to Rennes Métropole and geOrchestra ! 😊

Layer Settings: tune the layer settings in terms of *general information, display mode, style* and *feature Info*

The screenshot shows the MapStore Layer Settings interface for a layer named 'gsus_states'. The interface is divided into two main panels: a left panel for general information and a right panel for display and style settings.

Left Panel (General Information):

- Title:** States of US
- Title translations:**
 - Italiano
 - English
 - Français
 - Deutsch
 - Español
- Name:** gsus_states
- Description:** (Empty text area)
- Group:** Default
- Tooltip:** Title
- Placement:** Top

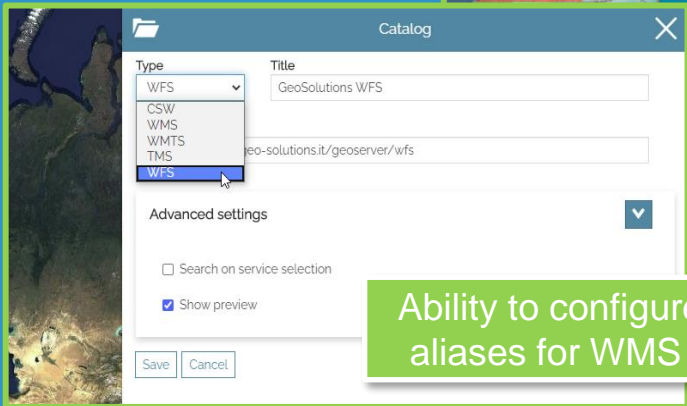
Right Panel (Display and Style Settings):

- Format:** image/png
- WMS Layer tile size:** 256
- Opacity %:** 65
- Visibility limits:**
 - Max value (excluded): Select max value
 - Min value (included): Select min value
 - Limits type: Scale
- Legend:**
 - ☒ Transparent
 - ☒ Use cache options
 - ☐ Single Tile
 - ☒ Enable localized style
- Width:** 12
- Height:** 12

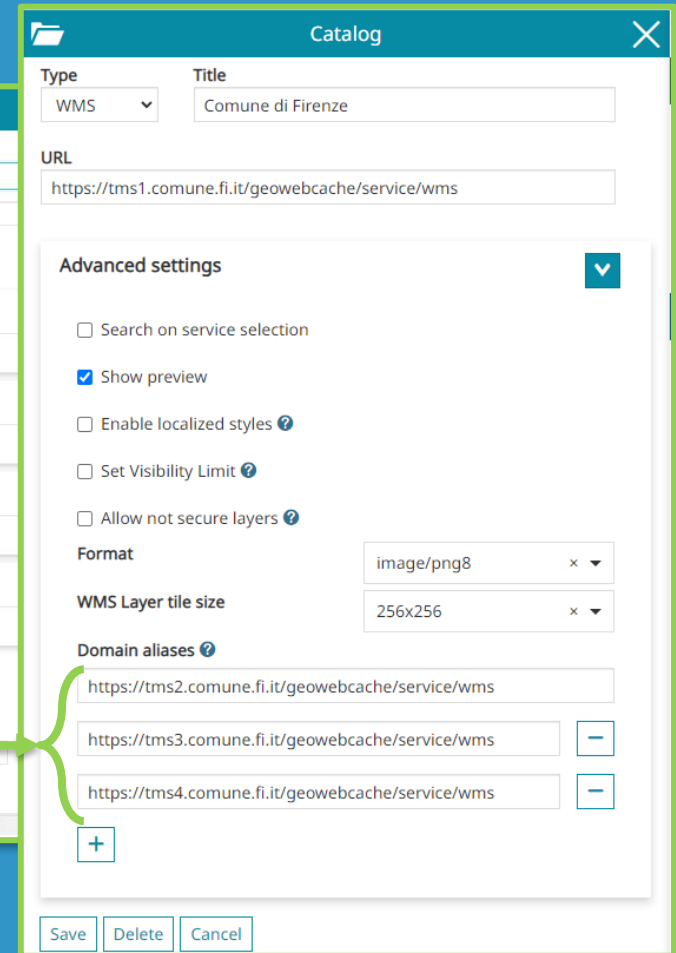
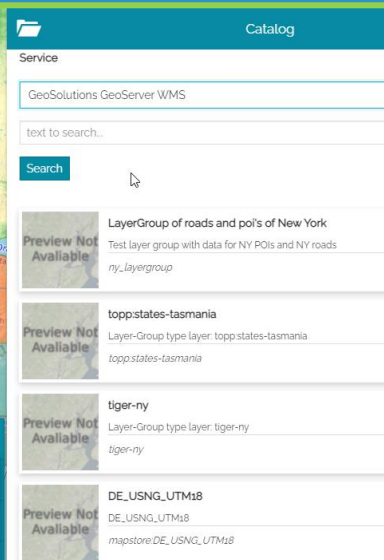
The background of the interface shows a map of the United States with various cities labeled, including Denver, Aurora, Colorado Springs, Albuquerque, Tucson, Ciudad Juárez, El Paso, Hermosillo, Chihuahua, Ciudad Obregón, Los Mochis, Culiacán, Gómez Palacio, Saltillo, Durango, Mazatlán, Aguascalientes, Tlaxcala, León, Guadalajara, Zapopan, Celaya, and Nezahualcóyotl.

Catalog Tool: browse contents from external sources to add layers to the map. Supported catalog types are:

- WMS
- WMTS
- WFS
- TMS
- CSW
- Now also **3D Tiles**

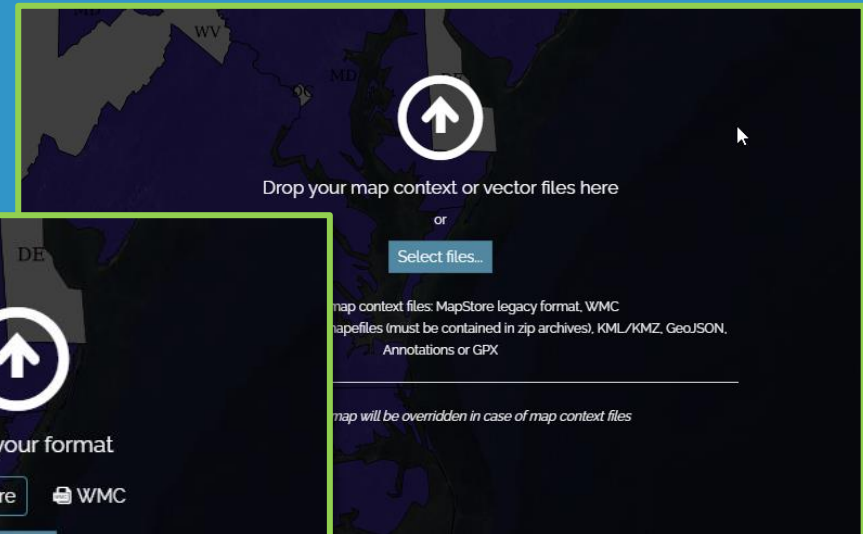
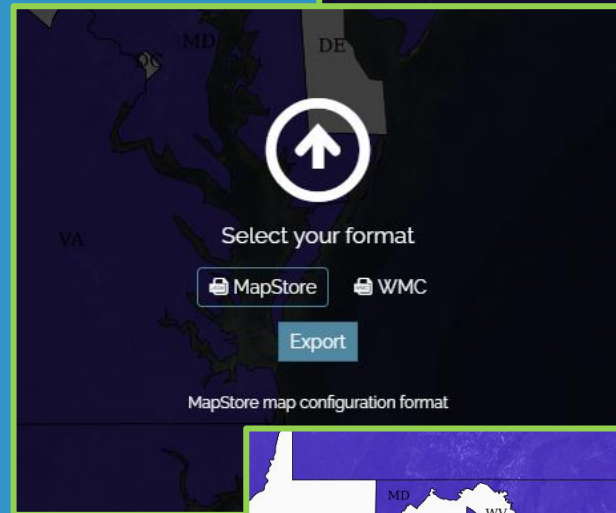


Ability to configure domain aliases for WMS sources

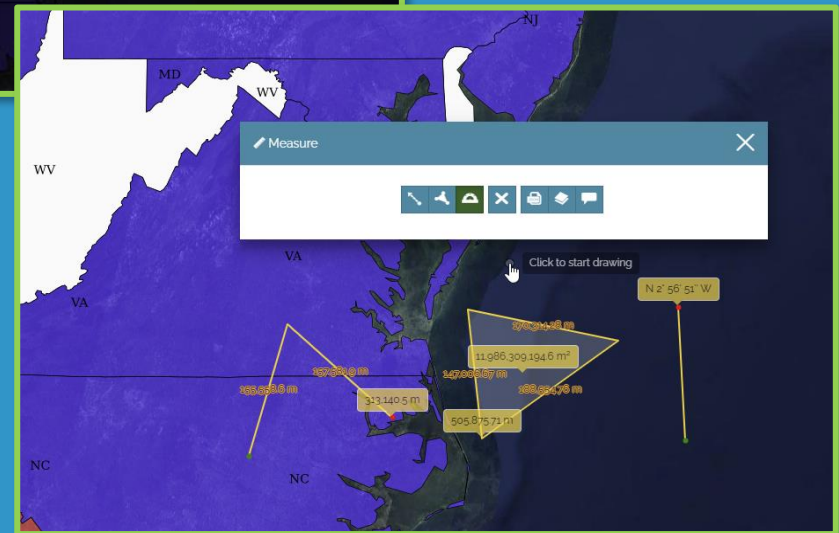


Thanks to Rennes Métropole and geOrchestra ! 😊

- **Import/Export:** import and export of map context (MS JSON and WMC are supported)



- **Measurements:** perform your measurement in map and export or convert them to be used with other tools



Thanks to Rennes Métropole and geOrchestra! 😊

MapStore at work

Map Print (based on mapfish 2.0)

Print

Title: My Map Resolution: 96 dpi

Description: My Demo Map

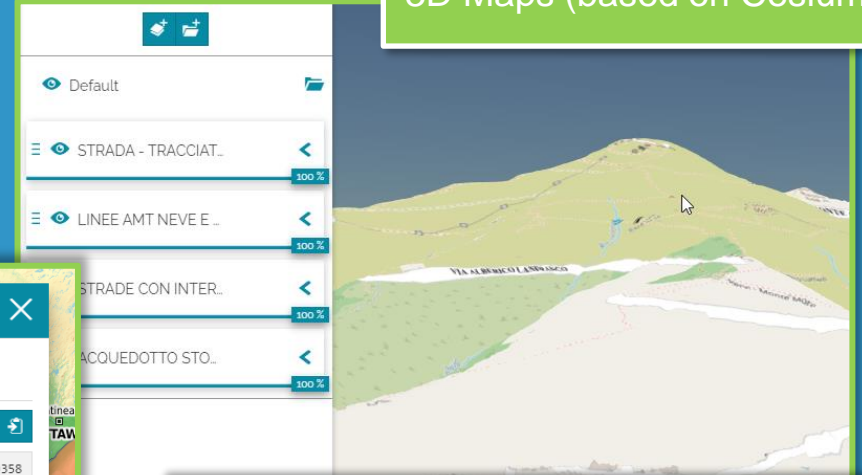
Layout

Sheet size: A3

☐ Include legend
☐ Legend on distinct page
☐ Landscape ☒ Portrait

Legend options

3D Maps (based on Cesium JS)



Share

Link Social Embed

Via a direct link

<https://qa-mapstore.geosolutionsgroup.com/mapstore/#/viewer/openlayers/10358>

QR code

Advanced options

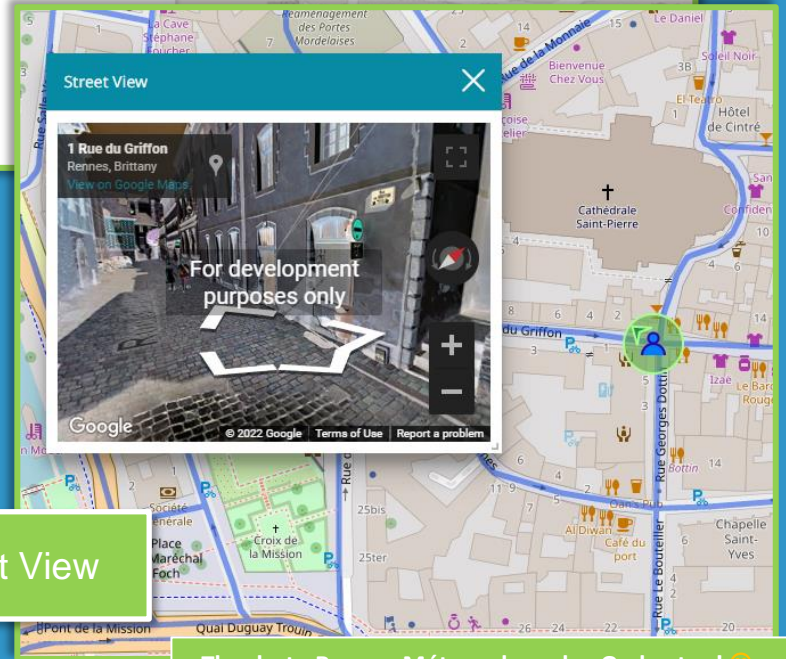
☐ Add bounding box param to sharing link
☒ Add center and zoom to sharing link

Coordinate

Lat: 38.51699339247796 Lon: -90.7939700937501

Zoom

Map Share

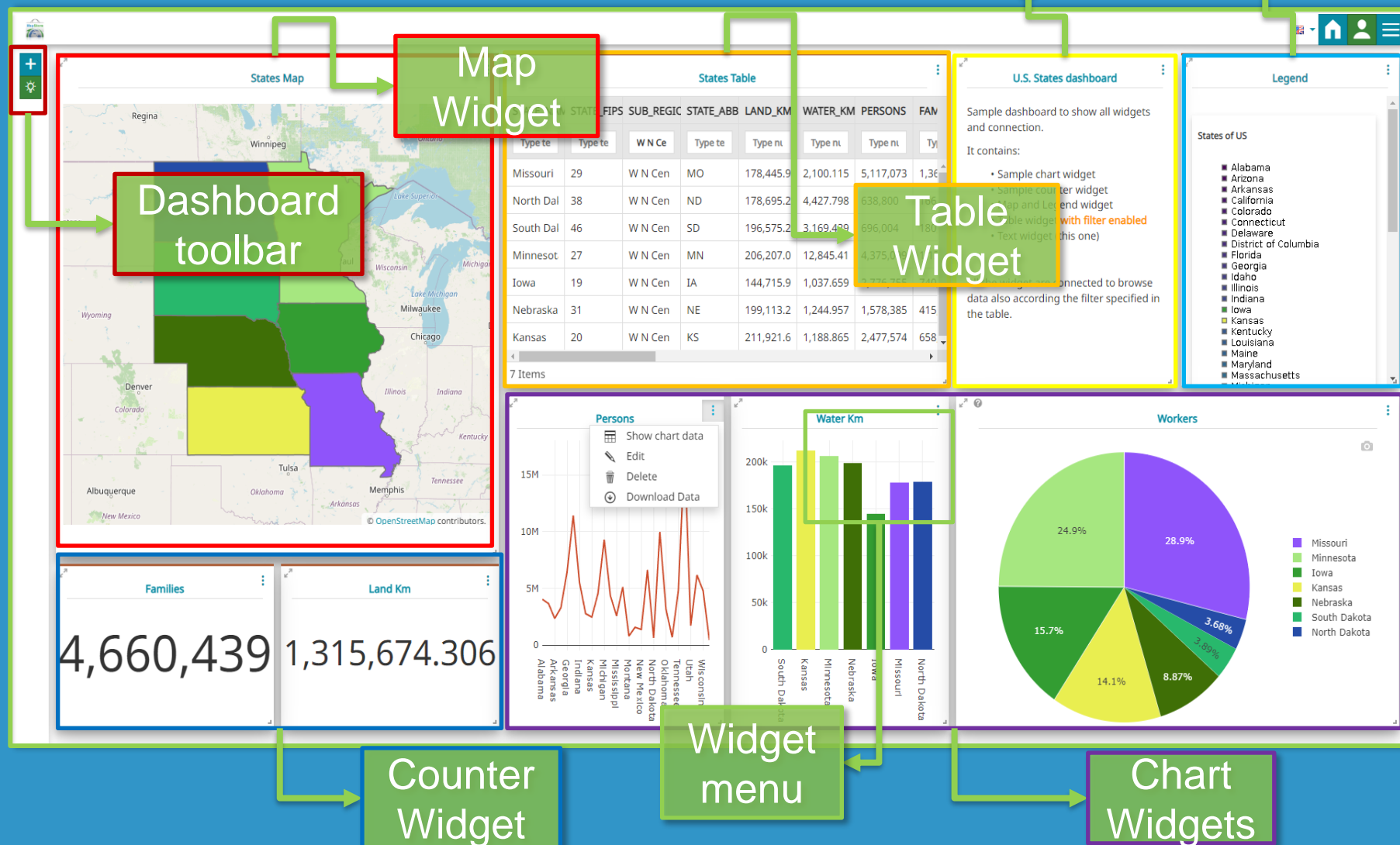


Street View

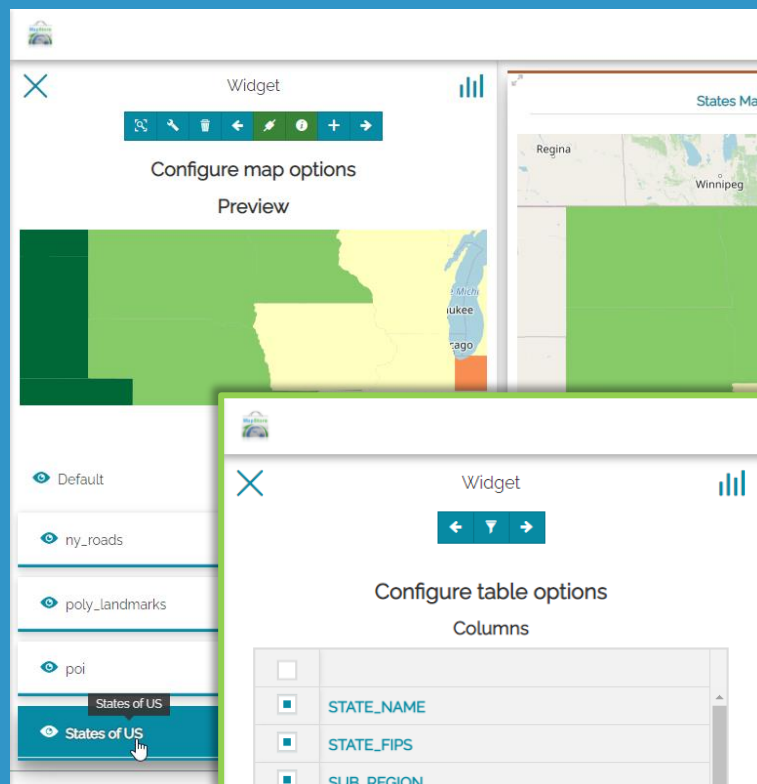
Thanks to Rennes Métropole and geOrchestra ! ☺

MapStore at work

MapStore Dashboard: general overview



Widget Editors



Widget

Configure map options

Preview

Default

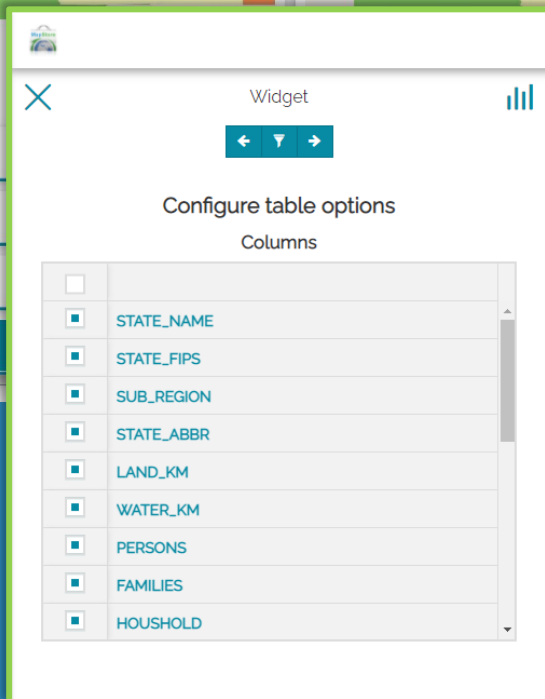
ny_roads

poly_landmarks

poi

States of US

States of US

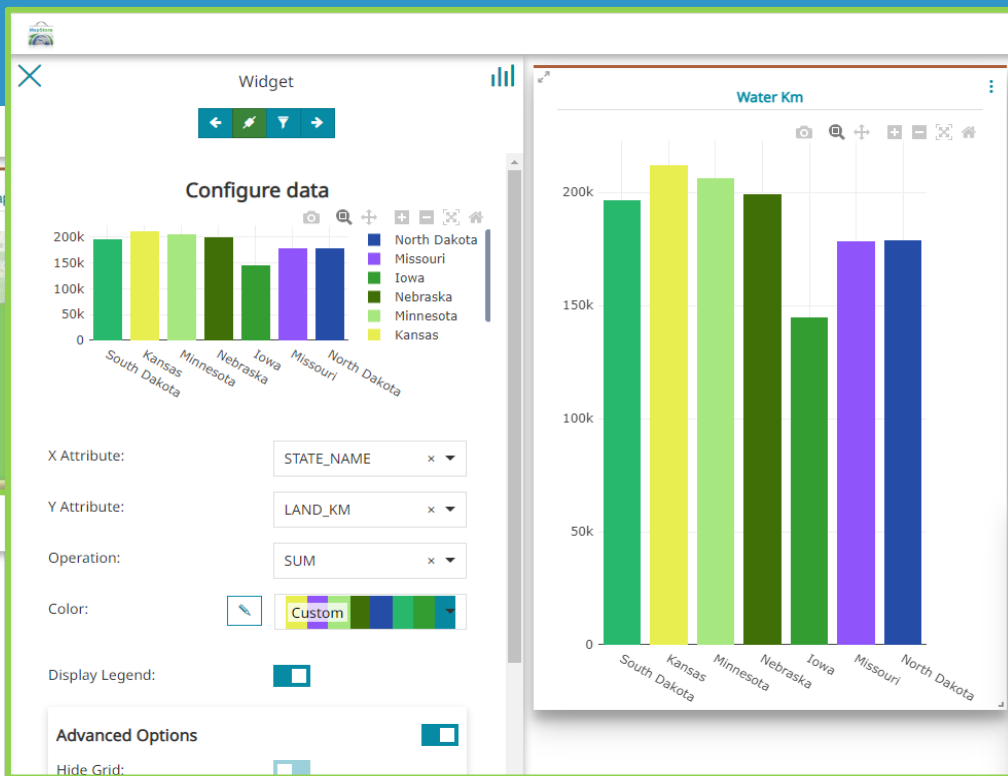


Widget

Configure table options

Columns

<input type="checkbox"/>	STATE_NAME
<input type="checkbox"/>	STATE_FIPS
<input type="checkbox"/>	SUB_REGION
<input type="checkbox"/>	STATE_ABBR
<input type="checkbox"/>	LAND_KM
<input type="checkbox"/>	WATER_KM
<input type="checkbox"/>	PERSONS
<input type="checkbox"/>	FAMILIES
<input type="checkbox"/>	HOUSHOLD



Widget

Configure data

X Attribute: STATE_NAME

Y Attribute: LAND_KM

Operation: SUM

Color: Custom

Display Legend: ☐

Advanced Options

Hide Grid: ☐

Water Km

State	Land Km
South Dakota	196,575.21
Kansas	206,207.01
Minnesota	144,715.08
Nebraska	199,113.20
Iowa	12,841.30
Missouri	1,037.30
North Dakota	1,244.30

South Dal	46	W N Cen	SD	196,575.21	3,169
Minnesot	27	W N Cen	MN	206,207.01	12,841
Iowa	19	W N Cen	IA	144,715.08	1,037
Nebraska	31	W N Cen	NE	199,113.20	1,244
Kansas	20	W N Cen	KS	206,207.01	12,841

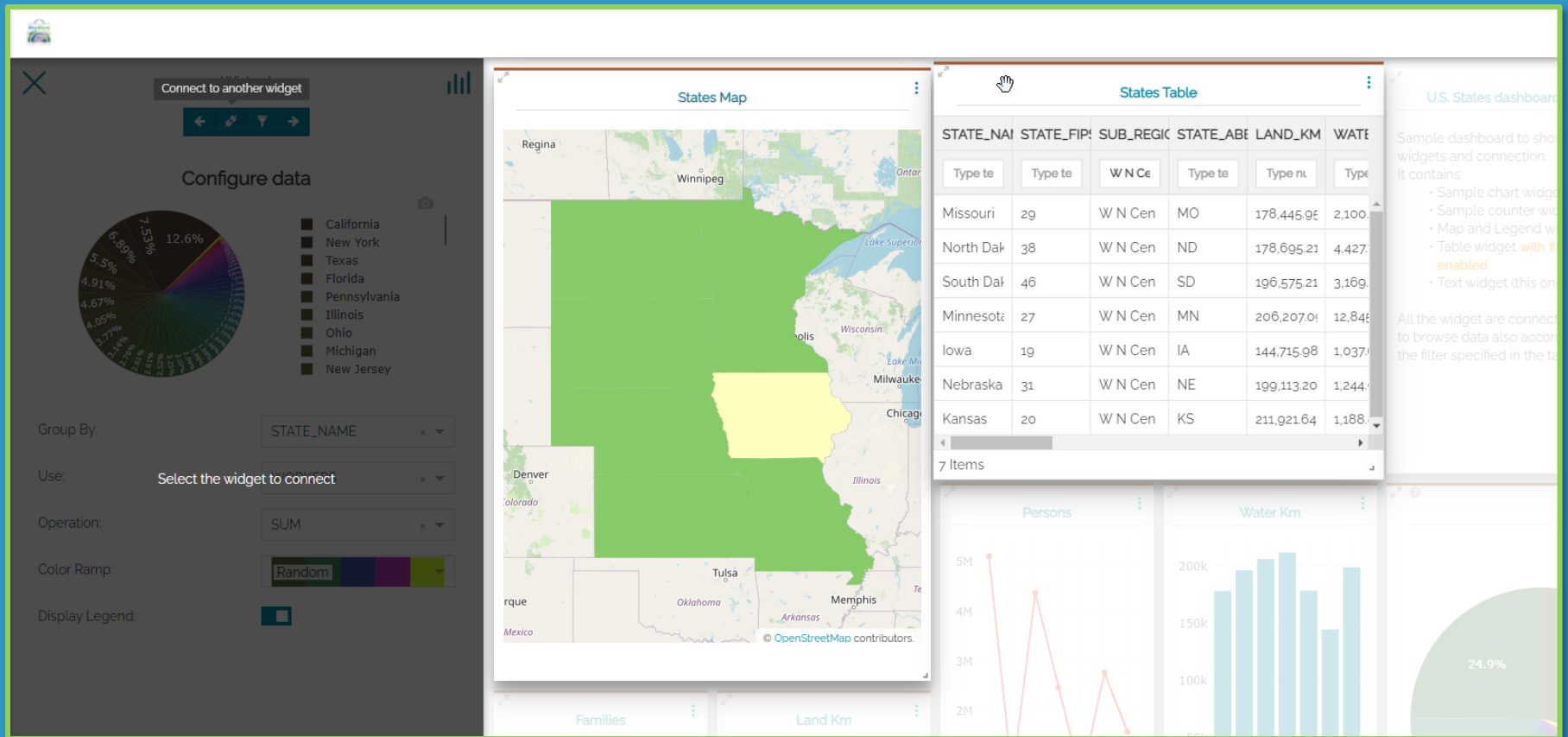
7 Items

Families

4,660,439 1,315,674.306

Fine tuning of all widgets based on OGC standards

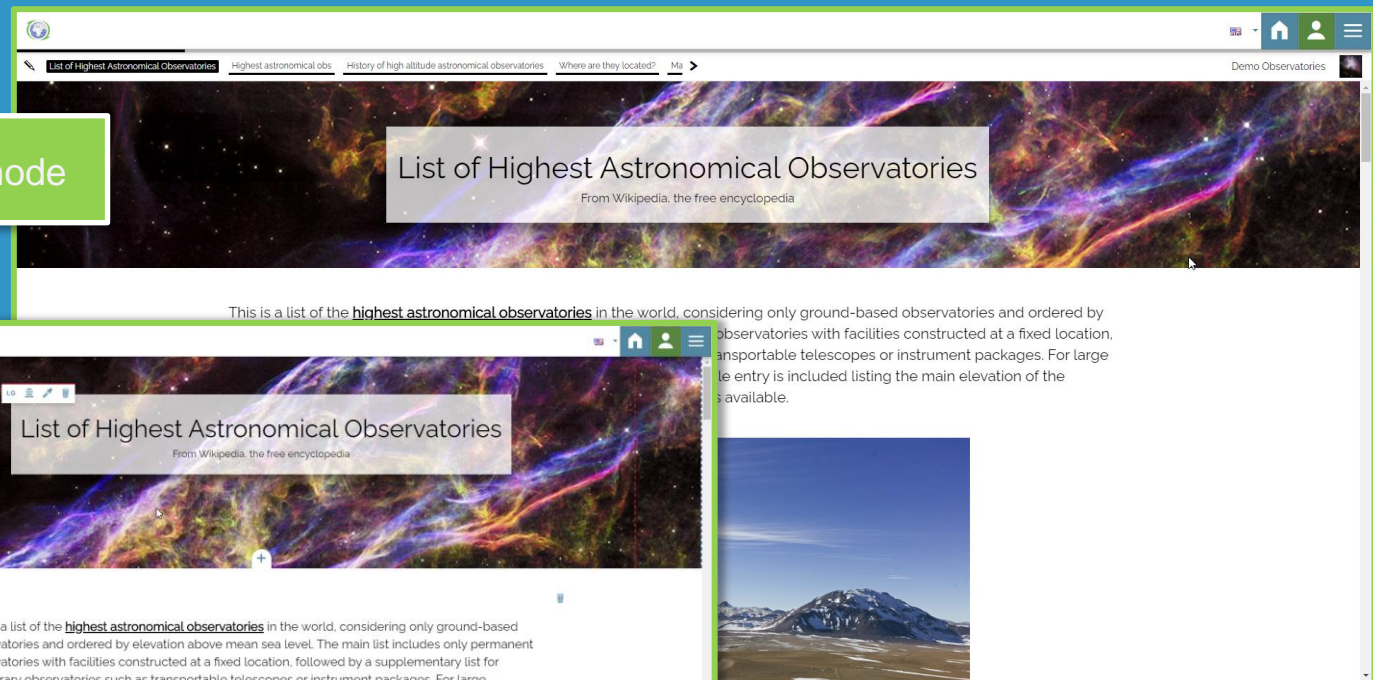
You can connect widgets to other widgets: **Maps** or **Tables** widgets



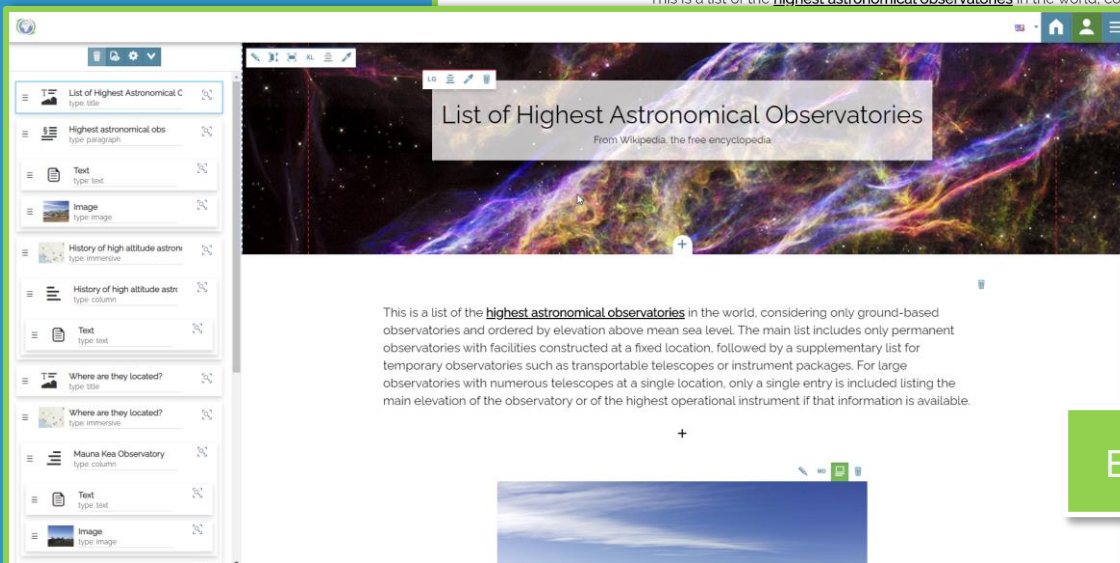
A connected widget updates its content according to the parent one!

MapStore GeoStory:
create **inspiring and immersive stories** by combining **text**, **interactive maps** and **multimedia content** (e.g. images, video or other third party content).

View mode

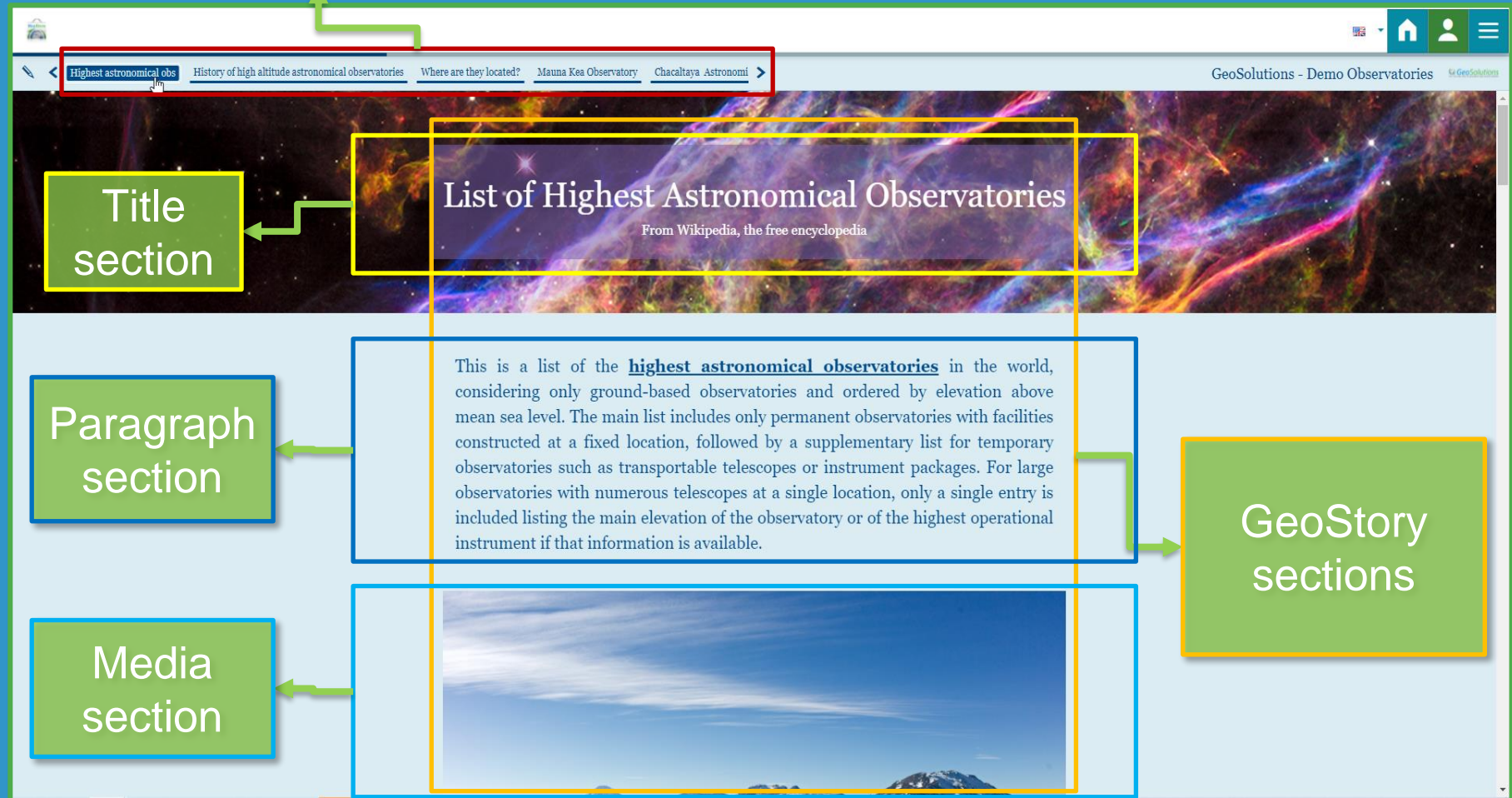


Edit mode



Navigation
toolbar

Tell your story with a modern look !



The screenshot shows a web browser displaying a story in MapStore. The browser's address bar shows the URL: [Highest astronomical obs](#). The story's title is "List of Highest Astronomical Observatories" with a subtitle "From Wikipedia, the free encyclopedia". The main content area contains a paragraph of text and a photograph of a mountain peak under a blue sky. The story is part of a collection titled "GeoSolutions - Demo Observatories".

Annotations on the left side of the screenshot identify the following sections:

- Navigation toolbar**: Points to the browser's address bar and the story's navigation controls.
- Title section**: Points to the story's title and subtitle.
- Paragraph section**: Points to the main text paragraph.
- Media section**: Points to the photograph of the mountain peak.
- GeoStory sections**: Points to the entire story content area.

Other kind of sections are available, like **Maps** and **Immersive**! 😊

Build your story by adding different kind of sections, one after the other with an **advanced web editor**:

- Title/Cover
- Paragraph
- Immersive
- GeoCarousel
- Media (Map, Image, Video)
- Web Page

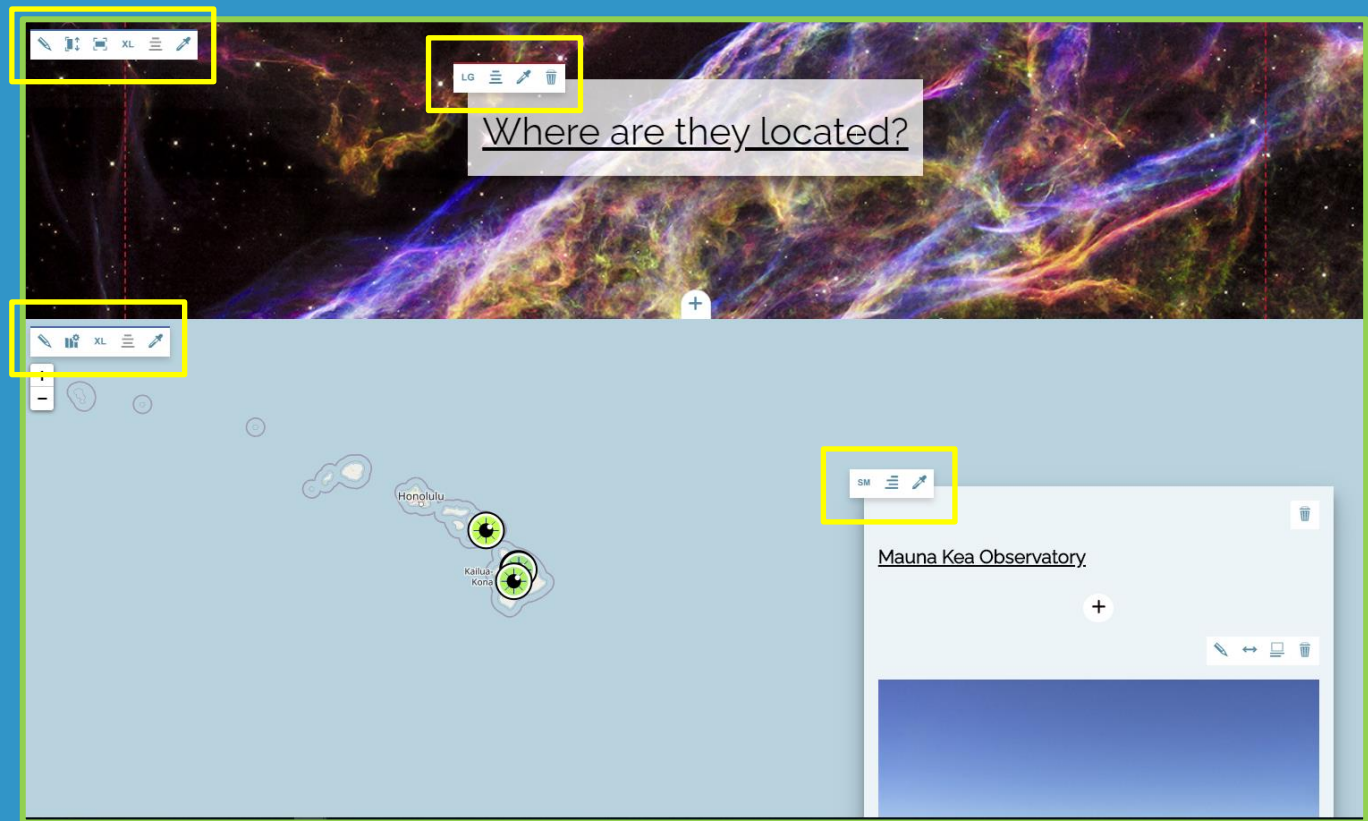


The screenshot displays the MapStore web editor interface. On the left, a toolbar contains icons for adding different types of sections: Title/Cover, Paragraph, Immersive, GeoCarousel, Media (Map, Image, Video), and Web Page. The main workspace shows a map with several sections being added or edited. These sections include:

- A landscape image of a mountain range with the text: "Clear, pristine views of the world's highest observatory sites in China, looking north across the Lushan-Changbai and Jialu Mountains, with the peaks of Cerro Toco right center and Cerro Chajapampa right rising above."
- A paragraph titled "The Northern Tip of India" with text about the Indian Astronomical Observatory and its unique geology.
- A map section titled "Chacallaya Astrophysical Observatory" showing the location of the observatory in the Andes.
- A video section showing a telescope at night.
- A text section titled "This is a list of the highest astronomical observatories in the world, considering only ground-based observatories and ordered by elevation above mean sea level. The main list includes only permanent observatories with facilities constructed at a fixed location, followed by a supplementary list for temporary observatories such as transportable telescopes or instrument packages. For large observatories with numerous telescopes at a single location, only a single entry is included listing the main elevation of the observatory or of the highest operational instrument if that information is available."
- A map section titled "Indian Astronomical Observatory" showing the location of the observatory in India.

Sections are organized in a **continuous scrolling layout**!

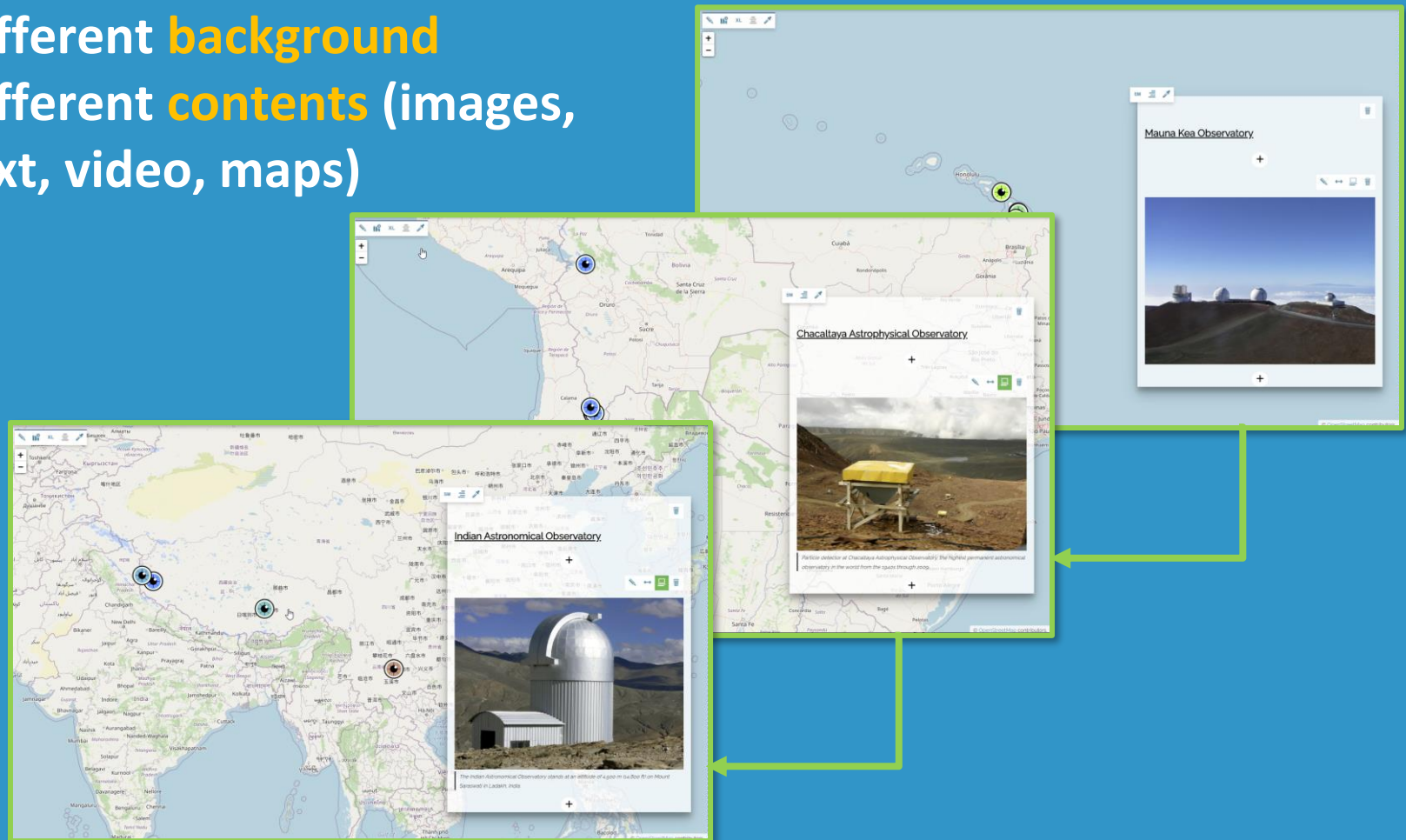
GeoStory gives control over the sections through an **action toolbar**, one per section or sub-section



Perform **quick actions** on your section contents to place, align and configure them as you prefer!

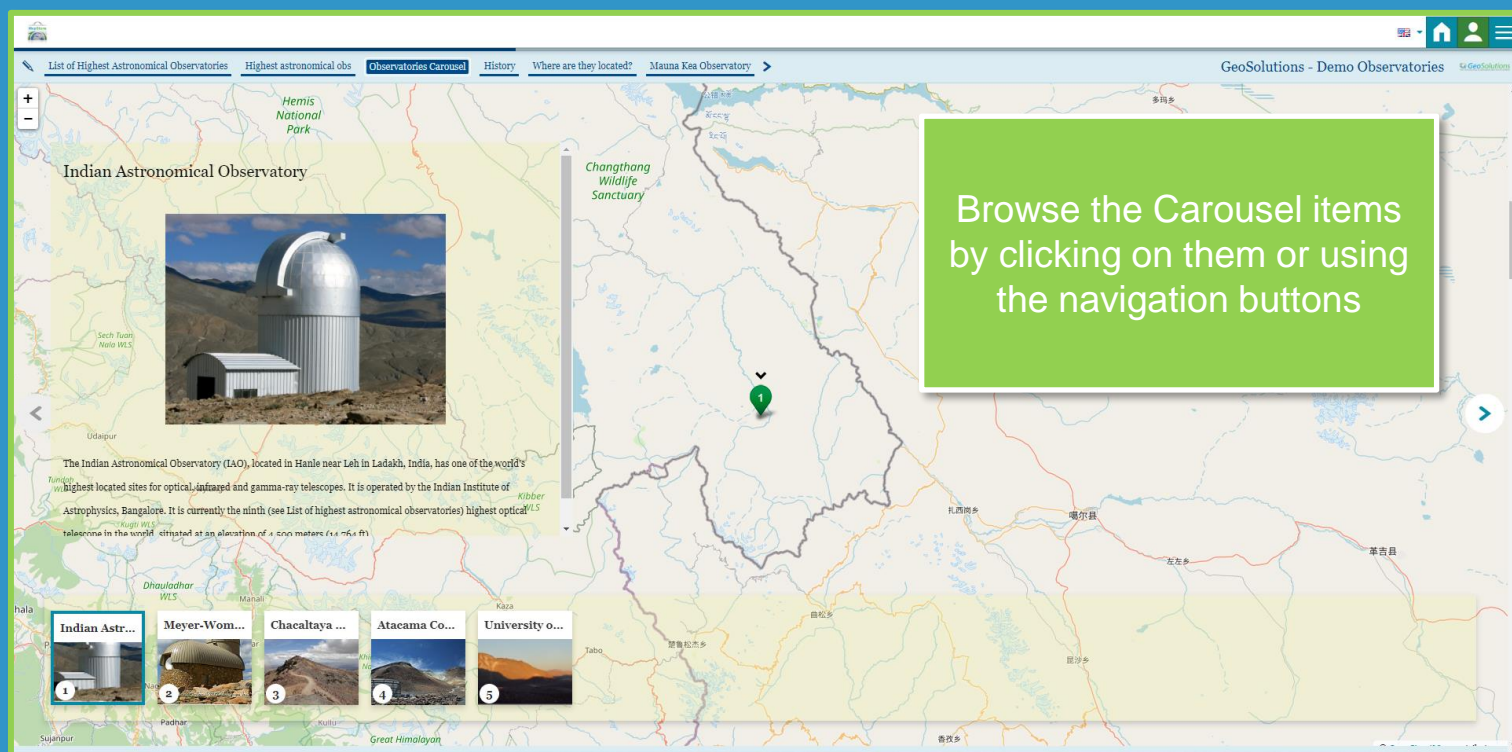
Browse connected topics vertically in your story with the **Immersive section**

- Different **background**
- Different **contents** (images, text, video, maps)



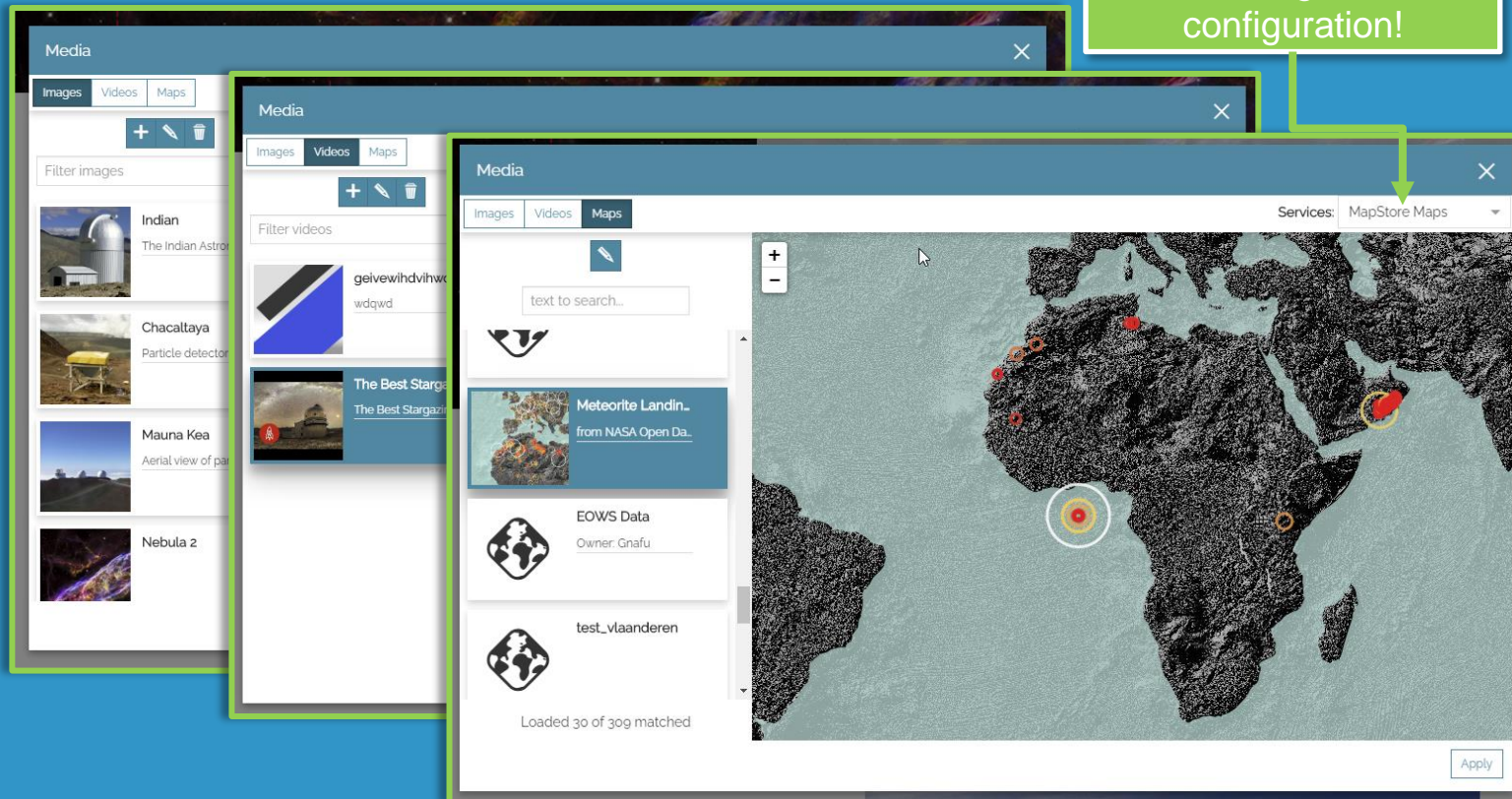
Browse connected topics horizontally in your story with the **Carousel** section

- Define **different locations** that help to tell your story
- Customize each location with its own **descriptive content** in overlay (images, text, video, maps)



What should you do if you want to **change multimedia content** in your story?

You can connect multiple MapStore catalogs via configuration!



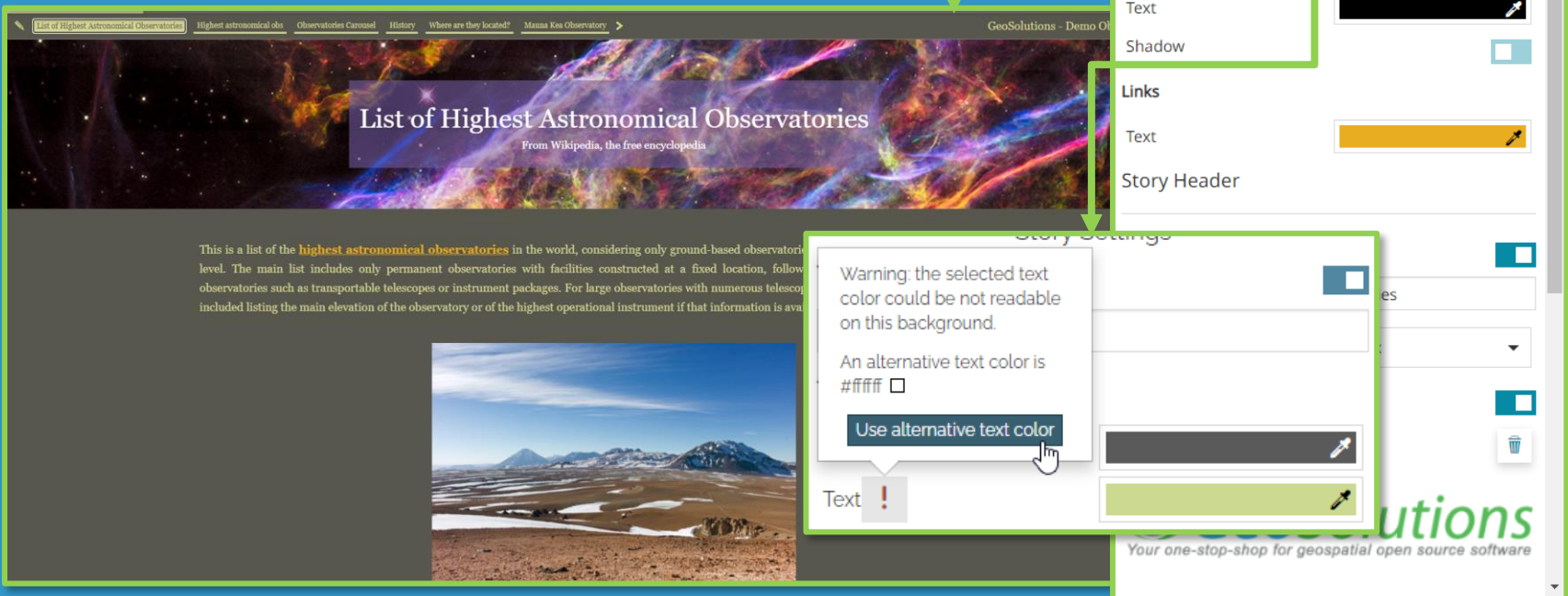
The **Media Editor** gives you control over different multimedia contents!
Images, Videos and Maps



A **Toolbar** on top of the side panel provides additional settings for the story

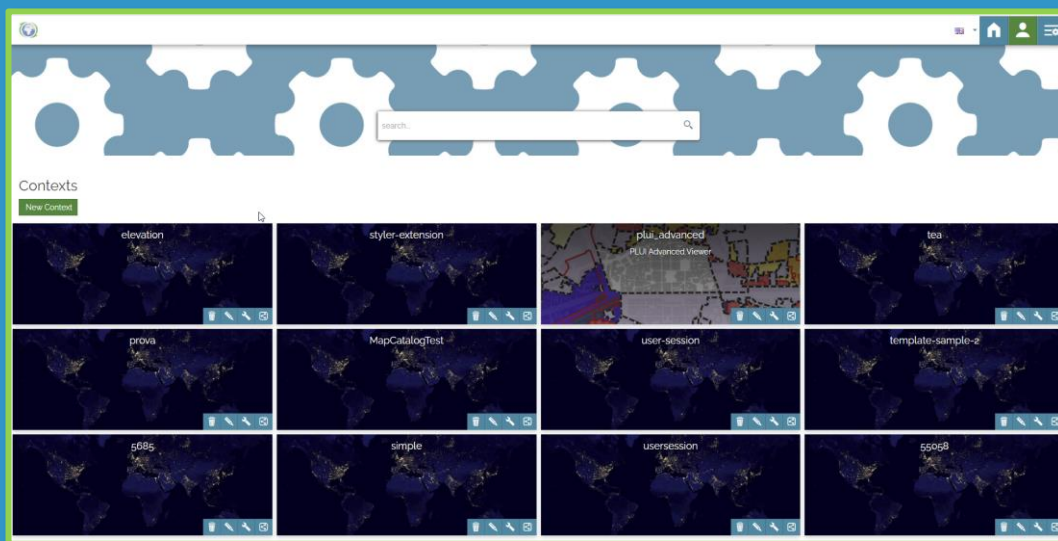
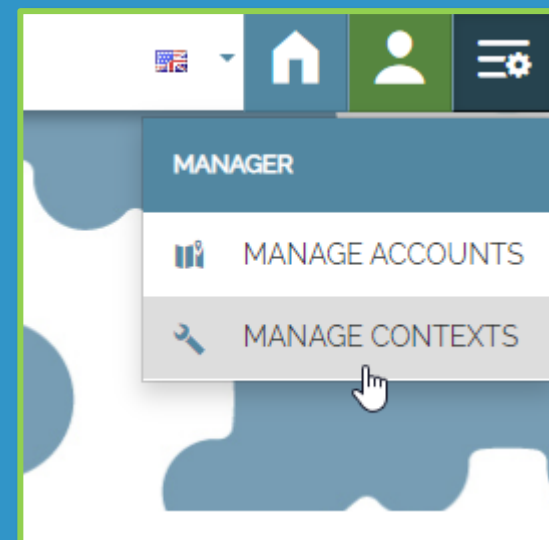
Changing the story theme

- **Background** color
- **Text** color
- All **sections** can inherit the above or have their own **custom theme**



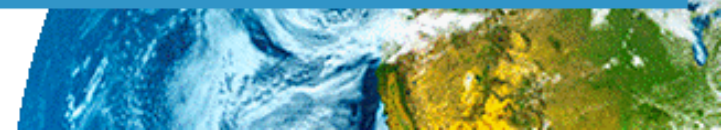
The screenshot shows a MapStore interface with a story titled "List of Highest Astronomical Observatories". The story content includes a header image of a nebula and a text block about astronomical observatories. A toolbar on the right side of the story provides settings for the story theme, default theme, overlay, links, and story header. The toolbar includes color pickers for background and text colors, a font family dropdown, and checkboxes for overlay, shadow, and links. A warning dialog box is displayed, indicating that the selected text color might not be readable on the background and suggesting an alternative text color (#ffffff).

The **Application Context Manager** is an administrative tool designed to build and configure different MapStore viewer configurations for the same MapStore installation

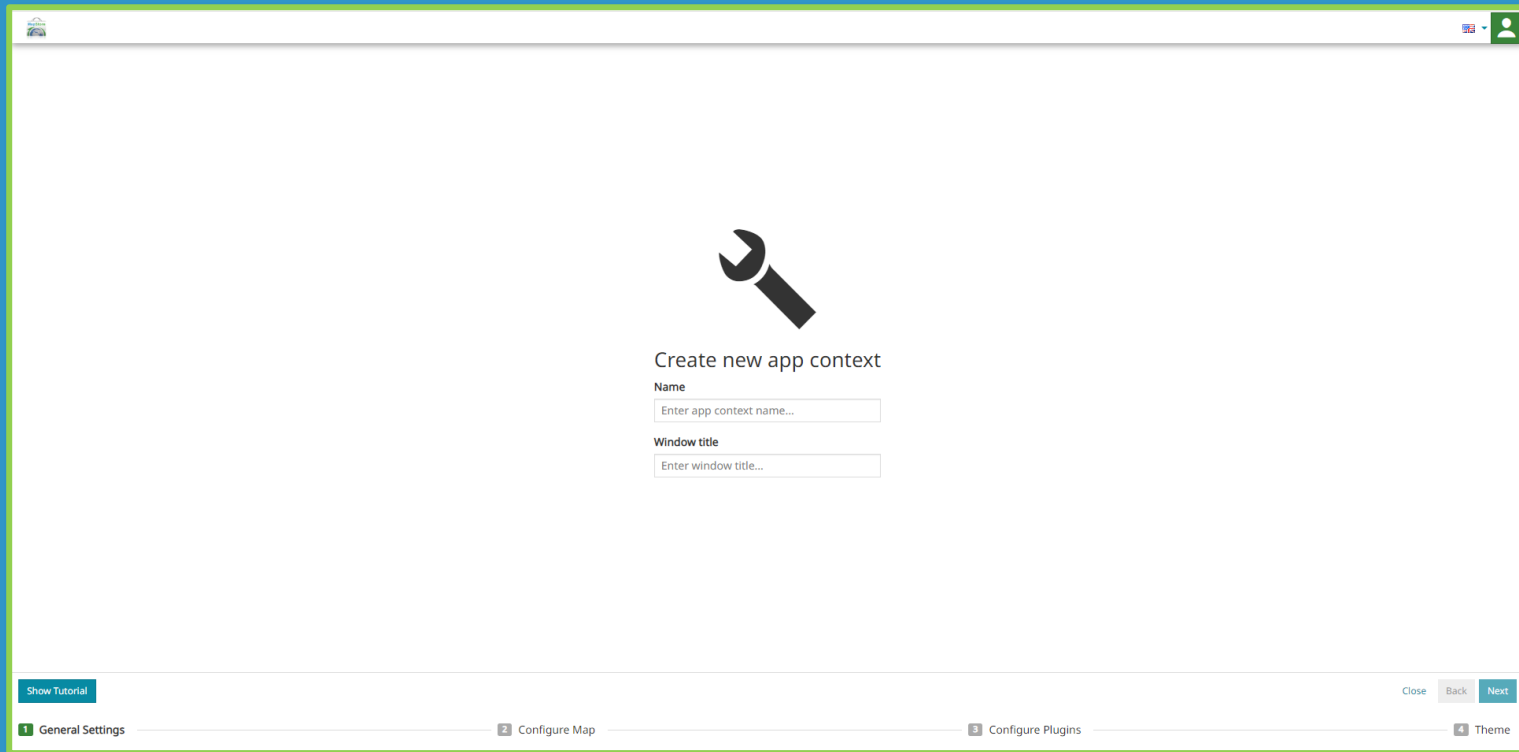


A **multisteps wizard** allows the administrator to configure a custom MapStore viewer

Thanks to Rennes Métropole and geOrchestra ! 😊



- **Step #1:** configure the name of the context and the window title



The Context URL:

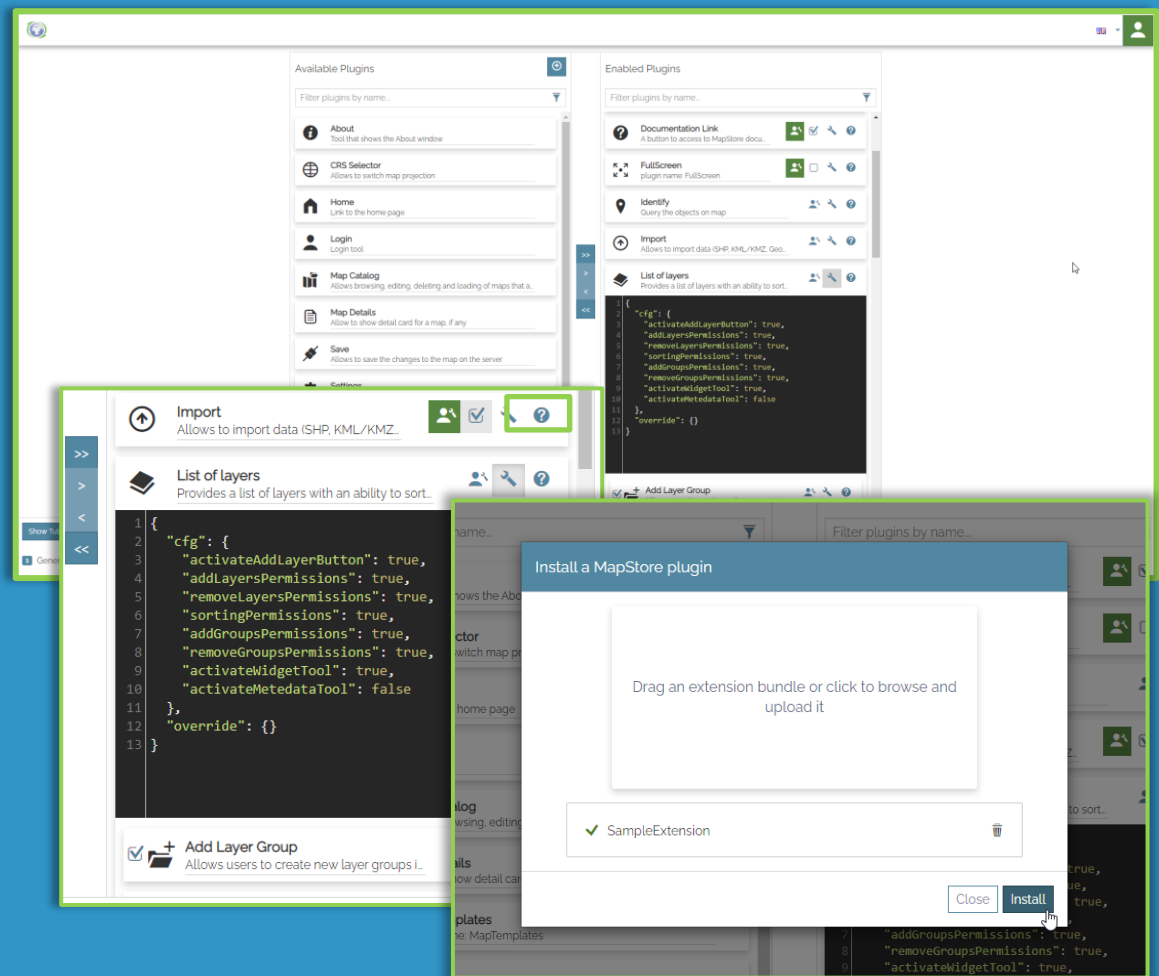
<https://mapstore.geosolutionsgroup.com/mapstore/#/context/newyorkcity>

- **Step #2:** configure the default map state and map contents

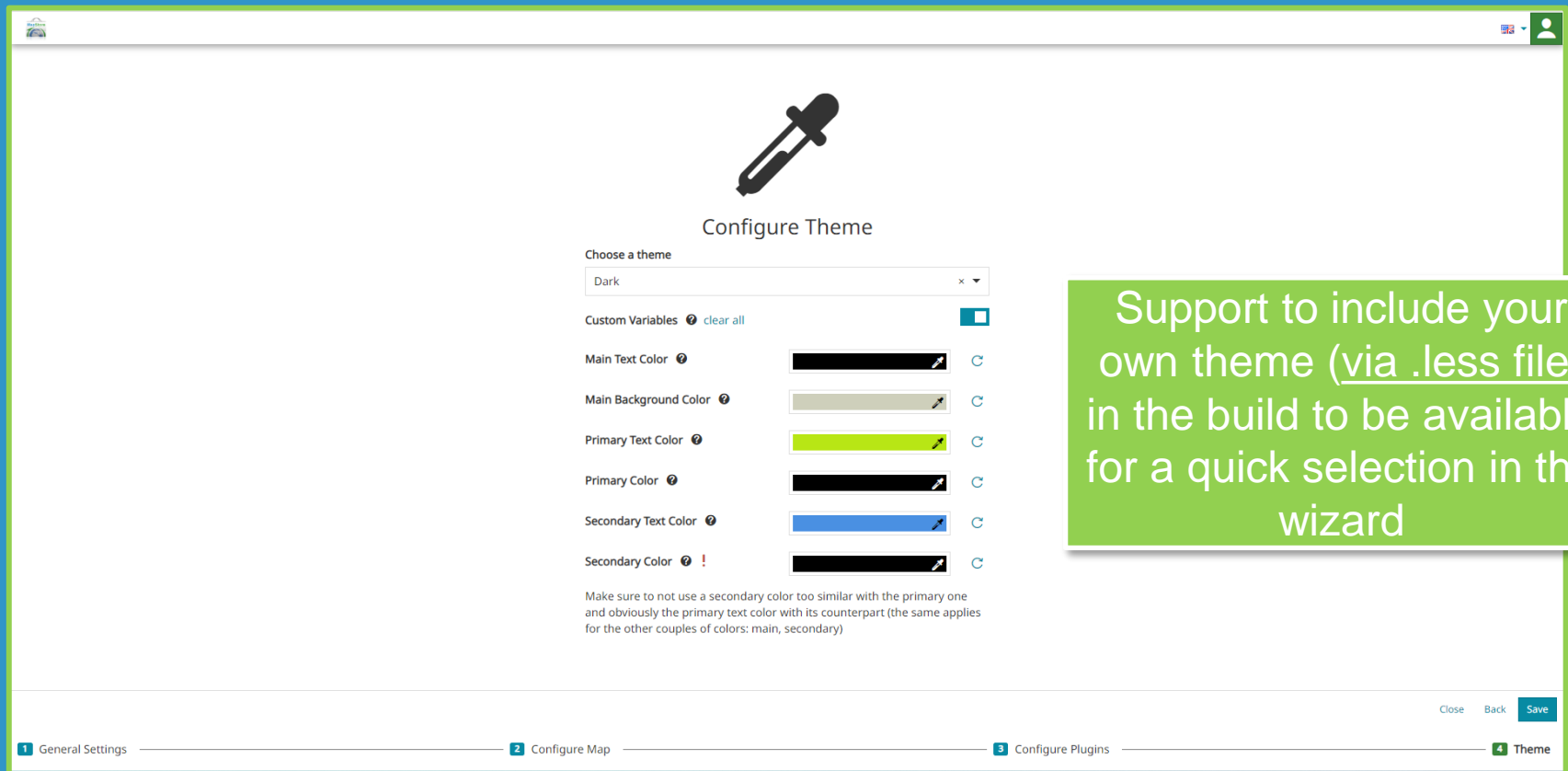
- Layers in TOC
- Backgrounds
- Catalog sources
- CRS
- Annotations
- Map Import
- Map Export

The screenshot displays the MapStore web application interface. The main map area shows a satellite view of Jersey City, New Jersey, with labels for 'Jersey City', 'Hudson River', 'East River', and 'Central Park'. A 'Filter layers' panel on the left shows a list of layers including 'Default', 'pol', 'landmarks', 'ads', 'of US', and 'contributors'. A 'Configure Map' button is visible at the bottom. A 'Configure Plugins' dialog box is open, showing a list of plugins with 'Open Street Map' selected. The dialog also displays the selected CRS as 'EPSG:4326' and the filter projection as 'EPSG:3857'. A 'Scale' bar indicates 1:36072. A 'Close' button is visible in the bottom right corner of the dialog.

- **Step #3:** configure the set of plugins to include in the context viewer
 - **Select plugins** to include
 - **Configure** each plugin
 - **Make plugins** ready to be activated by users on the fly
 - **Install** a custom plugin
 - **Direct link** to the plugin online doc



- **Step #4:** customize the **Theme** of your context





Configure Theme


Choose a theme


Dark


Custom Variables [clear all](#)


Main Text Color  [C](#)

Main Background Color  [C](#)

Primary Text Color  [C](#)

Primary Color  [C](#)

Secondary Text Color  [C](#)

Secondary Color  [C](#)

Make sure to not use a secondary color too similar with the primary one and obviously the primary text color with its counterpart (the same applies for the other couples of colors: main, secondary)

Close Back Save

1 General Settings 2 Configure Map 3 Configure Plugins 4 Theme

Support to include your own theme (via [.less file](#)) in the build to be available for a quick selection in the wizard

Yes, you can do it from the **User Interface!** 😊

- **Step #5:** share the context and manage permissions 😊

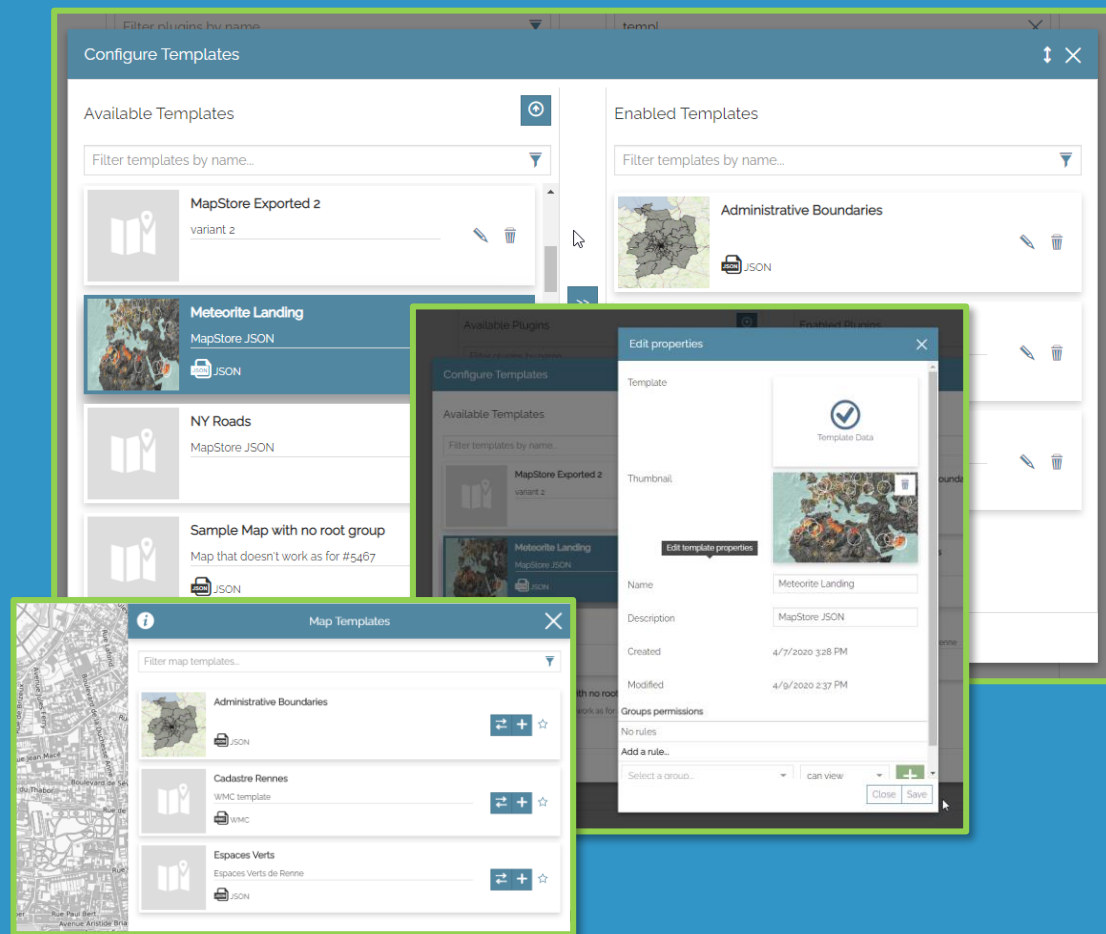
The screenshot displays the MapStore interface with several key components highlighted:

- Contexts Panel:** Located on the left, it shows a 'New Context' button and a map preview for 'newyorkcity Context of NY'.
- Share Dialog:** A modal window titled 'Share' is open, showing options for 'Link', 'Social', and 'Embed'. It provides a direct link: `https://mapstore2.geo-solutions.it/mapstore/#/context/newyorkcity` and a QR code for sharing.
- Edit properties Dialog:** Another modal window titled 'Edit properties' is open, showing fields for 'Name' (newyorkcity), 'Description' (Context of NY), 'Created' (7/15/2020 2:30 PM), and 'Modified' (7/28/2020 12:00 PM). It also includes a 'Groups permissions' section with a table for managing access.

Groups permissions		
everyone	can view	✖
Add a rule...		
Select a group...	can view	+

The **Map Templates** tool is also available for Application Contexts

- **Ready-made map contents** that can be added to a Map
- **Two formats** supported (both MapStore JSON and WMC)



Thanks to Rennes Métropole and geOrchestra ! 😊

- **Easy to customize and extend:** customize the theme and develop your own plugins to be uploaded and installed in one or more application contexts!

Urbanisme

Cadastrapp

The screenshot displays the MapStore web application interface. On the left, a map shows a cadastral plot highlighted in blue. A 'Land Planning' window is open, displaying regulations for plot 350238000BP0161. On the right, the 'Cadastrapp' context is active, showing a 'Plots research' panel with search filters and a 'Plots selection' table. A 'Parcelle' information popup is also visible over the map.

Land Planning - Regulations applicable to the cadastral plot 350238000BP0161

Commune	Rennes
Section	BP
Plot number	161
Cadastral address	RUE DE CHATEAUDUN
DGFIP capacity (m²)	246
Calculated area (m²)	248
Owner account	
Owner (s)	
Date of production of RU	24/09/2020

Parcelle Information:

PARCELLE
350238000AB0010
Town: Rennes
County: 35
Town's INSEE: 238
Prefix: AB
Section: AB
Plot: 10
Address: 8 RUE ROBELIN
DGFIP: 225 m²
GIS: 230 m²

LAND UNIT
DGFIP UF: 225 m²
GIS UF: 230 m²

Plots research (Cadastrapp):

Reference: Rennes (350238)
ex. Rennes, Lannion

Reference(s):
+ Click to add a new reference
AB 10

Plots selection:

Town	Section	Cadastral address	Plan number	Surface DGFIP in m²
350238	AB	8 ROBELIN	10	225

MapStore Extensions: leveraging on the Application Context system MapStore gives you the ability to build custom extensions in a structured and standard way

- **Dedicated repository:** so that you can manage versioning and keep your extension inline across different versions of MapStore
- **Ready to be installed:** following the guidelines your extension can be uploaded and installed in a running MapStore instance
- **Well documented:** we are trying to keep the [online documentation](#) always in line at each MapStore release
- **Extension Template:** we provided a template project as a quick start to encourage developers to use this system and improve it

<https://github.com/geosolutions-it/MapStoreExtension>

Thanks to Rennes Métropole and geOrchestra ! 😊

Check out the updated **User and Developer** guides of the release v2022.01.01

<https://mapstore.readthedocs.io/en/v2022.01.01/user-guide/home-page/>

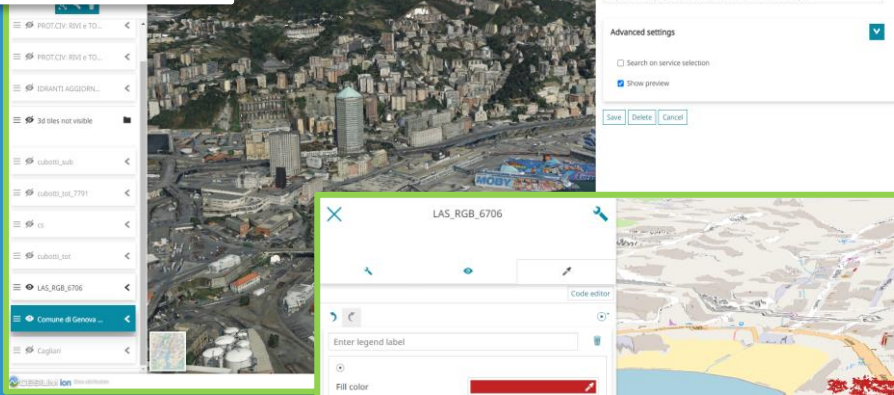
<https://mapstore.readthedocs.io/en/v2022.01.01/developer-guide/requirements/>

We are actively working on interesting new features and improvements for existing tools to be available in next releases!

The MapStore community is also growing a lot,
Thank you all! 😊

- **3D Tiles:** we are working to improve the MapStore 3D viewer through the inclusion of new interesting updates:
- **Update of the Cesium JS** library to the latest version. This helps to solve also some performance issues present in the older version

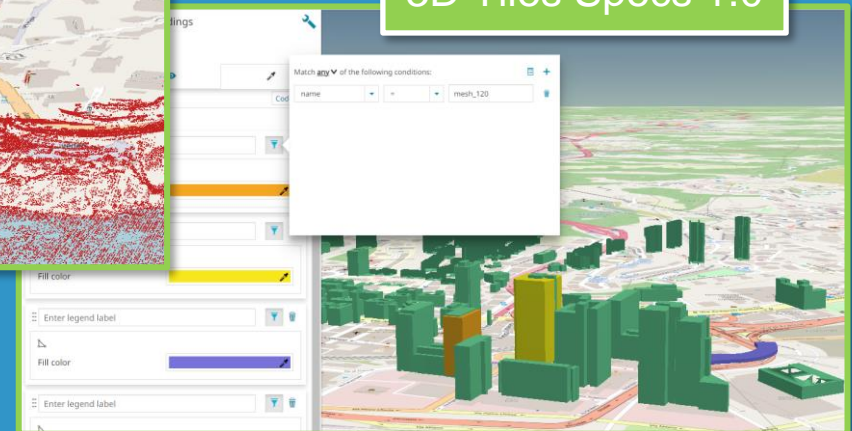
2022.Q1
2022.Q2



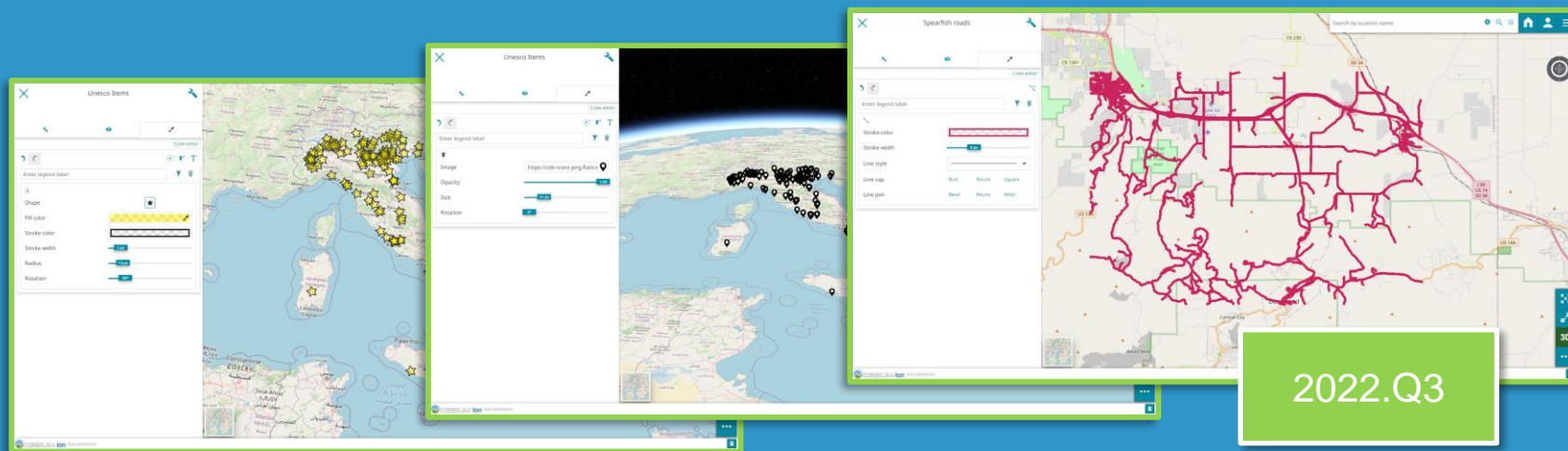
- Support for a new catalog source and layer type for **3D Tiles**
- Support for **3D Tiles styling**

3D Tiles Specs 1.0

- More work in progress to support **more styling capabilities**



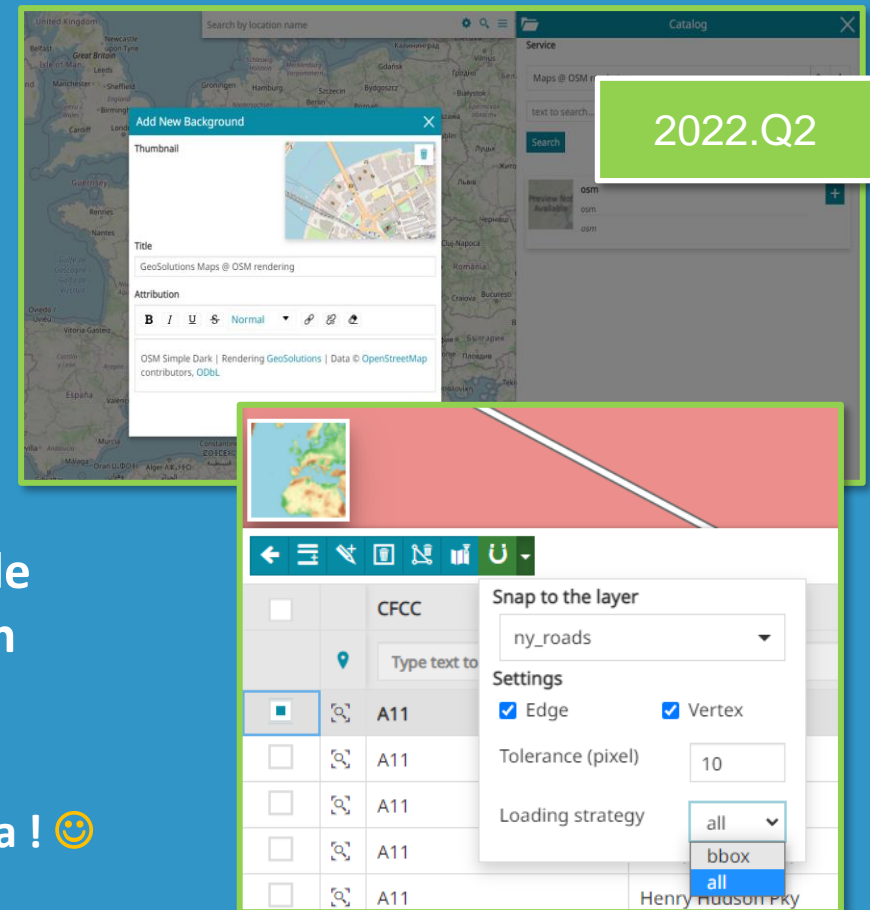
- **More on 3D:** we are working to move further steps on the 3D functionalities
- **Some experiments** aimed to support 3D geometries in the Cesium map (in GeoJSON format)
- **Support of WFS layers** also in Cesium map
- **Enhancements** aimed to evolve the styling of client side **vector features** with an improved Visual Style Editor (both 2D and 3D maps)



- **More on 3D:** we are working to move further steps on the 3D functionalities
- **More experiments** aimed to enrich the **styling capabilities of 3D Tiles** (based on the OGC Styling specifications 1.0) such as: labels, alignment of Graphics (Marks/Icons) and labels, clamp to ground and extrusion properties and more
- **Some investigations** to possibly support experimental styling properties
- **Some experiments** aimed to include the selection of **multiple Terrain layers** for in the 3D map



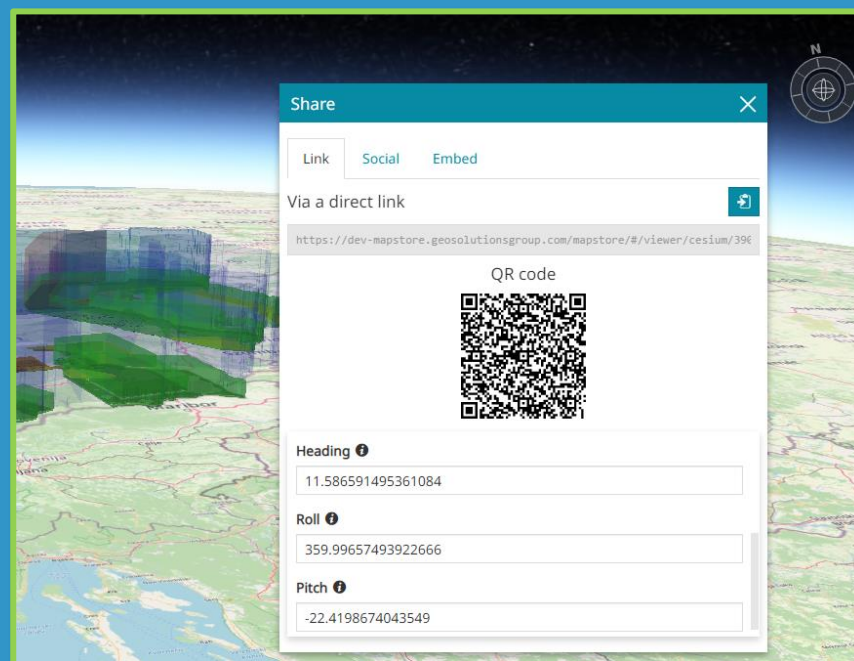
- **Additional capabilities added to existing tools:** in v2022.01 some interesting enhancements and new features have been included
- **Improved the WMTS support:** more support of WMTS layers in GeoStory and added Attributions for WMTS background layers
- **Snapping function for Attribute Table:** in edit mode it is now possible to snap features to other ones when editing geometries



Thanks to Rennes Métropole and geOrchestra ! 😊

Loading strategy included! Support to implement additional strategies in addition to the default ones

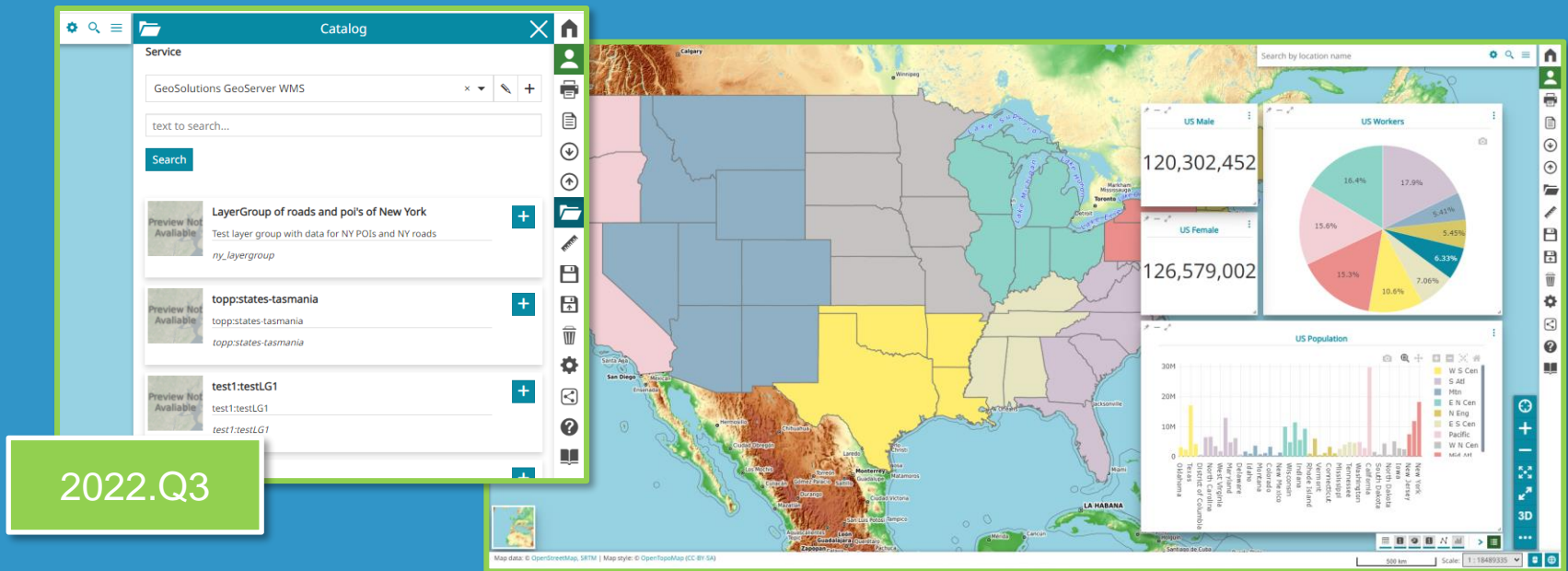
- **Additional capabilities added to existing tools:** in v2022.01 some interesting enhancements and new features have been included
- **3D query parameters:** enhanced sharing capabilities for the 3D map providing the support for additional options for the **camera orientation**
- **Map Viewer query parameters:** enhanced the support to viewer query parameters (also via POST)



Thanks to Rennes Métropole and geOrchestra ! 😊

2022.Q2

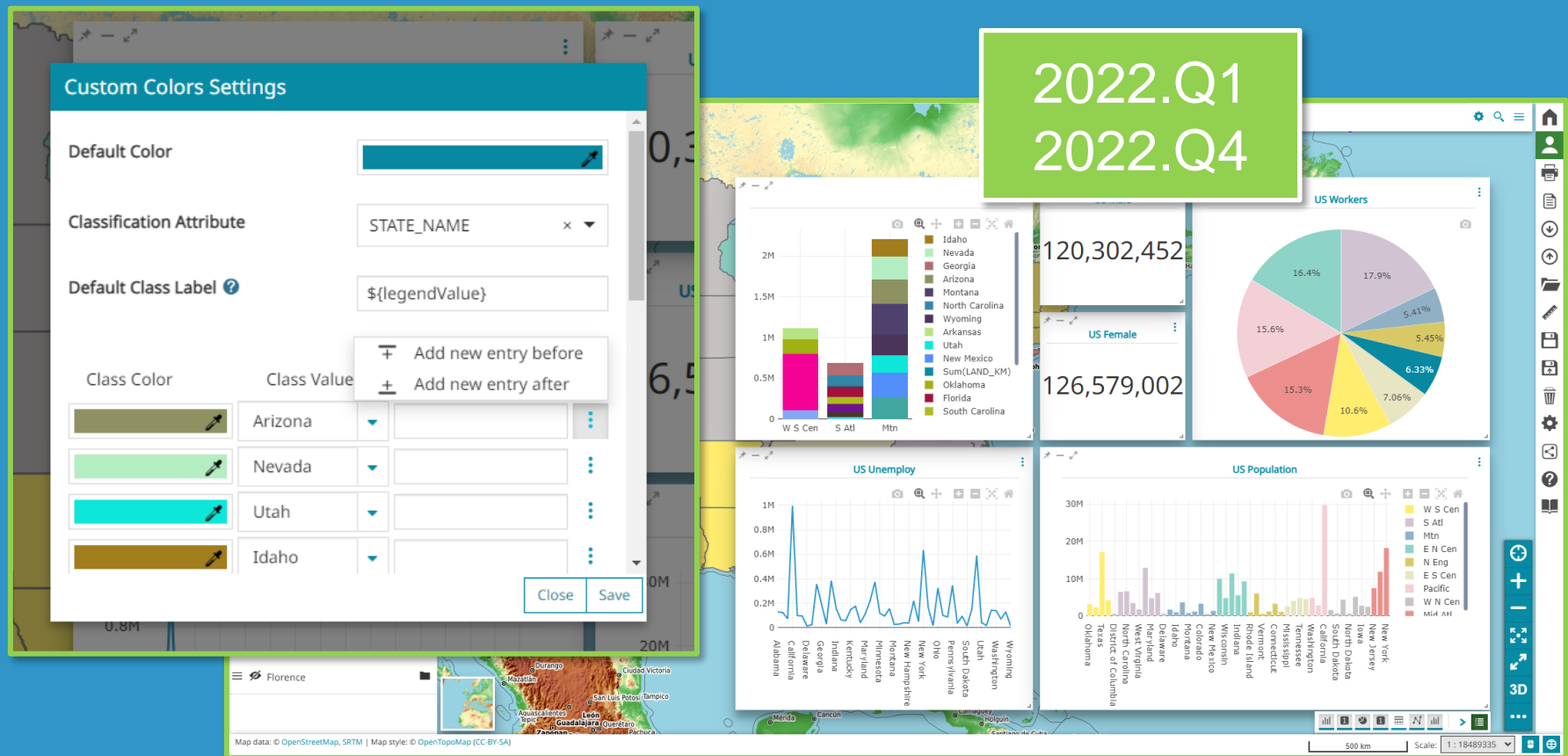
- **Layout enhancements:** in v2022.02 some interesting improvements will also be provided for the new MapStore layout where:
 - The Options menu will be replaced by a **Sidebar**
 - Other layout changes such as: **smaller buttons** and **reduces size of side panels on the right**



2022.Q3

Thanks to Rennes Métropole and geOrchestra ! 😊

- **MapStore Charts:** we are working to improve charts
 - In v2022.01 MapStore widgets have been enhanced with classification capabilities for **Bars (stacked and grouped)** and **Pie** charts



Both **MapViewer** and **Dashboard** are supported!

- **Downstream projects:** we are working on a new project system that helps to maintain and update existing projects and new ones. We are going to separate gradually the core from the product to have the core library in **npm package(s)**
- **Performances:** MapStore is growing very quickly. For this reason, we are working to keep it as optimized as possible to:
 - **Reduce the loading time at startup** by reviewing and reducing the bundle size
 - Optimize **build time** and **resource consumption**

2022.Q4

2022.Q3

2022.Q4

That's all folks!



Questions?

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