Viewer Features
DataBC Mashup Framework (DMF)
## Contents

1 Definition and Description  
2 Data Sources  
   2.1 Google Base Maps  
   2.2 Web Map Service (WMS) Layers  
   2.3 Keyhole Markup Language (KML) Layers  
      2.3.1 Folders  
      2.3.2 Point Clustering  
      2.3.3 Network Links  
   2.4 Google Fusion Tables  
   2.5 Shapefiles  
   2.6 MPCM (Layer Catalog) Layers  
3 Tasks  
   3.1 Main Tasks  
      3.1.1 Task: "About this Application"  
      3.1.2 Task: "Comparative Charting"  
      3.1.3 Task: "Defined Query"  
      3.1.4 Task: "Find Coordinates"  
      3.1.5 Task: "Find Nearby"  
      3.1.6 Task: "Geomark"  
      3.1.7 Task: "Layer List"  
      3.1.8 Task: "Search by Category"  
      3.1.9 Task: "WorkBC Service Centre"  
   3.2 Additional Tasks  
      3.2.1 Task: "Address Search"  
      3.2.2 Task: "Driving Directions"  
      3.2.3 Task: "Feature Charting"  
      3.2.4 Task: "Geolocation"  
      3.2.5 Task: "Share Map"  
   3.3 Startup Parameters  
      3.3.1 Set the Map Extent  
      3.3.2 Filter with Search by Category  
      3.3.3 Set the Layer Visibility  
      3.3.4 Add Dynamic Data Sources  
      3.3.5 Other
4  Screen Layout  

4.1  Desktop  

4.2  Mobile  

4.2.1  Behavior differences with Desktop mode
1 Definition and Description

The DataBC Mashup Framework (DMF) is an application for creating and viewing mapping applications. DMF focuses on building a simple design for lightweight mapping sites, while providing the power to connect to a variety of data sources. The framework uses Google Maps Javascript API to make it possible for Ministry business groups to quickly develop and deploy lightweight applications.

The deployment process is simplified by the ability to create sites using the DMF Wizard Application. The wizard provides step-by-step instructions for designing both the structure and the style of the site. Site authors can configure data sources, tasks, and site layout using the wizard.

Once a site has been defined in the wizard, it can be accessed through the DMF Viewer. The Viewer loads the data from the site’s data sources onto a map and implements configured tasks for accessing the map data. The Viewer is styled differently depending on whether the end user is accessing it from a desktop or mobile web browser.

2 Data Sources

The framework is built to use many data sources. This section covers how to get data onto a map using a DMF site.

A Layer List with multiple sources of data

2.1 Google Base Maps

Google Maps provides out-of-the-box base-map data, including Map, Terrain, and Satellite views. Google Maps API v3 also includes built-in support for Street View functionality.
2.2 Web Map Service (WMS) Layers

The DMF Wizard contains preconfigured connections to WMS data. A WMS service may contain multiple layers of data. In the wizard, a site author can select which layers to add to a site. Google Maps then loads data from these map services as map tiles.

2.3 Keyhole Markup Language (KML) Layers

KML is an XML-based language for managing the display of 3D geospatial data and is an accepted Open Geospatial Consortium (OGC) standard. A KML layer adds geographic markup to the map from a KML or KMZ file that is hosted on a publicly accessible web server. KML files are the main way to include style-able, searchable data in a DMF site.
KML layer data

Styles can be preconfigured in the KML file or a site author can specify custom styling for a particular layer. Some predefined styles and icons are available in the DMF Wizard, but the author can also upload a custom icon.

Be careful to use an icon that displays well on multiple devices. This is especially true for handheld devices. Large icons on a small screen can make the map difficult to use.

If you want to create a KML file from scratch, Google provides a tutorial on the KML file format here:

https://developers.google.com/kml/documentation/kml_tut

If you have a KML or KMZ file created in Google Earth, please note that not all KML tags are supported in Google Maps. To see a list of KML features supported by Google Maps, visit this page:

https://developers.google.com/kml/documentation/kmlelementsinmaps

DMF provides an XSD file to validate your KML files prior to uploading them to the DMF wizard. This XSD file, accessible only from the BC government’s internal server, is located here:

http://apps.gov.bc.ca/gov/wsvn/TC7.dmf-source/documentation/dmfkml.xsd

2.3.1 Folders

DMF supports one level of folders in a KML file. When you upload a KML file, the DMF Wizard will condense subfolders into their parent folders.

Folders are displayed in the Layer List. From the Layer List, a user can select and unselect folders to show and hide groups of data on the map.

When you add a KML layer with folders to a site in the DMF Wizard, you may be presented with a screen to assign a style to each folder. If you know that a folder uses only one icon style, you can use this screen to make the icon and the folder appear inline with each other.

The icon/folder association screen will only appear when you add a KML layer to the site if it contains both folder definitions and point features.

If you assign styles to folders in the DMF Wizard, this only affects the Layer List layout. It does not change the icons that appear on the map. The DMF Wizard does not verify your folder/style selection, so it is your responsibility to confirm that the choices make sense.
2.3.2  Point Clustering

If a KML layer contains a large amount of point data, the layer can be configured to use clustering. The server calculates groups of points based on how far the user has zoomed in or out.

Site authors can configure cluster options in the DMF Wizard for each layer with clustering enabled. They can select font size, font color and background color to match the original icon style.

![Point Clustering of KML layer data, styled to match individual points](image)

When a user clicks on a cluster point, the map will zoom to the extent of its features. Site authors may choose a different click behavior for clusters from the following options:

- **Zoom** – Zoom the map to the extent of the cluster point’s features.
- **Show Features** – Display the details of the cluster point’s features. The site author can set how many results should be displayed on a page, and clusters will automatically split the features’ details across multiple pages.
- **Threshold** – Provide a hybrid behavior between the two other choices. Site authors set a minimum threshold value in the DMF Wizard. Clusters up to the threshold size display feature details, similar to Show Features, while clusters over the threshold size will only zoom the map to the extent of the features.

2.3.3  Network Links

KML files make it possible to introduce network links so the server can dynamically receive data from an external server. DMF supports connections to servers that can return KML data. On every search or map pan, the Viewer then requests data updates from the linked server.

2.4  Google Fusion Tables

Google Maps includes an experimental version of Google Fusion Table layers. You can add Fusion Table data with geographic location data to a DMF site, and Google Maps renders it using server-side map tiles. Google Fusion Tables currently do not support using custom symbology. To take advantage of Google Maps’ server-side rendering, you have to define your layer symbology using the Google Fusion Table interface.

DMF automatically discovers location data from a Fusion Table. It does not currently support Fusion Tables with two-column locations or geocoded addresses.

Google Maps only allows five (5) Fusion Table layers on the map at a time. Additional layers will not show up on the map until other Fusion Table layers are turned off.
Google Fusion Table data loaded as tiles

2.5 Shapefiles
Shapefiles are divided into three component files (.shp, .dbf, .shx). Shapefile data is transformed into an intermediate KML format and rendered in the same way as other KML layers.

2.6 MPCM (Layer Catalog) Layers
MPCM is a mapping aggregation service, providing an organized list of map layers. Layers available through MPCM can be sourced through ArcGIS Server or WMS services. The MPCM service contains layer connection details along with additional metadata information. Site authors can search the MPCM layer catalog for preconfigured layers and include them in their DMF site.

All layers from MPCM will be rendered as tiled images, as overlays to the base map (‘underneath’ other vector layers). However, DMF assumes the layers can return vector data, allowing users to apply search & filter tasks to the data.

Site authors can navigate the Layer Catalog in the DMF Wizard to find layers from the MPCM service

3 Tasks
Tasks are tools integrated into the DMF Viewer that allow users to interact with site data. This section gives an overview of task functionality and configuration available through DMF.

3.1 Main Tasks
Main Tasks are those tasks that are configurable for the Desktop viewer side panel (or Mobile viewer main toolbar).
Some tasks may be added to a DMF site more than once. Each task can be configured independently, which allows the author to create multiple tasks of each type. For example, you could implement two Defined Query tasks, one for Old Parks and another for Parks with Boat Launches.

Site authors can assign aliases, and optionally subtext, to tasks defined in their sites. The alias and subtext are shown in the side panel to give a more personalized feel to the site.

<table>
<thead>
<tr>
<th>Search for Parks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picnic Locations</td>
</tr>
<tr>
<td>Show parks with picnic facilities</td>
</tr>
<tr>
<td>Old Parks</td>
</tr>
<tr>
<td>No Motors; Just Camping</td>
</tr>
</tbody>
</table>

Tasks in the side panel, configured with Alias and Subtext

Aliases are especially important when you use multiple copies of a task. Make sure to be descriptive enough to let the users know what they are clicking.

### 3.1.1 Task: “About this Application”

When included in a site, About this Application provides the user with a site overview, including contact information. It is included in sites by default. The content is fully customizable, either through a Rich Text or HTML editor.

When you use the HTML editor, be careful to avoid rigid page designs like tables or images with hard-coded sizes. Different devices have different amounts of screen real estate.

Support for embedded YouTube videos has been added. YouTube makes it possible to embed HTML through their video Share options.

For best compatibility across all devices, resize YouTube video to use 300px width.

### 3.1.2 Task: “Comparative Charting”

The Comparative Charting task allows a user to quickly view numerical data for multiple locations in a layer. Charts can either show as bar or line charts.
The Comparative Charting show numerical values for multiple locations, styled as a bar chart

Each comparative chart will be configured for a single layer. The author can add multiple categories, one for each desired attribute to display. The title and axes are configurable in the DMF Wizard.

When users open the Comparative Chart task, they will be notified to click on locations in the configured layer. As they click on points, they will be highlighted on the map with colored circles. These circles match the colors of the bars in the chart.

As locations are selected for Comparative Charting, they are highlighted with colored circles on the map

3.1.3 Task: “Defined Query”

A Defined Query is a preconfigured, custom search that can be set up by a site author to make it easier for users to search for data. For example, a site with park data could include a preconfigured search for parks with washrooms.

Queries simplify the user search experience. The site author configures the Defined Query search criteria in the DMF Wizard and then users can select the query to find results with a single click.
Defined Queries (custom searches) for school data

- **Elementary Schools**
  Find local elementary schools

- **Schools with French Immersion**
  Looking for French immersion? Find a school in your area

**Defined Queries (custom searches) for immigration data**

- **Find Settlement Services**
  Find settlement services in your city

- **Find English Language Resources**

- **Find Employment and Labour Resources**
  Find employment and skill-building resources

**A general parks search (a Search by Category task) followed by some custom searches**

Authors can configure defined queries for data sources from KML files, shapefiles, and Google Fusion Tables.

3.1.4 Task: “Find Coordinates”

Find Coordinates is a tool to track the latitude and longitude on the map. A user can pan or click on the map to display coordinates at their location. Also, the user can input latitude and longitude coordinates, and the map will pan to the specified locations.
The Find Coordinates task, displaying some Latitude/Longitude coordinates on the map

3.1.5 Task: “Find Nearby”

Find Nearby is a feature that filters data by its location on the map. After you select a starting location and add distance to include in the search, the application finds all those features within range that are on the selected layer and displays the results. The results are ordered by their distance from the starting location with those nearest being listed first. Features on the map are filtered to show only those that fall within the distance specified.
The Find Nearby task, showing a list of search results

This task has advanced options that are configurable in the DMF Wizard. When these features are enabled, users can show or hide the search radius circle on the map. If the circle is displayed, there is an option for users to edit the circle's size and location on the map.

The Find Nearby search shows the search area as a circle on the map

3.1.6 Task: “Geomark”

Geomark tools allow a user to draw and save polygons on the map. The Geomark Web Service stores the geometry and returns a URL link to retrieve the geometry data. This link can be shared with other users, allowing them to view the saved geometries.
DMF sites do not keep a record of geomarks created from the site. It is the user’s responsibility to keep track the geomarks he or she has created by saving the URL generated by the Geomark Web Service between sessions.

In the desktop viewer, the Geomark task includes a panel for saving, loading and clearing geomarks from the current map. When the panel is active, the user can use the polygon drawing tools available through Google maps to produce geometries.

The Share Map task adds geomarks in the current user session to the resulting URL as startup parameters.

For more information on the Geomark Web Service, visit this page:

http://www.data.gov.bc.ca/dbc/qeo/geomark/index.page

A Geomark polygon on the map

3.1.7 Task: “Layer List”

The Layer List displays relevant data for each loaded layer in the site. Layer visibility can be toggled on this panel. WMS layers include a legend and a link to its metadata webpage.

For other data sources, a layer metadata URL can be set via the Select Data Sources screen in the DMF Wizard to add or modify links to a metadata webpage in the Layer List.

Folders defined in the KML layer are listed, along with a legend of symbols used in the layer. For more information on options related to folders, see the Folders section for KML layers.
Layer List, showing a WMS layer and two KML layers with folders

3.1.8 Task: “Search by Category”

The Search by Category feature makes it possible for users to filter features by non-spatial attributes (e.g. users can search for schools with grade range 1-5 AND French immersion). The results of the search are displayed in the Results List, and features on the map are filtered.

Authors can configure searches for data sources from KML files, shapefiles, and Google Fusion Tables.

Each field from a specified layer can be given an alias to be used as a description that will be displayed on the Search by Category screen. Also, the author can specify whether the input should be a dropdown list or a text input.
The Search by Category task has advanced options that are configurable in the DMF Wizard. When enabled, users can search for locations that match one or all of the given criteria. If, for instance, a user wants to search for parks with either a boat launch or picnic facilities, this option will broaden the search results to features with any number of matching conditions. When advanced options are enabled, Search by Category also allows the user to find locations that do not meet their criteria. This can be useful when a user wishes to focus on information outside of a given data set.

3.1.9 Task: “WorkBC Service Centre”

The WorkBC Service Centre task, also known as the Locate Service Centre task, allows a user to filter a layer of centre locations by districts on the map.

To configure the Service Centre task, the site author must first upload two KML layers. The first is a Service Centre point layer with a 'storefrontId' attribute. Clustering cannot be enabled on the Service Centre layer. The other layer is a Districts or Catchments polygon layer with a 'catchmentId' attribute.

Once the site has the appropriate layers configured, the author can select which format of search to include. The author can either choose to let the user select a district by name (drop-down list) or by entering a postal code (text entry). An author may include both search types by adding two separate tasks to the site.
The WorkBC Service Centre task filters service centres by the user’s location, with surrounding regions greyed out.

When a user searches for service centres with this task, the selected district will be highlighted by greying out all other districts on the map. The locations will be filtered to only show those with the selected district. If the user entered a postal code, a ‘home’ point will appear on the map to show the approximate starting location.

The filtered service centre locations will also be displayed in a results list. If users search by postal code, the results are sorted by distance, and users can request directions from their starting location.

Find your WorkBC Centre

Your WorkBC Centre is based on your home address. There may be more than one WorkBC Centre available in your area. To locate the WorkBC Centre(s) associated with your home address, enter your postal code below and press search.

Home Address Postal Code

V8V 2L8

Search

2 Results Found

Clear Results

<table>
<thead>
<tr>
<th>WorkBC Services Centre - Victoria</th>
<th>Directions</th>
<th>0.9 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1463 Douglas Street, Victoria, BC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WorkBC Services Centre - Victoria</th>
<th>Directions</th>
<th>2.4 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>415 Gorge Road East, Victoria, BC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The WorkBC Service Centre results after a postal code search, with Directions option to each centre.
3.2 Additional Tasks

For various reasons, not all tasks are displayed in the main task side panel. A task may be specific to a selected map feature, it may depend on the user’s web browser, or it may only need very little screen real estate. This section describes what these tasks do and how they accessed through the DMF viewer.

3.2.1 Task: “Address Search”

The Address Search task allows users to find locations by name. After entering a location into the textbox, the site searches the GeoBC BC Geographical Names service with a geocoding service from either GeoBC or Google. The first result in the list is marked on the map.

![Address Search Example](image1)

An example of the Address Search, using a common place name

This task is available to sites by default. Site authors can configure which geocoding service is used for a given site.

3.2.2 Task: “Driving Directions”

Driving Directions are accessible from any info window with details about a single feature. Users can enter a start or end address, or they can use their current location if their browser supports geolocation.

![Driving Directions Example](image2)

The Driving Directions portion of the information window

The start and end locations are sent to the Google Directions API, which determines a route. The directions are displayed on the screen, and the route is drawn on the map. Currently, only driving directions are available.
The Driving Directions results screen

3.2.3 Task: “Feature Charting”

Feature Charting allows authors to construct charts on numeric data for single locations of a layer. The charts will be contained in the info window for each location. Feature charts can either be displayed as a bar, line or pie chart. Each feature chart will be defined for a single layer. A feature chart is made up of series (different colors of data) and categories (data groups that spans across all series). The site author will be able to configure each attribute as part of the chart data.

When a Feature Chart task is configured for a layer, a link will appear in info windows for that layer with the name of the feature chart. If the user clicks on the chart link, the info window contents are replaced with the chart.
3.2.4 Task: “Geolocation”

Geolocation shows the user’s current location. This button only appears if the user’s browser supports geolocation. The browser may ask the user to allow a connection to determine his or her location.

Geolocation button in a desktop viewer

The estimated location is displayed on the map, with a circle to show approximate error. Results may vary depending on the user’s browser and Internet connection.

An example of the user’s location shown using Geolocation

3.2.5 Task: “Share Map”

The Share Map task makes it possible for a user quickly distribute a URL of the current DMF site through an assortment of social media sites, including Twitter, Facebook, Google+, and Yammer. The URL retains any startup parameters, and shows the user’s current map extent. The QR code provided allows a user with a QR-enabled mobile device to quickly scan and test the given URL.

The URL provided passes through the TinyURL, a URL shortening service. URLs with startup parameters can exceed Twitter’s 140 character limit, so a shortened URL ensures users can post a complete URL to any social media site.
The Share Map screen

3.3 Startup Parameters

Query parameters can be appended to a site URL to dynamically configure a site on startup. This section lists startup parameters available in the DMF Viewer.

Startup parameters can be added to a site URL by appending specific strings to the site URL, separated by ampersand symbols (&), for example: {Viewer_URL}?siteid=1234&ll=49,-123&z=12

3.3.1 Set the Map Extent

- ll – latitude/longitude coordinate pair, separated by a comma.
- z – map zoom level, range 0-21 where 0 is zoomed out.

3.3.2 Filter with Search by Category

- qLayer – layer name, as defined in the DMF Wizard, to execute a search.
- qWhere – search parameters, format {Field_Name} OP 'Value' CONJ ....
  - Valid OPs: =, <, <=, >, >=, LIKE.
  - Valid CONJs: AND, OR (cannot mix).

3.3.3 Set the Layer Visibility

Use vertical bars (|) to separate the list elements.

- lshow – list of layer names to SHOW on startup.
- lhide – list of layer names to HIDE on startup (should not be combined with lshow).

3.3.4 Add Dynamic Data Sources

Use vertical bars (|) to separate the list elements.

- wmsservices – list of WMS URLs to scan for WMS layers.
- wmslayers – list of WMS layer names to include.
- geomarks – list of geomark URLs.
3.3.5 Other

- maponly – shows only the map without the banner or any configured tasks. Disables feature selection in mobile browsers.
- hidetasks – in Desktop mode, hides the side panel by default, but keeps the 'open panel' tab available.
- disableinfowindow – prevents the map from displaying feature data when user clicks on a feature.
- lang – forces the map to display labels in a specific language. Valid language codes can be found on the Google Maps API Languages Coverage document.

4 Screen Layout

This section covers differences in the look and feel of sites in desktop and mobile modes.

User-created content, such as About this Application text and feature descriptions, is reused between both desktop and mobile viewers. The use cases for each viewer are different. Be sure to design flexible custom content to make effective use of both viewers.

4.1 Desktop

Desktop Mode, with a few notes highlighted (see description below)

Image Notes:

1. In standalone mode, the desktop viewer shows a banner image. If no image is selected, the banner displays the site title. In embedded mode, the desktop viewer does not include a banner, as it is assumed that the surrounding site will contain its own banner.
2. The side panel displays by default on startup. Authors can configure the side panel to display on either the left or the right side of the screen. Each task in the side panel can be given an alias and subtext. Each task
has a Back to menu option, which returns the user to this menu. The side task panel can be minimized, which allows the user to see a larger portion of the map.

3. Google Maps provides built-in map controls, including street view.
4. The desktop layout includes a toolbar that shows the address search with additional tasks like Share Map and Geolocation. The additional tasks must be configured in the site.

Info windows display data when a user clicks on a feature. Features with a description field will always display the description data, allowing authors to upload info windows with custom designs. The author can choose whether to display the feature name and extended data within the info windows.

The description field in KML files can contain HTML code. When defining this markup, use CSS class names instead of inline styling. Authors can define CSS styling through the DMF Wizard by adding styles to "author.css", available on the 'Select Site Style' screen. This technique lets the author make minor modifications to the layout without re-uploading the KML data.

If clusters are set up to show feature info when clicked, the info window includes page controls for flipping between the data of selected points.

![Feature Information Window](image)

**Feature Information Window**

### 4.2 Mobile

Mobile Mode uses a different layout than Desktop Mode in order to reduce clutter around the map. Instead of a side panel, tasks are added to the top toolbar.
Mobile Mode
The desktop toolbar has been replaced with a floating toolbar. Click on the tool icon to show these tasks.

Mobile Mode Toolbar
Results Lists from different searches are merged. The Results tab is added whenever the user executes a search, and is updated to show results from the latest search.
Results List

Selecting an item from the results list bring up a results detailed view for that particular item. The user is also shown this detailed view after clicking on a placemark on the map.

The top of the results detailed view has controls to return to the results list and to show the result on the map. A user can get driving directions at the bottom of the detailed view.

Results Detailed View

The Share Map task screen is styled differently in Mobile Mode to fit a wide range of mobile web browsers.
Mobile Mode Share Map task

4.2.1 Behavior differences with Desktop mode

- When using maponly mode, icons on the map are not clickable since there is no target panel for displaying data.
- Geomarks can be loaded through startup parameters in both browser modes, but Mobile mode has no controls loading or saving geomarks.
- The Mobile layer list does not include links to WMS metadata pages.
- The Share Map URL is not directly provided through the Mobile task panel.
- When a user clicks a feature’s Show on Map button in Mobile mode, a flashing circle is displayed as a visual cue.
- The Google Maps toolset, including base map selection and street view controls, is trimmed down to save screen real estate.

To add CSS styling that targets only the desktop or the mobile viewer, begin CSS style definitions with ‘.desktop’ and ‘.mobile’ for their respective layouts (e.g. ‘.desktop .my-custom-style’ or ‘.mobile .my-custom-style’). In this way, each viewer can be given a distinct look and feel while using the same layout.