JMap 6.5

Administrator Manual

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Table of Contents

Introduction 1

Welcome to JMap 6.5 1
Getting Started with JMap Admin 1
User Interface 3

Databases 5

Introduction 5
Creating Databases 5
Managing Databases 8
SQL Console 8

JMap Server to JMap Server Connections 10

Introduction 10
Creating Connections Towards JMap Server 11
Managing JMap Server Connections 13

Spatial Data Sources 14

Introduction 14
Creating Spatial Data Sources 15
Vector Spatial Data Sources 19

SHP Files 19
MIF Files 19
TAB Files 20
GML Files 20
DGN Files 20
DWG/DXF Files 21
CSV Files (x,y coordinates) 22
File geodatabase (ESRI) 23
GeoJSON Files 23
ADF/E00 Files 24
EDIGEO Files 24
KML Files 25
GPX Files 25
Database Tables with x,y coordinates 25
WBT ou WKT in a Database 27
Annotations in a Database 28
Oracle Spatial/Locator Servers 29
PostGIS Servers 31
SQLServer Spatial Servers 32
MySQL Spatial Servers 33
Personal geodatabase (ESRI) 34
Enterprise geodatabase (ESRI) 35
ArcSDE geodatabase (ESRI) 36

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

WFS Servers ... 37
JMap Server ... 38
JMap Spatial Tables ... 39
Raster Spatial Data Sources ... 39
GDAL ... 39
WMS Servers ... 40
ECW/Jpeg2000 Files and ECWP Servers ... 41
TIFF/GeoTIFF Files ... 42
JMap Server ... 43
Spatial Data Source Permissions ... 43
Managing Spatial Data Sources ... 44
Sharing Spatial Data Sources ... 46
External Attributes ... 46
Metadata ... 49
Metadata Templates ... 49
Metadata of a Data Source ... 50

Projects 52

Introduction ... 52
Creating Projects ... 52
Managing Projects ... 54
Project Permissions ... 54
Organizing Layers ... 55
Attribute Queries ... 59
Creating Attribute Queries ... 59
Managing Attribute Queries ... 62
Style Templates ... 63
Personal Layers ... 64

Layers 65

Introduction ... 65
Creating Layers ... 66
Publishing Layers ... 71
Layer Permissions ... 72
Sharing Layers ... 73
Configuring Layers ... 75
General Settings ... 75
Style ... 76
Thematics ... 82
Creating Thematics ... 82
Managing Thematics ... 90
Labels ... 91
Mouseover ... 95
Information Reports ... 102
Forms ... 109

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Introduction ... 109
Form Designer ... 110
Layer Attributes Forms ... 118
Database Forms ... 119
Attribute Query Forms ... 124

Extensions 125

JMap Extensions ... 125

Deploying JMap applications 127

Introduction ... 127
JMap Pro Applications ... 128
JMap Web and JMap Mobile Applications ... 131
Web Services ... 138
Managing Deployed Applications ... 139
Using a GeoWebCache Server ... 140

Security 143

Managing Users ... 143
Managing User Accounts and Groups ... 147
Managing Permissions ... 149
Permission Reports ... 153
Single Sign-On ... 154
Managing Sessions ... 154

JMap Server Management 157

JMap Server Status ... 157
Exporting and Importing ... 159
JMap Server Settings ... 161
Messages ... 163
Log Files ... 164
JMap Server System Data ... 166

Advanced Concepts 169

Data Caching in JMap ... 169
Geographic Projections ... 170
Resource Pooling ... 171

To Contact Us 172

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Introduction

Welcome to JMap 6.5

JMap is a highly interactive, multi-platform mapping data dissemination and analysis tool. It is also a map-oriented integration tool. Offering many possibilities to integrate the various systems used within organizations, JMap is a central component of these systems, providing easy access to data through desktop, web or mobile applications.

This manual explains how to administrate a JMap Server installation using JMap Admin. JMap Admin is a web-based application that allows system administrators to perform administrative tasks remotely, including spatial data publishing, database integration, project creation and security management.

You may also download a PDF version of this manual.

Getting Started with JMap Admin

The following walk-through guide describes the major steps for configuring and publishing a map with JMap.

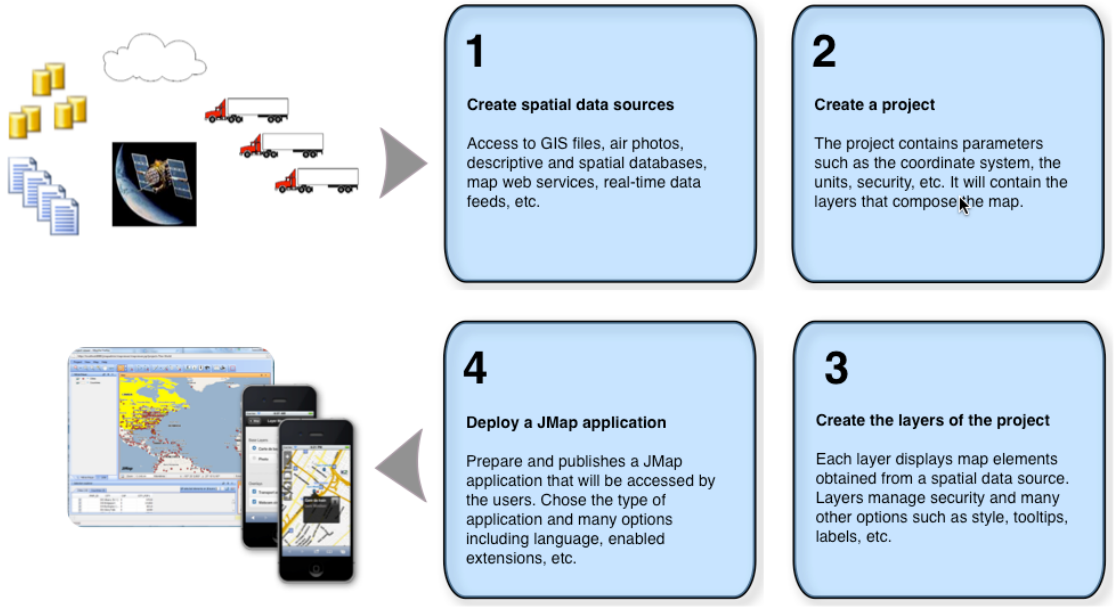
Make sure JMap Server is running. If it was installed as a service on Windows, you must start it using the Windows Services window. Otherwise, it must be started using the executables in JMAP_HOME/bin or using the shortcuts created during installation on the server.

To start JMap Admin, you can use the shortcut that was created during the installation inside the installation home directory, on the server. You can also open a web browser and type a URL similar to http://192.168.0.1:8080/jmapadmin. The IP address and port number may vary depending on the installation environment and parameters.

Once JMap Admin, is started, you will be prompted for a login username and password. **The default login after installation is username "administrator" and the password field is empty.**

In JMap Admin, you will need to accomplish the following steps in order to publish map data.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Click on image to enlarge

Step 1 — Creating spatial data sources

This step requires that you define your spatial data sources. These can be GIS files, spatial data servers, satellite images, etc. When doing so, you indicate to JMap where to read your data from.

See section Creating Spatial Data Sources for more information.

Step 2 — Creating a project

A project in JMap contains map layer definitions data along with parameters regarding access controls (security), queries, units, etc. By creating a project, you define what information your map will contain and what it will look like.

See section Creating Projects for more information.

Step 3 — Creating layers inside the project

This step requires that you create your map layers inside the project. Each map layer is associated with a spatial data source. For each layer, you must define its style (how the layer elements will be drawn), reports, thematics, etc. You can also define access control on a layer by layer basis.

See section Creating Layers for more information.

Step 4 — Deploying an application

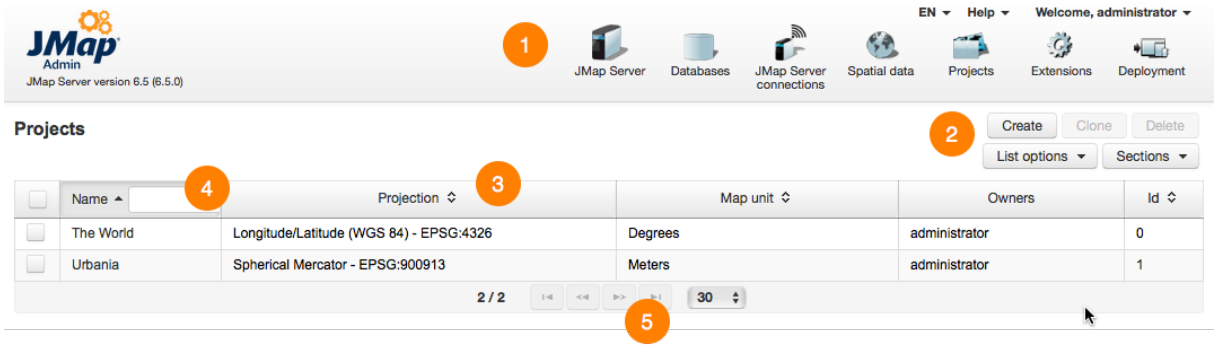
Copyright © 2001-2017 K2 Geospatial. All rights reserved.

This is the last step. Here you publish your project using the application model of your choice. Each application model offers different levels of functionality. There are models for desktop, web and mobile applications. Once your application is deployed, users can start using it to navigate your map data.

See section Deploying JMap Applications for more information.

User Interface

The following screen captures show the graphical user interface of JMap Admin. The different parts of the interface are described.



1 Click on the icons in the top section to access JMa pAdmin's main sections.

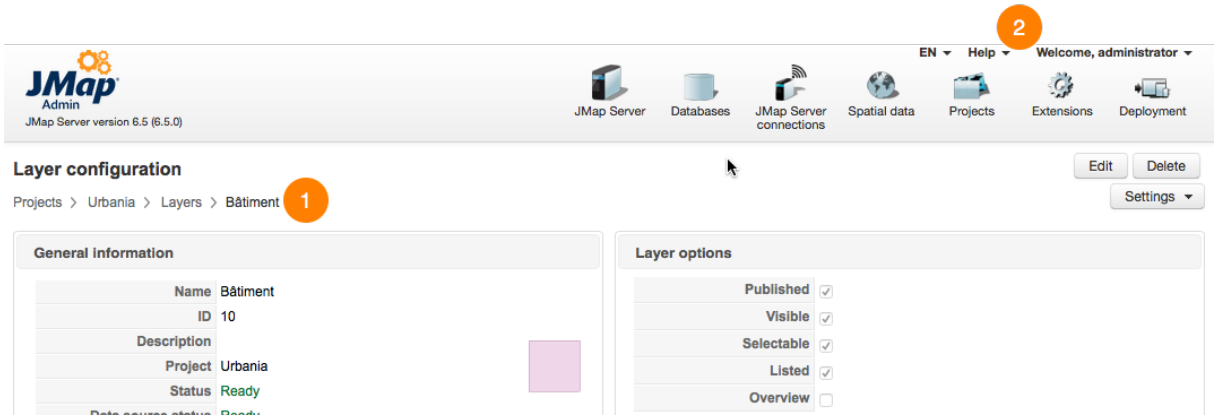
2 For each section, the available actions or subsections are accessible by pressing the buttons located in the top right area.

3 Resources are presented in tables. In each table, data can be sorted by clicking on the column headers.

4 Filter fields are located in the headers of some columns. Enter some text or select values from the lists to filter the contents of the tables.

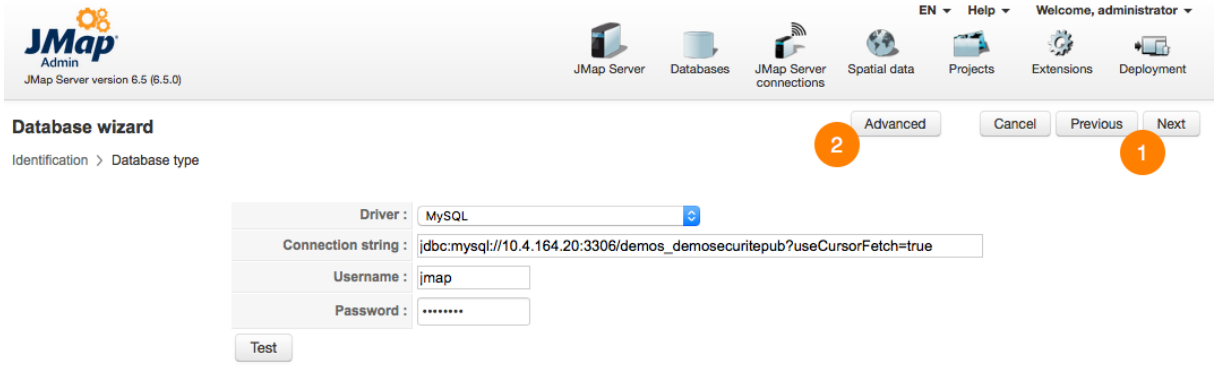
5 You can change the number of table rows displayed at once. Use the arrows to navigate through the different pages.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



1 A breadcrumb indicates the currently displayed section and, when available, allows you to click on the text to jump directly to the corresponding section.

2 This menu allows you to change the display language, access JMap administrator and extension manuals, as well as closing the JMap Admin session.



1 Many configuration tasks are done using wizards that guide you through each step of the process. You can press ***Next*** or ***Previous*** to navigate.

2 There are ***Advanced*** sections that are accessible in the wizards. Those sections contain advanced parameters and options that usually don't need to be modified.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Databases

Introduction

JMap Server manages database connections in pools (see Resource Pooling in section *Advanced concepts*). The pools contain a certain number of open database connections that are shared between the different users according to their database access needs.

All the database connection pools (thereafter called *databases* for simplicity) are centrally managed using JMap Admin. Databases are typically used by JMap Server to read spatial data stored in tables and to access descriptive data related to spatial data. Once databases are configured in JMap Admin, they can be used from other sections and for various purposes in the administration process.

The Database section in JMap Admin is used to display a table of existing databases and to show their statuses.

System Database

JMap has a *System* database that contains JMap Server configuration and geometry tables. This database is mandatory and generally should not be modified. It cannot be deleted and should only be manipulated by advanced users. See section JMap Server System Data for more information.

Creating Databases

Like other tasks in JMap Admin, you create a new database by following a wizard. To start creating a new database, press the ***Create*** button in the page listing the databases and follow the required steps.

Identification	
Name	Enter a name for the new database. The name must be unique.
Description	Optionally enter a description for the new database. Used for administrative purposes.

Database type

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Database driver	Select the database driver that matches the database system that needs to be accessed. New drivers can be added by creating new configuration files in directory JMAP_HOME/conf/db on the server. **Note that when using the ODBC driver, an existing ODBC data source must exist in the Windows System menu**. This ODBC data source is referenced in the JMap Admin connection string.
Connection string	This string provides the necessary parameters to connect to the database. The parameters vary from one driver to another. The structure is presented but the parts between brackets need to be replaced by the actual values (the brackets must be removed in the end). **E.g. jdbc:mysql://[HOST]:3306/[DATABASE]?useCursorFetch=true** becomes **jdbc:mysql://192.168.0.6:3306/mydatabase?useCursorFetch=true**
Username	Enter the username to connect to the database.
Password	Enter the password used to connect to the database.
Test	Each database must be tested. Press this button to do a connection test. If the test fails, an error message will provide a description of the error.

Connections	
Number of connections	Enter the initial size of the pool of connections. This determines how many connections to the database will be kept open.
Maximum connections	Enter the maximum number of connections allowed for this pool. It must be equal to or greater than the initial number of connections. If the pool needs to be increased, new database connections will be created automatically until the maximum value is reached. The maximum value can be disabled using the check box, allowing the pool to increase as needed.

Advanced parameters

The following advanced parameters usually don't need to be modified.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Parameters	
Additional parameters	In some rare cases, database systems may require additional parameters. They can be entered here.
Validation query	JMap uses a query validation mechanism to validate database connections. This query is used to test the connection each time a query needs to be executed. If the validation query fails, which typically means that the connection to the database system is broken, JMap Server will try to establish a new connection automatically. This mechanism ensures the database connections are always working. The query must be valid and very quick to execute. In order to reduce the impact on performance, make sure you minimize the number of returned records (zero is perfect) and use indexed fields in the WHERE clause. Default queries are provided. They normally don't need to be changed.
Inactivity timeout	The connection inactivity timeout is used to close and reopen connections that are inactive for a long period. This mechanism ensures that the database system does not close inactive connections. Make sure that this value is lesser than the connection timeout of your database system. A default value of 2 hours is appropriate most of the time.
Connection type	Specify the connection type to create. Generic connections are all created with the same user information (username and password) defined earlier. From the perspective of the database system, it is as if the same user performed all queries. This type of connection is used most of the time. Identified connections are created on the fly for each user connected to JMap Server. The same connection is reused during the session for each user. From the perspective of the database management system, each query is done by the user who is connected to JMap Server. This connection mode is useful in environments where security is managed at the database level. In order for the identified connection mode to work, it is required that JMap and the database system share the same list of users. This can be the case when the Oracle user manager module is used to manage users.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Managing Databases

Reinitializing databases

Reinitializing a database closes all open connections and creates new ones. This can be useful to force a reconnection to a database system.

Deleting databases

Deleting a database deletes the connection configuration for the database system. The data contained in the database is not affected at all.

Database status

Each database has a status. The status indicates the condition of the database connection. The following table describes the possible statuses of a database.

Status	
CONNECTED	The database connections were created successfully and are ready to be used.
ERROR	The database connections are broken. The database cannot be used until the cause of the error is eliminated and the connections are reopened. Reinitializing the database might correct the problem. You can view a description of the error by clicking on the word *Error* displayed in red.

References to the database

From the section of the database, you can access the References section. This section shows all the ressources that use this database. It is useful to check the references before deleting or modifying a database.

SQL Console

JMap Admin provides a generic SQL console that can be used to view database structures, execute SQL queries, inspect the content of tables, test for query execution speed, etc. All configured databases are accessible through this console.

When performing an SQL query, the query execution is subject to security permissions granted to the user connected to the database. See Creating Databases for more information about specifying the user for database connections.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

SQL console	
Database	Select the database to use.
View structure	Click on this to open a window that allows you to navigate in the structure of the database. You can see the schemas, the tables and views, and information about each field of a table or view.
Max. rows	When executing a *Select* SQL query, you can enter a value to limit the number of returned rows.
Auto commit	If performing SQL transactions (e.g. *Insert* , *Update*), select this option to validate the transactions automatically (SQL COMMIT command). Otherwise, you will need to perform the validations manually.
Test for speed only	When executing an SQL query, select this option to repeat the query a certain number of times and display the execution times.
SQL Query	Enter the SQL query to execute. The result will be displayed in a table.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap Server to JMap Server Connections

Introduction

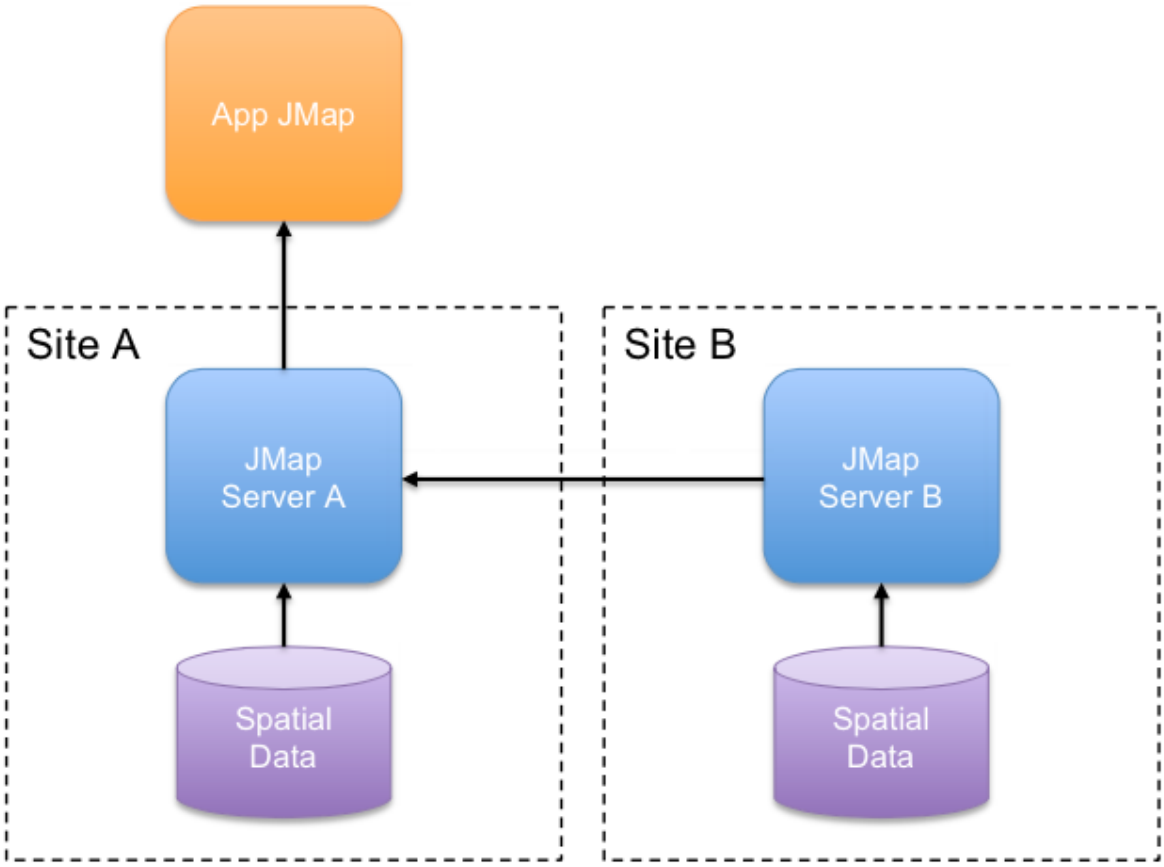
It is possible to create connections from one JMap Server to another. These connections can then be used to share layers and spatial data sources between different JMap Servers, avoiding duplication of source data. They may also be used by some JMap Server extensions that require server to server communication. These connections are used, among other things, when creating JMap Server vector or JMap Server raster data sources and when using shared layers.

JMap Server manages connections towards other JMap Servers by placing them in a pool (refer to Resource Pooling in the *Advanced Concepts* section). Resource pools have a certain number of open connections that are shared between users, based on how they need to access the other JMap Server instances.

Note that your JMap user license must allow *server sessions* in order for another JMap Server to connect to your JMap Server. For more information, refer to the JMap Server Status section.

The following diagram shows the connection between two JMap Servers (A and B) where the JMap application connected to server A accesses spatial data served by another JMap Server instance (server B).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Connection between 2 instances of JMapServer

Creating Connections Towards JMap Server

Like many other tasks performed in JMap Admin, you create a connection to another JMap Server using a wizard. To start creating a new connection, click on the ***Create*** button in the page listing the connections and follow the required steps.

Identification	
Name	Enter a name for the new connection. The name chosen must be unique.

Configuration	
Connection type	Select the method used to connect to the remote server, either *direct* or *proxy* . The settings on the remote server side may affect this option. Proxy connections use the

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	HTTP protocol and therefore pass through firewalls easier. The parameters to set depend on the type of connection selected.
Host	Enter the name or IP address of the remote server to which you wish to connect.
Server port	(Direct connection) If you are creating a *direct* connection, enter the port used to establish the connection towards JMap Server.
Protocol	(Proxy connection) If you are creating a *proxy* connection, select the HTTP or HTTPS (secure) protocol used by the connection.
Relative path	(Proxy connection) If you are creating a *proxy* connection, enter the relative path to reach the JMap proxy.
Proxy port	If you are creating a *proxy* connection, enter the port used for the HTTP or HTTPS connection.
Username	Enter the user name for the connection towards the other JMap Server. This name must have a corresponding user account.
Password	Enter the password to connect to the other JMap Server.
Number of connections	Enter the initial size of the connections pool to determine the number of connections towards the other JMap Server that will remain open.
Maximum connections	Enter the maximum number of connections allowed for this pool. The number entered must be equal to or above the initial number of connections. If the pool's size must be increased, new connections will automatically be created until the maximum value is reached. The maximum value may be deactivated by entering -1 in order to increase the size of the pool, if needed.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Managing JMap Server Connections

Resetting connections

When resetting a pool of connections to JMap Server, all open connections will be closed and new ones will be created. This action may be useful to force reconnection to a JMap Server.

Deleting connections

Deleting a connection to JMap Server deletes this connection's entire configuration.

Connection statuses

Each connection has a status. This status indicates the condition of the connection towards JMap Server. The following table describes the possible statuses of a connection.

Status	
CONNECTED	Connections to JMap Server were successfully created and are ready to be used.
ERROR	Connections to JMap Server are broken. The connection cannot be used until the error has been resolved and the connections have been reopened. Resetting the connection may resolve this issue. You can view a description of the error by clicking on the word *Error* displayed in red.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Spatial Data Sources

Introduction

A spatial data source in JMap, as its name implies, is any source that can provide spatial data. Spatial data sources are separated into 2 families : **vector data sources** and **raster data sources**. Vector data sources provide vector spatial data along with its attributes and raster data sources provide raster data (images). Configuring data sources is usually the first step to complete to publish spatial data with JMap.

Some spatial data sources work with a file reader to load spatial data from files in various formats (e.g. mif files, shape files, tiff image files). Other data sources access the data stored on distant spatial data servers (e.g. PostGIS, Oracle Spatial/Locator, ArcSDE, WMS/WFS servers, etc.).

Once a spatial data source is created, it must be updated before it can be used. Updating a spatial data source means preparing it for use by JMap Server. In concrete terms, it implies different tasks, depending on the type of data source. Generally speaking, for data sources that access data stored in files, the file contents are read by JMap Server and put inside JMap System database tables. A spatial index is then built for fast access and attribute statistics are calculated. For data sources that access data stored on remote spatial servers like Oracle Spatial/Locator or WFS systems, the update process is simpler and reduced to calculating attribute statistics. Updating file data sources takes more time than updating server data sources.

Spatial data sources are listed in the *Spatial data sources* section in JMap Admin. The following table presents basic information about each data source. When you click on the name of a data source, a details section is displayed. This section presents some useful information about the spatial data source as well as buttons to perform management tasks.

Spatial data sources	
Edit	Starts the edition wizard for the data source.
Make editable	Allows you to transform a spatial data source that reads data files (e.g. SHP, TAB, DWG, etc.) into a JMap Spatial data source. Afterwards, you can use this spatial data source to edit spatial and descriptive data in JMap. Once this transformation has been done, the data source will no longer be linked to the original files. Any changes made to the data must be done directly using JMap's editing tools.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Update	Starts the update process of this data source. See section Managing Spatial Data Sources for more details.
Delete	Deletes the data source. See section Managing Spatial Data Sources for more details.
Metadata	Opens the metadata section. Refer to the Metadata of a Datasource section for more information on this topic.
Permissions	Opens the section allowing you to modify the permissions related to this spatial data source. Refer to the Spatial Data Source Permissions section for more information on this topic.
Schedule	Opens the scheduling section for this data source, allowing you to define schedules for automatic updates of this data source. See the Managing Spatial Data Sources section for more details.
References	Opens a list of all layers that refer to this data source. This is useful to know if a data source is used by some layers before deleting it.

Creating Spatial Data Sources

Creating spatial data sources is done using a wizard. Simply follow the different steps until you reach the end of the wizard. Some user interfaces are common to all data sources and some are specific to each type of data source.

Basic concepts

Including multiple files

In most data sources that read files, multiple files can be integrated together to form continuous maps. It is frequent for CAD users to split the territory in rectangular tiles. By reading all tile files together, JMap administrators can recreate continuous maps. The only prerequisite is that the files contain the same data structure (geometry, layers and attribute types).

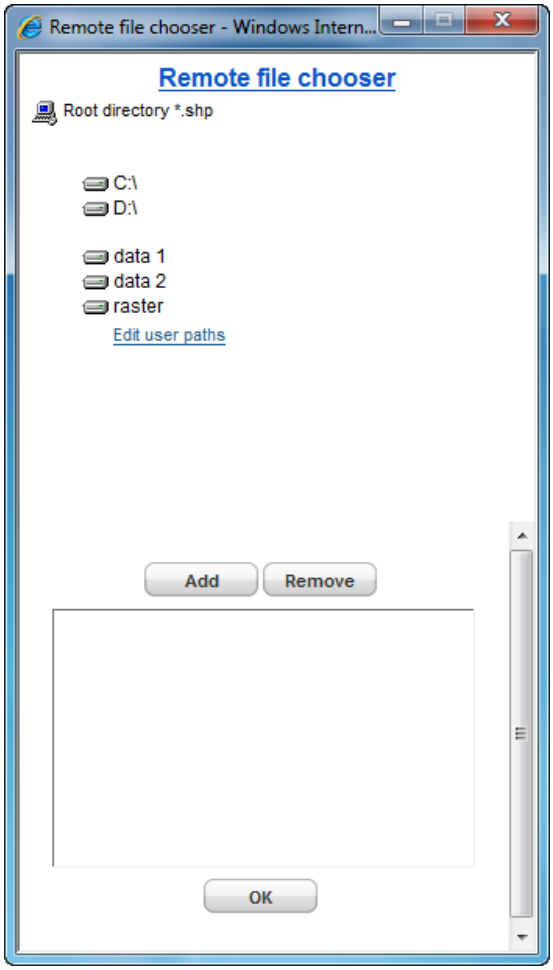
File browsing

For selecting files to include in data sources, JMap Admin provides a remote file browser that allows you to navigate the file system of the server where JMap Server is running. In

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

order to select files, these must be located on disks accessible through the server file system and read permissions must be set accordingly.

When browsing the root of the file system, you have the option to create user-defined paths. These paths are shortcuts that can be useful to save time when browsing or can be used to write OS specific paths like Windows UNC (e.g. \\myserver\data).



JMap Admin remote file browser with user-defined paths

Creating a new data source

To create a new data source, press the ***Create*** button in the *Spatial Data Sources* list section.

Identification	
Name	Enter a name for the new spatial data source. The name must be unique.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Description	Optionally enter a description for the new spatial data source. This description can only be viewed by the JMap administrator.

Type	
Source type	Select the type of data source that matches the type of the data to read. All supported data source types are presented.

Note that custom data source types may exist. They are new types of data sources that are developed using JMap SDK for special needs.

The next steps will depend on the data source type you selected. **For more information on data source-specific configuration interfaces, refer to the appropriate section by clicking on the links in the following table.**

Vector spatial data sources	
Spatial data files	SHP (ESRI), MID/MIF (Mapinfo), GML, DGN, DGNV8, DWG/DXF, CSV, ESRI File Geodatabase, TAB (MapInfo), GPX, KML (Google Maps), VEC (Edigeo), GeoJSON, ADF/E00 (ESRI Arcinfo).
Spatial data servers	Database coordinates, Database annotations, Oracle Spatial/Locator, PostGIS, MySQL Spatial, MS SQL Server Spatial, ESRI Geodatabase (personal), ESRI Geodatabase (SDE), WFS Servers, JMap Server, JMap Spatial Table
Raster spatial data sources	
Image files	GDAL (Geospatial Data Abstraction Library), TIFF/GEOTIFF, ECW/JPG2000
Image servers	WMS Servers, ERDAS Image Web Server, JMap Server

Attributes

This step applies only to vector data sources.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

After the data source-specific configuration section, you need to configure attributes for the data source. All available attributes are listed in a table. By default, all attributes are included but some attributes can be excluded, in which case they will be completely ignored by JMap Server. It is also possible to specify for which attributes JMap Server should create an index for better query response times (this does not affect the map download and display times). These indexes are used when performing attribute queries on these fields. Also, it is possible to look at a sample of the attribute values (10 first values) by clicking on the attribute names.

This section also contains settings to configure external attributes. See External Attributes for more details.

Attributes	
Include	Included attributes are processed by JMap Server. They can be used in reports, to produce thematic maps, for labeling, etc. Excluded attributes are totally ignored by JMap Server. By default, all available attributes are included.
Indexed	JMap Server can create an index on an attribute to speed up queries that will use this attribute. If you plan to use an attribute for attribute queries, this attribute should be indexed, especially if the data source has a high number of elements.
Key attribute	A key attribute is used when JMap must establish relationships between certain data and your spatial data. It is important to choose an attribute whose values will never change. If you do not need this parameter, you can keep the default value.

Projections

The projection of the data source must be selected to match the projection of the data. If this is not set correctly, the data display may be invalid. For more information about projection support in JMap, refer to the Geographic Projections section.

Projections	
Original projection	The projection or spatial coordinate system that is used in the data to be read.
Start update automatically	This option is a shortcut that launches an update of the data source after pressing ***Finish*** in this wizard. When options requiring an update of the data source are modified in the wizard, this option is selected by default.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Vector Spatial Data Sources

SHP Files

Read	Yes
Write	No

JMap Server can read shape files as a spatial data source. They are generally produced by ESRI applications.

Parameters	
Selected files	Select one or more shape files to read. If selecting more than one file, all files must have the same list of attributes and geometries must be of the same type. Also, each shape file (SHP) must be accompanied by a DBF file and an SHX file.
DBF charset	Select the character set used for the attributes stored in the DBF file. If this parameter is not set correctly, some characters may not be properly displayed. The default value is CP437, which is correct most of the time.

MIF Files

Read	Yes
Write	No

JMap Server can read MID/MIF files as a spatial data source. They are generally produced by MapInfo applications.

Parameters	
Selected files	Select one or more MIF files to read. If selecting more than one file, all files must have the same list of attributes and geometries must be of the same type. Also, each MIF file must be accompanied by a MID file.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

TAB Files

Read	Yes
Write	No

JMap Server can read TAB files as spatial data sources. These files are usually produced with MapInfo applications.

Parameters	
Selected files	Select one or more TAB files to read. If you select several files, they must all have the same attributes list, and the geometries must be of the same type.
Layers	Select one or more layers to be included in the data source. Data on other layers will not be read.

GML Files

Read	Yes
Write	No

JMap Server can read GML files as a spatial data source. GML files must be paired with schema files (.XSD). If a GML file contains instances of more than one feature type, only one of those types can be chosen as the base type for the data source. JMap can read GML files of versions 2.x and 3.x.

Parameters	
Selected file	Select a GML file to read.
Feature types	Select the feature type to read. GML files must be accompanied by a schema file (XSD).
GML version	Indicate the version of the GML file (2.x or 3.x).

DGN Files

Read	Yes

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Write	No

JMap Server can read DGN version 7 and 8 files as a spatial data source. Select the data source type that is appropriate for your DGN files version. DGN files are generally produced by Bentley MicroStation.

The DGN V8 file reader is only available on Microsoft Windows systems.

DGN files are often paired with a database of attributes. This database can be MS Access or any other database system. If the DGN files have attributes stored in a separate database, you must first configure a database connection pool for that database before proceeding. See Creating Databases for more information on database connection configuration.

Parameters	
Selected files	Select one or more DGN files to read. If selecting more than one file, all files must have the same list of attributes and geometries must be of the same type.
Convert polygons to lines	Check this option if you want polygons to be read as lines.
Attribute database	Optionally, select the database that contains the attributes. This database must be already configured in JMap Admin.
Layers	Select one or more layers to include in the data source. Data on other layers will not be read.

DWG/DXF Files

Read	Yes
Write	No

JMap Server can read DWG and DXF files produced by Autodesk Autocad versions 12 to 2014 as a spatial data source. Block attributes are read and transformed to element attributes.

Parameters	
Selected files	Select one or more DWG or DXF files to read. If selecting more than one file, all files must have the

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	same list of attributes and geometries must be of the same type.
Source	The Autocad file contains a model space and a paper space. The paper space contains additional elements that are intended for printing. Select the space to be read by JMap (typically the model space).
Line and polygon options	**No conversion**: No conversion will be done. **Convert closed lines to polygons**: Closed line objects will be read as polygons by JMap. **Convert polygons to lines**: Polygon objects will be read as lines by JMap.
Block reference options	**No conversion**: No conversion will be done. The different object types (lines, polygons, ...) will be treated separately by JMap. **Convert block references to complex elements**: The different object types (lines, polygons, ...) that compose the blocks will be read together and treated as complex elements by JMap. **Convert block references to points**: JMap will replace block references by points. This has the effect of considerably reducing the size of the data when the blocks are composed of many objects.
Layers	Select one or more layers to include in the data source. Data on other layers will not be read.

CSV Files (x,y coordinates)

Read	Yes
Write	No

JMap Server can read CSV files or any text file with separated values that contain x and y coordinates. These coordinates can be used for layers of points. The first row must contain the field names. The allowed separators are commas (,), semicolons (;) and tab characters. Text fields may or may not be inside double quotes. X and Y coordinates must be numeric values.

Parameters

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Selected files	Select one or more CSV files to read. If selecting more than one file, all files must have the same list of attributes.
Separator	Select the separator in use in the files to read.
Data type	Select the appropriate data type for each field.
X field	Select the field that contains the X values. Only numeric fields are listed.
Y field	Select the field that contains the Y values. Only numeric fields are listed.

File geodatabase (ESRI)

Read	Yes
Write	No

JMap Server can read ESRI File geodatabases as a spatial data source.

Parameters	
Selected files	Select the directory containing the geodatabase's structure.
Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

GeoJSON Files

Read	Yes
Write	No

JMap Server can read GeoJSON files as a spatial data source.

Parameters	
Selected files	Select one or more GeoJSON files to be read. If you select several files, they must all share the same attributes list.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

ADF/E00 Files

Read	Yes
Write	No

JMap Server can read ADF and E00 files as spatial data sources. These files are normally produced by ESRI's Arc/Info software.

Parameters	
Selected files	Select one or more ADF or E00 files to be read. If you select several files, they must all share the same attributes list.
Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

EDIGEO Files

Read	Yes
Write	No

JMap Server can read EDIGEO files as spatial data sources.

Parameters	
Selected files	Select one or more EDIGEO files to be read. If you select several files, they must all share the same attributes list.
Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

KML Files

Read	Yes
Write	No

JMap Server can read KML files as spatial data sources.

Parameters	
Selected files	Select one or more KML files to be read. If you select several files, they must all share the same attributes list.
Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

GPX Files

Read	Yes
Write	No

GPX is an XML-based GPS data exchange format. JMap Server can read GPX files as spatial data sources.

Parameters	
Selected files	Select one or more GPX files to be read. If you select several files, they must all share the same attributes list.
Layers	Select one or more layers to be included in the data source. The data on other layers will not be read.

Database Tables with x,y coordinates

Read	Yes

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Write	Yes

JMap Server can connect to any relational database to extract X and Y coordinates that can be used as a spatial data source to create layers of points. The database must contain at least coordinate fields (numeric values) and a field with unique integer values to be used as element identifiers. An SQL query must be provided. This query will be executed to read the data and it can access one or many tables at the same time.

The connection to the database must already be configured. See Creating Databases for more information.

Parameters	
Database	Select the database to read the data from. It must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract coordinates and attributes from the database.
Geometry table	Select the physical table that effectively contains the x and y coordinate values. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
X field	Select the field that contains the X values. Only numeric fields are listed.
Y field	Select the field that contains the Y values. Only numeric fields are listed.
Id field	Select a field that contains unique identifiers. Only integer fields are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

WBT ou WKT in a Database

Read	Yes
Write	Yes

JMap Server can connect to databases containing geometries that have been coded according to WKB and WKT standards (http://en.wikipedia.org/wiki/Well-known_text).

In addition to the column containing the geometry, you must have a number column with unique integer values used as element identifiers. There must also be 4 columns containing the values of minimum bounding rectangles (MBR).

An SQL query must be provided. The query will be launched to read the data and it can access more than one table at a time.

The connection to the database must already be configured. Refer to the section Creating Databases for more information on this topic.

Parameters	
Database	Select the database from which the data must be read. This database must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.
Geometry table	Select the physical table containing the geometries. Clicking on ***Load*** displays the list of fields returned by the query. This action is required to proceed with the configuration.
Geometry field	Select the field containing the geometries. .
Geometry type	Select the format of the data to read, either WKB or WKT.
Encoding (for WKB)	If the data format is WKB, you must indicate the type of coding used by the data, *Little Endian* or *Big Endian* .

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

MBR X1	Minimum X value of the minimum bounding rectangle (MBR) in the geometry.
MBR Y1	Minimum Y value of the minimum bounding rectangle (MBR) in the geometry.
MBR X2	Maximum X value of the minimum bounding rectangle (MBR) in the geometry.
MBR Y2	Maximum Y value of the minimum bounding rectangle (MBR) in the geometry.
Id field	Select a field that contains unique identifiers. Only the fields containing whole numbers are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained. .

Annotations in a Database

Read	Yes
Write	No

JMap has its own storage format for annotations in database tables. If you have any annotations in this format, JMap Server can use them as a spatial data source. Annotation tables in JMap format have a certain number of required fields, as explained in the table below. An SQL query must be provided. The query will be executed to read the data and it can access more than one table at a time.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

The database connection must already be configured. Refer to the Creating Databases section for more details on this topic.

Parameters	
Database	Select the database from which the data must be read. This database must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract database annotations.
Geometry table	Select the physical table containing the geometries. By clicking on ***Load*** , you will obtain the list of fields returned by the query. This action is necessary to configure the remaining parameters.
X field	Select the field containing the X coordinate of the lower left position of the text.
Y field	Select the field containing the Y coordinate of the lower left position of the text.
Id field	Select a field containing unique identifiers. Only fields containing whole numbers are listed.
Text field	Select the field containing the annotation text.
Height field	Select the field containing the height of the annotation, indicated in data units.
Angle field	Select the field containing the rotation angle of the annotation text. The angle is indicated in degrees and increases clockwise. The zero value indicates that the text is horizontal.

Oracle Spatial/Locator Servers

Read	Yes
Write	Yes

JMap Server can connect to Oracle Spatial or Locator databases to extract spatial data and attributes to be used as a spatial data source. The only special requirement is the presence of a numeric column with unique integer values to be used as element identifiers. An SQL query must be provided. This query will be executed to read the data and it can access one or many tables at the same time.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

The connection to the database must already be configured. See Creating Databases for more information.

Parameters	
Database	Select the Oracle database to read the data from. It must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.
Geometry table	Select the physical table that effectively contains the geometries. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
Geometry field	Select the field that contains the geometries.
Id field	Select a field that contains unique identifiers. Only integer fields are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

PostGIS Servers

Read	Yes
Write	Yes

JMap Server can connect to PostGIS databases to extract spatial data and attributes that can be used as a spatial data source. The only special requirement is the presence of a numeric column with unique integer values to be used as element identifiers. An SQL query must be provided. This query will be executed to read the data and it can access one or many tables at the same time.

The connection to the database must be already configured. See Creating Databases for more information.

Parameters	
Database	Select the PostgreGIS database to read the data from. It must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.
Geometry table	Select the physical table that effectively contains the geometries. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
Geometry field	Select the field that contains the geometries.
Id field	Select a field that contains unique identifiers. Only integer fields are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

SQLServer Spatial Servers

Read	Yes
Write	Yes

JMap Server can connect to Microsoft SQLServer Spatial databases to extract spatial data and attributes that can be used as a spatial data source. The only special requirement is the presence of a numeric column with unique integer values to be used as element identifiers. An SQL query must be provided. This query will be executed to read the data and it can access one or many tables at the same time.

The connection to the database must be already configured. See Creating Databases for more information.

Parameters	
Database	Select the SQLServer Spatial database to read the data from. It must be already configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.
Geometry table	Select the physical table that effectively contains the geometries. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
Geometry field	Select the field that contains the geometries.
Id field	Select a field that contains unique identifiers. Only integer fields are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

MySQL Spatial Servers

Read	Yes
Write	Yes

JMap Server can connect to MySQL Spatial databases to extract spatial data and attributes to be used as a spatial data source. The only special requirement is the presence of a numeric column with unique integer values to use as element identifiers. An SQL query must be provided. This query will be executed to read the data and it can access one or many tables at the same time.

The connection to the database must be already configured. See Creating Databases for more information.

Parameters	
Database	Select the MySQL database to read the data from. It must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.
Geometry table	Select the physical table that effectively contains the geometries. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
Geometry field	Select the field that contains the geometries.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Id field	Select a field that contains unique identifiers. Only integer fields are listed.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

Personal geodatabase (ESRI)

Read	Yes
Write	No

JMap Server can read Personal geodatabases to extract spatial and attribute data to be used as a spatial data source. This format uses Microsoft Access files to store the data. The connection to the Access database must already be configured using the ODBC driver (this is available on Windows systems only). See Creating Databases for more information.

Parameters	
Database	Select the database to read the data from. This database should point to an ODBC source configured to read an MS Access file. It must already be configured in JMap Admin.
SQL query	Enter the SQL query used to extract geometries and attributes from the database.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Geometry table	Select the physical table that effectively contains the geometries. Pressing ***Load*** will retrieve the list of fields returned by the query. This is necessary for the rest of the configuration.
Id field	Select a field that contains unique identifiers. Only integer fields are listed. It is usually called OBJECT_ID.

Enterprise geodatabase (ESRI)

Read	Yes
Write	Yes

JMap Server can read Enterprise geodatabases from ESRI (ArcGIS 10.0 and later) to extract spatial and attribute data to be used as a spatial data source. The connection to the database must already be configured. See Creating Databases for more information.

The spatial data source created supports value domains and relationships defined in the enterprise geodatabase (EGDB).

Parameters	
Database	Select the database to read the data from. The connection uses a standard database driver (Oracle, SQL Serveur, etc.). It must already be configured in JMap Admin.
System tables schema	Select the database schema where are located the metadata tables.
Schema	Select the database schema in which will be read the table (or view) containing the feature class.
Layer	Select the feature class to be read. Each table in the database corresponds to a different layer.
Id field	Select a field that contains unique identifiers. Only integer fields are listed. It is usually called OBJECT_ID.
Geometry field	Select the field that contains the geometries.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the creation date of each object. If no field is selected, the

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained. This field is used to manage the transaction conflicts and must be present in the attributes of editable layers for that feature to be enabled.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.

ArcSDE geodatabase (ESRI)

Read	Yes
Write	Yes

JMap Server can read Enterprise geodatabases that use the ArcSDE service (ArcGIS version 10.1 and earlier) to extract spatial and attribute data to be used as a spatial data source. The connection to the ArcSDE service must already be configured.See Creating Databases for more information.

Parameters	
SDE Connection	Select the SDE connection to use to extract spatial data and attributes. The connection is a database that uses the ArcSDE driver. This database must be already configured in JMap Admin.
Layer	Select the feature class to read. Each table in SDE is associated with a different feature class.
Id field	Select a field that contains unique identifiers. Only integer fields are listed. It is usually called OBJECT_ID.
Creation time field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will show the

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	creation date of each object. If no field is selected, the data can still be edited, but this information will not be maintained.
Modification date field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will contain the date each object was last modified. If no field is selected, the data can still be edited, but this information will not be maintained. This field is used to manage the transaction conflicts and must be present in the attributes of editable layers for that feature to be enabled.
Author field	**This parameter is optional**. If you want this data source to be editable by JMap, this field will either contain the name of the user who created each object or the name of the user who made the last change. If no field is selected, the data can still be edited, but this information will not be maintained.
Metadata database	**This parameter is optional**. This field is used to define the database containing the value domains and the relationships to be used. These must have been exported from ArcSDE in a specific table structure. See Exporting SDE domains for more information.

There is a special attribute configuration option that is available only with ArcSDE data sources that have attribute domains.

Attributes	
Value source	Select whether the attribute values should be used directly (**Attribute**) or if they should be substituted by the values specified in the domain (**Domain**).

Exporting SDE domains

In order for JMap to use ArcSDE attribute domains, they must be exported into database tables that JMap can understand. There is a tool that plugs into ArcCatalog to create those tables. Please contact K2 Geospatial for more information.

WFS Servers

Read	Yes

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Write	No

Web Feature Service (WFS) is a standard proposed by the Open Geospatial Consortium that defines how client applications should request map vector data and attributes from a WFS compatible server. The protocol used is HTTP and the data returned is typically in Geography Markup Language (GML). WFS servers publish their capabilities in an XML document that specifies the types of requests supported and provides a description of available features.

JMap Server can read data from WFS servers versions 1.0.0 and 1.1.0 to be used as a spatial data source.

Parameters	
URL	Enter the GetCapabilities URL that will return the capabilities of the WFS server. It should be similar to: http://www.server.com/wfs?SERVICE=WFS&VERSION=1.0.0&REQUEST=GetCapabilitie
Feature types	The list of feature types is returned by the WFS server after pressing ***Load*** . Select one feature type to read.

JMap Server

Read	Yes
Write	Yes

JMap Server may use a vector spatial data source that comes from another JMap Server instance. To enable this, you must start by configuring a connection towards the other JMap Server. Refer to JMap Server to JMap Server Connections for more information.

Parameter	
Remote connection	Select the connection towards another JMap Server instance that must be used to extract spatial data and attributes. The connection must already be configured in JMap Admin.
Data source	Select the existing vector spatial data source on the other JMap Server instance you wish to access. This data source must be shared by the other server.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap Spatial Tables

Read	Yes
Write	Yes

JMap Spatial is the format used to store JMap's spatial and descriptive data. It is based on the WKB format (http://en.wikipedia.org/wiki/Well-known_binary).

An existing JMap Spatial table may be used as a spatial data source or a new one can be created to receive data.

Parameter	
Table	Select the JMap Spatial table to be used as a data source. If the table does not exist, you can create it by clicking on ***Add table*** .

Adding or modifying a table

Click on ***Add table*** to create a new table in JMap Spatial format. You can also select an existing table and click on ***Edit table*** to change its name or structure. When creating or modifying a table, you can add new fields to the table by clicking on + and remove fields by clicking on 🗑. Note that other fields besides those shown in the list exist in the table. These fields have a geometry field, spatial index fields, etc.

Once the table has been created or modified, it can be used for the spatial data source.

Raster Spatial Data Sources

GDAL

This type of spatial data source allows you to read a wide variety of raster data formats. GDAL (Geospatial Data Abstraction Library) is an *open source* library specializing in raster data conversion and processing.

There can be one or more source image files (mosaic of images). The images of the mosaic can overlap and there can be holes in the mosaic.

When the data source is updated, if the option is activated, a pyramid of lower resolution images is created by JMap Server and stored in the image cache. The image cache is then used for high performance production of images on the fly at specific resolutions. Depending on the initial image sizes and parameters, the image cache size can become voluminous. Typically, the total image cache is about the same size as the original images. Available disk

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

space must be sufficient before updating this data source. It is possible that the data format selected will not require the creation of a pyramid. In this case, the parameter will be ignored.

Parameters	
Selected files	Select one or more image files to read. If many files are selected, they will be considered as a mosaic. The files must be georeferenced.
Cache path	The directory where JMap Server will store generated image files for the various resolutions. Default is JMAP_HOME/cache/raster.
Compute statistics	Statistics on image pixels simplify the analysis of these images. JMap extensions such as *Imaging* use these statistics to work. Calculating statistics can take several minutes and this option should only be activated when necessary.
Interpolation type	Method for producing images with reduced resolutions from images with higher resolutions. Default is "Cubic" and this method usually produces the best results.
Create a pyramid	Activate creation of an image pyramid with several resolutions. This greatly improves performance for producing images on the fly.
Pyramid image interpolation	Method used to produce pyramid images. The default value is "Cubic" and this method usually produces the best results.

WMS Servers

Web Map Service (WMS) is a standard proposed by the Open Geospatial Consortium that defines how client applications must request maps from a WMS compatible server. The protocol used is HTTP and the maps returned are typically images of popular formats (png, gif, jpg, etc.). WMS servers publish their capabilities in an XML document that specifies the types of requests supported as well as the metadata (list of layers, supported projections, etc.).

By configuring WMS data sources, you allow JMap to connect to and query WMS compatible servers (versions 1.0 to 1.3). You can then create raster layers based on these WMS data sources inside projects.

Parameters

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Get server capabilities (GetCapabilities)	Enter the *GetCapabilities* URL that will return the WMS server's capabilities. The URL should look like this: http://www.server.com/wms?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetCapabilities
Enable HTTP authentication	Enable this option if the WMS server controls access to the WMS service via HTTP authentication. In this case, enter the username and password that must be used.

Press *Next* to complete the configuration.

Request configuration

Once you have obtained the capabilities, you can define the parameters for the other types of requests in the WMS protocol. JMap Admin automatically suggests default queries that usually work very well. They are generated from the *GetCapabilities* request. If you wish to modify these default requests, you must select the *Override default request* option and enter new requests. For each type of request, you can also activate HTTP authentication and provide sign-on parameters.

Parameters	
Get server capabilities (GetCapabilities)	This request is exactly the same as the one entered at the previous step to get the WMS server's capabilities.
Get map(GetMap)	This request is used to get a WMS server map.
Get feature info(GetFeatureInfo)	This request is used to get the attributes of a map element.

ECW/Jpeg2000 Files and ECWP Servers

With this type of data source, it is possible to read ECW or JPG2000 image files **or** to connect to an ECWP server (ERDAS Image Web Server) to obtain images. It is not possible to configure both at the same time.

Note: This type of data can also be read by the GDAL data source with the same performance. This data source is kept for compatibility with existing configurations.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Parameters	
Selected files	Select one or more ECW or JPG2000 image files to read. If many files are selected, they will be considered as a mosaic. The files must be georeferenced.
ECWP URL	Enter the URL of an ECWP compatible server to read the images from.

TIFF/GeoTIFF Files

This type of spatial data source can read georeferenced TIFF image files. JMap supports two types of georeferenced tiff images: tiff files with tfw files (the tfw files contain georeferenced data) or geotiff files (georeferenced data inside image file).

There can be one or more source image files (mosaic of images). The images of the mosaic can overlap and there can be holes in the mosaic. When the data source is updated, lower resolution images are created by JMap Server and stored in the image cache (pyramid of images). The image cache is then used to produce images on the fly at specific resolutions with optimal performance. Depending on the initial image sizes and parameters, the image cache can become voluminous. Typically, the space used by the cache is the same size as the original images. Available disk space must be sufficient before updating this data source.

Note: This type of data can also be read by the GDAL data source with the same performance. This data source is kept for compatibility with existing configurations.

Parameters	
Selected files	Select one or more image files to read. If many files are selected, they will be considered as a mosaic. The files must be georeferenced.

Advanced parameters

The following advanced parameters don't need to be modified most of the time.

Parameters	
Cache path	The directory where JMap Server will store generated image files for the various resolutions. Default is JMAP_HOME/cache/raster.
Interpolation type	Method for producing images with reduced resolutions from images with higher resolutions. Default is bicubic

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	and usually gives the best results.
Compression type	Type of compression of the lower resolution images in cache. Default is none and offers the best performances but uses more disk space.
Resolutions	Number of lower resolution images to prepare and resolution ratio in relation to the higher resolution images. Default is 8 with each image resolution divided by 2.

JMap Server

JMap Server can use a **raster** spatial data source that comes from another JMap Server instance. To enable this, you must start by configuring a connection towards the other JMap Server. Refer to JMap Server to JMap Server Connections for more information.

Parameter	
Remote connection	Select the connection towards another JMap Server instance that must be used to extract spatial data and attributes. The connection must already be configured in JMap Admin.
Remote raster data source	Select the existing **raster** spatial data source on the other JMap Server instance you wish to access. The data source must be shared by the other server.

Spatial Data Source Permissions

Permissions define the users and groups who have special access to spatial data sources.

Defining spatial data source permissions

Only one type of permission is associated with spatial data sources :

Spatial data source permissions	
Remote access	Allows a user to access this spatial data source through a JMap Server to JMap Server connection. This permission must be granted to the user account through which the secure connection between both

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	JMap Servers was established. For more information on this topic, refer to sections JMap Server to JMap Server Connections and Sharing Spatial Data Sources.

In the details section of a spatial data source, click on ***Permissions*** to access the permissions section. A list of authorized users and groups displays. Click on ***Add...*** to add new users or groups and automatically grant them the ***Remote access*** permission. The available users and groups are configured in the ***JMap Server*** section of JMap Admin. Refer to the Managing Users and Groups section for more information on managing users in JMap.

Managing Spatial Data Sources

Updating spatial data sources

Before a spatial data source can be used to create layers, it must be updated. In JMap, updating a data source generally involves collecting information on the spatial data and its attributes and preparing data for fast and efficient access. This process may be very brief or may take several minutes, depending on the type of data source and amount of data. Updating data sources that read data files usually takes more time, in proportion to the size of the files. Data sources that read data from servers can usually be updated very quickly.

In JMap Admin, you can update a data source by clicking on ***Update*** in its information section. You can also update several data sources simultaneously by selecting them in the section displaying the list of data sources and clicking on ***Update*** .

Scheduling automatic data source updates

You can schedule automatic data source updates. This action may be helpful if you use data sources that read data files. If the files are frequently modified, you can schedule automatic updates that will occur on a regular basis (every day at midnight, for instance) for the appropriate data sources. Each data source can have its own schedule.

In order to schedule updates for a given data source, click on ***Schedule*** in that data source's details section. Afterwards, simply follow the wizard to define the specific moments when the updates will take place. Scheduling options are very flexible.

Once these tasks have been scheduled, you can view the current schedule for a data source by viewing its information section.

At any time, you can access the list of all planned updates for data sources by clicking on ***Scheduler*** in the JMap Server section.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Deleting spatial data sources

You can delete spatial data sources by clicking on ***Delete*** from the data source's information section. You can also delete data sources by selecting them in the section listing the sources and then clicking ***Delete*** . When a data source has been deleted, its entire configuration is permanently deleted. **The data itself (the file or database) is not affected**.

Statuses of spatial data sources

Each spatial data source has a status. The status indicates the condition of the data source, i.e. if it is ready to work, if an error occurred, etc. The status of a newly created data source is always set to *not ready* (unless you checked the auto-update flag). This means that the data source cannot be used yet. In order to be used, every data source must be updated at least once. Depending on the type of data source and volume of data, the update process can be very fast or can take a certain amount of time.

Data sources can be updated in batches. A maximum of 3 data sources can be updated simultaneously. Other data sources to be updated are queued until they get updated too.

The following table describes the possible statuses of a spatial data source:

Statuses	
READY	The data source is ready to handle requests.
NOT READY	The data source is not ready to handle requests. This status typically occurs when a new data source was created but not updated yet.
NEEDS UPDATE	The configuration of the data source has been modified and it must be updated before the changes are effective. The data source can still handle requests.
UPDATING	The data source is being updated. Depending on the type of data source and volume of data, the update process can be very fast or take a certain amount of time. The data source can still handle requests if it was updated at least once before.
QUEUED	The data source is waiting to be updated. A maximum of 3 data sources can be updated simultaneously. The data source can still handle requests if it was updated at least once before.
INDEXING (ATTRIBUTES) (vector data sources only)	One or more attribute columns are being indexed. This process can take a certain amount of time depending on

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	the volume of data. The data source can still handle requests if it was updated at least once before.
INDEXING (SPATIAL) (vector data sources only)	The spatial index of the geometry is being created. This process can take a certain amount of time depending on the volume of data. The data source can still handle requests if it was updated at least once before.
ERROR	An error occurred. The data source cannot handle requests. See error message to determine the source of the error.

System spatial data sources

System spatial data sources are data sources that are automatically created by JMap to support JMap data source and layer sharing. Normally, these resources do not need to be managed and they are not displayed by default in the list of spatial data sources. If you wish to display them, you can select ***Show system data sources*** in the bottom right portion of the window.

Sharing Spatial Data Sources

Spatial data sources can be shared in order to be accessed by other JMap Server instances. This way, data can be stored in a single location but is accessible from several JMap Server instances.

In JMap Admin, you can share a spatial data source by granting the ***Remote access*** permission to one or more users on this spatial data source. This choice must be consistent with the user who established the connection from the JMap Server that must access the shared spatial data sources.

Refer to sections Spatial Data Source Permissions and JMap Server to JMap Server Connections for more information on this topic.

Once a spatial data source has been shared, a • icon displays in the list of data sources, in the ***Shared*** column.

External Attributes

External attributes for a spatial data source in JMap are attributes that are obtained from an external database (external means a database that is separate from the data source itself).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

The external attributes are added to the list of existing attributes and can thereafter be used like any other attribute in reports, queries, mouse-over, thematics, etc.

External attributes are available only for vector spatial data sources that read data from files (shp, mif, tab, dwg, dgn, etc.). When working with vector data sources that access data inside existing spatial databases (PostGIS, MySQL Spatial, Oracle Spatial/Locator, etc.), this option is not available. In that case however, it is often easy to include all needed attributes using normal SQL joins with other tables or by creating views.

External attributes are created from the spatial data source creation wizard.

1. To create an external attribute, press ***Edit*** in the attribute section of the wizard.
2. Press ***Add*** to create a new attribute.
3. Select a database to get the attribute values from. This database must already be configured in JMap Admin.
4. Select where to get the attribute values from:

Get external attribute value from	
One or more existing fields	Choose this option to select one or more fields from a specific table of the database to get the values from. This is the simpler method.
An SQL query result	Choose this option to provide an SQL query that will retrieve the values from the database. This method is more flexible.

One or more existing fields

If you selected this option, follow these steps:

1. Select the database schema to use.
2. Select the database table to use.
3. Select the fields to read and the join parameters:

Get external attribute value from	
Get value from	Select the physical fields to use as external attributes. For each field, you can provide an attribute name that is different from the field name.
Join on fields	Select the field from the external database to use as a join field with the data source. Select the field from the data source to use as a join field with the external database.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

If you go back to the configuration page of an existing external attribute, it is possible to define the aggregation method for this attribute. This defines the action to take if several values are found for the same geometry in the data source.

Aggregation	
Aggregation type	Select the aggregation method to use if more than one value is found for the same geometry: - **Keep first element**: Keep only the first value found. - **Average**: Calculate the average value to use as the attribute value. Only available for numeric attributes. - **Summation**: Calculate the summation value to use as the attribute value. Only available for numeric attributes. - **Concatenate using separator**: Build a string containing all values separated by the specified character. Only available for text attributes.

An SQL query result

If you selected this option, enter these parameters:

An SQL Query result	
Attribute name	The name of the the new external attribute will be the same as the selected field, by default. It can be modified later. The name must be unique.
SQL query	Enter the SQL query to be executed in the external database and that returns the values to use for the external attribute and the field used to join with the data source. Press ***Execute*** to test the query and to initialize the other parts of the interface.
Get value from	Select the table and the field to get the values from. Only those returned by the SQL query are available.
Join fields	Select the field from the external database to use as a join field with the data source. Select the field from the data source to use as a join field with the external database.
Dynamic attribute	Select this option to make the attribute dynamic. Dynamic attributes are dynamically read from the source. Non dynamic attributes are imported in JMap System database and are read again from the source

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	only when the spatial data source is updated in JMap Admin. Dynamic attributes can impact the performances in some situations.
Aggregation type	Select the aggregation method to use if more than one value is found for the same geometry: - **Keep first element**: Keep only the first value found. - **Average**: Calculate the average value to use as the attribute value. Only available for numeric attributes. - **Summation**: Calculate the summation value to use as the attribute value. Only available for numeric attributes. - **Concatenate using separator**: Build a string containing all values separated by the specified character. Only available for text attributes.

Metadata

Metadata Templates

JMap allows you to define metadata templates to document spatial data sources directly in JMap Admin. Once the model has been defined, you can associate this model to certain data sources and enter all the information, which users can then easily view in JMap's applications. If you already use a metadata management system that can be accessed in a browser, you can also create a direct link between certain layers and this system. Refer to the Metadata of a Data Source section for more information on the metadata of a spatial data source.

You can create as many metadata models as you want.

The metadata template management section can be accessed by clicking on ***Metadata templates*** in the ***Spatial data*** section.

Creating a metadata template

Click on ***Create*** to create a new template. The interface shows the following options:

Metadata template	
Name	Enter a name for this template. Template names must be unique.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Section name	You can define one or more metadata sections. Enter a name for the current section. Click on to delete a section.
Label	Enter a label for the field. The label text will be displayed in the metadata entry window and in the consultation interface.
Type	Select the type of field. The following types are available: **TEXT:** Alphanumeric data entry field on a single line. **TEXTAREA:** Data entry field spanning multiple lines to allow for longer text.
Mouseover	By selecting this option, the field value will be displayed in the mouseover bubble when a layer is pointed in the layer bar of JMap applications. This bubble presents a summary of a layer's metadata.

To add a new field in the template, click on ***Add field*** . Afterwards, you can configure this new field. To add a new section in the template, click on ***Add section*** .

Metadata of a Data Source

Metadata can be associated with spatial data sources in JMap. It can include information such as the person who produced the data, the date it was updated, a description, etc. Users can view this information for the corresponding layers in JMap applications. Metadata can be entered directly into JMap Admin using preset templates or it can be taken from an external metadata management system. Refer to the Metadata Templates section for more information on creating templates.

To access the metadata settings of a spatial data source, click on ***Metadata*** in the details section of a spatial data source. The following options are available:

Metadata	
Type	3 options are possible: **None**: No metadata is associated with this data source.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	External: The metadata comes from a metadata management system that is outside of JMap and accessed through a URL. The URL must be entered in the ***URL*** field below. **Template**: The metadata is entered directly in this section using the selected template.
URL	If the type of metadata is *external* , this setting defines the URL to be opened in order to view the metadata associated with this spatial data source.
Template	If the type of metadata is *template* , select the template to be used for this data source. The metadata entry form for this template displays. Enter the metadata in the various fields.

Layers whose data originates from spatial data sources with metadata will automatically inherit this metadata. Users of JMap desktop applications can view the metadata by positioning their mouse cursor on the name of a layer in the layer bar (summarized version) or by clicking on a layer's ***Metadata*** button (full version).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Projects

Introduction

In JMap, map data is organized in projects. A project is composed of an ordered list of layers. Typically, when a JMap application connects to JMap Server, the application opens a specific project. The layers contained in the project then get downloaded (in whole or in part) and are displayed in the map window of the client. An unlimited number of projects can be created (unless there is a license restriction).

Each layer of a project is associated with a spatial data source. The data source provides the data of the layer. Different projects can contain layers sharing the same data sources, allowing different data bindings, styles, etc. for the same data. Also, more than one layer in a project can share the same data source. This is useful when using layer filters to show different data of the same data source on multiple layers.

A project is a secured resource, which means that permissions are associated with it in order to control access by users. This allows precise control of which users or groups will be allowed to open each project. Furthermore, with layer level permissions, it is possible to control which users or groups will be allowed to view which layers of a project.

Creating Projects

To create a new project, press ***Create*** ... in the section listing the projects. Projects are created by walking through a wizard.

Identification	
Name	Enter a name for the new project. The name must be unique.
Description	Optionally enter a description for the new project. Used for administrative purposes.

Parameters	
Map projection	Determines how the data will be displayed in the client applications. Any data that is in a different projection will be transformed to that projection. Note that changing the map projection of a project invalidates the layer cache.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Map unit	The map unit is automatically selected according to the selected map projection.
Display unit	The unit used to display map coordinates
Distance unit	The unit used to display distances (measurements, zoom levels, etc.)
Minimum scale	The minimum scale of the map. Users cannot zoom out further when this limit is reached. Default value is 1:infinity (no limit).
Maximum scale	The maximum scale of the map. Users cannot zoom in further when this limit is reached. Default value is 1:1.
Map rotation	The rotation of the map in degrees. Default is 0.
Map background color	Default color to use for the background of the map
Default selection color	Color of selected objects on the map. It can also be defined for each layer

Advanced parameters

The following advanced parameters don't need to be modified most of the time.

Parameters	
Prevent label overlapping	This option applies to the project globally and makes the automatic labeling engine skip some labels to avoid overlaps. This is useful to keep the map readable when it contains a lot of data. However, some layers can override this option to allow every label to be displayed for those layers. See Labels for more information about automatic labeling.
Rebuild layer caches automatically	When the map projection is changed for a project, the cached data for all layers of the project is cleared. Select this option to automatically rebuild the layer cache when this happens.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Managing Projects

The *Projects* section in JMap Admin displays a list of existing projects. From this section, projects can be created, cloned or deleted.

Modifying an existing project

A project can be modified by pressing ***Edit*** from the project detail section. Modifying a project goes through the same steps as when the project was created. If the projection of the project is changed, the layer caches are cleared and need to be rebuilt.

Cloning projects

You can clone an existing project by selecting it from the table and pressing ***Clone*** . All layers inside the project are copied to the new project. Note that the underlying spatial data sources and databases are not copied. Instead, they are shared between the layers of the new project and the layers of the old project.

Deleting projects

To delete a project, simply click on the ***Delete*** button on the project configuration page. Be careful; deleting a project permanently deletes all layer configurations included in it. The spatial data sources are not affected.

Project Permissions

Project permissions define which users and groups of users can open a project. Access will be denied to users who do not have the required permissions. Security can also be defined at the layer level. See Layer Permissions for more information.

Defining project permissions

Only one type of permission is associated with projects:

Project permissions	
Open this project	Allows a user to open a project from a JMap application.

From the project detail section, press ***Permissions*** to access the project permissions section. A list of currently allowed users and groups is displayed. Press ***Add*** to add new users or groups and automatically grant them the **Open this project** permission. The available users and groups are configured in the ***JMap Server*** section in JMap Admin. See Managing Users and Groups for more information about managing users in JMap.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Anonymous user

Adding the anonymous user to the list of authorized users gives users the possibility to open a project without any authentication. This is equivalent to removing all security for the project. This is useful for public applications, when no project access control is needed. When using an application without a login prompt, the anonymous user is used implicitly.

Everyone user

Adding the everyone user to the list of authorized users allows any authenticated user to open a project. This is useful for private applications where all users are allowed to open a project but must authenticate themselves.

Organizing Layers

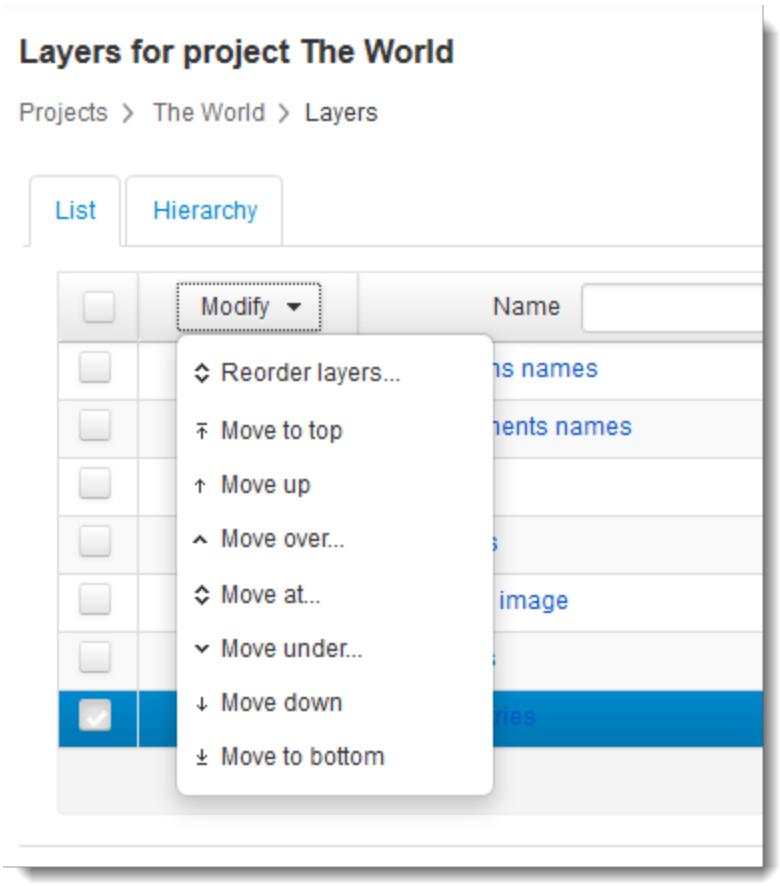
There are two aspects to organizing layers in a project. One is to define the order of appearance of the layers. Layers at lower positions are drawn first and layers at higher positions are drawn at the end. Top layers can hide elements of bottom layers. The other aspect is to create a logical hierarchy based on the nature of the layers. In other words, this allows the creation of groups (and subgroups) of layers that have a logical relationship. For example, there could be a group of layers related to roads, another to hydrography, and another to census. Organizing them in groups makes it easier for the users to work with layers.

To start organizing the layers, open the *Layers* section of the project.

Ordering layers

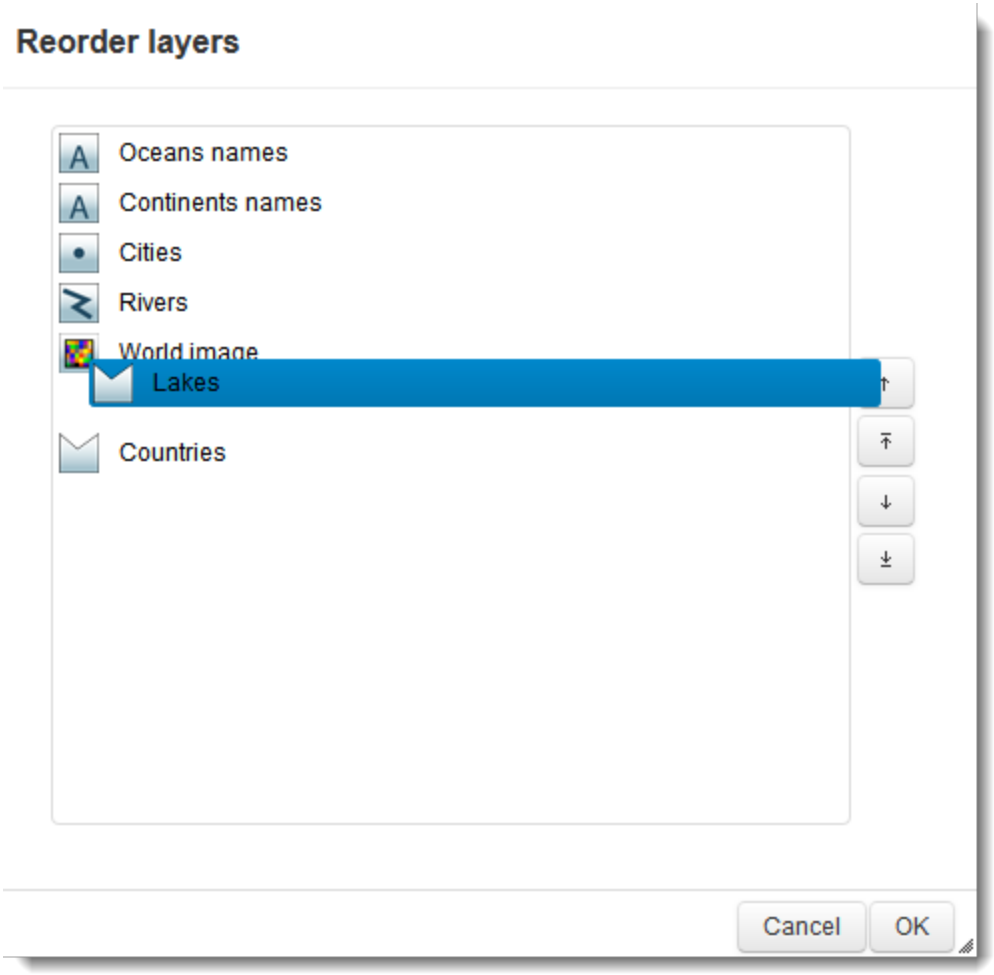
To order layers of a project, open the tab titled *List.* This section presents the layers in their order of appearance. The lowest position is the first layer to be drawn on the map. To change the order, you must use the ***Modify*** menu located at the top of the column displaying the position of each layer. You can also select one or more layers and move them using the available options (Move up, Move down, etc.). In addition, you can open a window displaying all the layers and reorder them using drag-and-drop actions.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



The Modify menu offers many options to modify the order of the layers.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



The option Reoder layers... allows for reordering the layers by drag abd drop.

Grouping layers

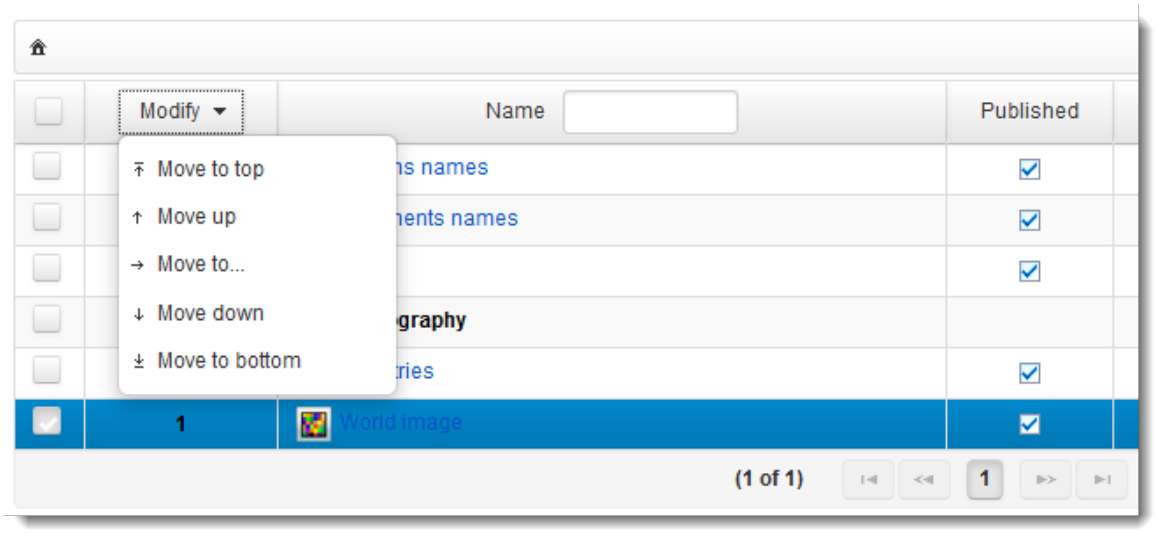
To organize layers in groups, open the tab named *Hierarchy* . This section presents the current hierarchy of layers. By default, all layers of the project are in one unique group called *Layers* . To create a new group, press ***New group*** . Fill the layer group parameters as described below.

Layer group	
Name	Enter a name for the new group. The name must be unique.
Description	Optionally enter a description for the new group. Used for administrative purposes.
Visible	Makes the group initially visible when the project is opened. All visible layers inside the group will be

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

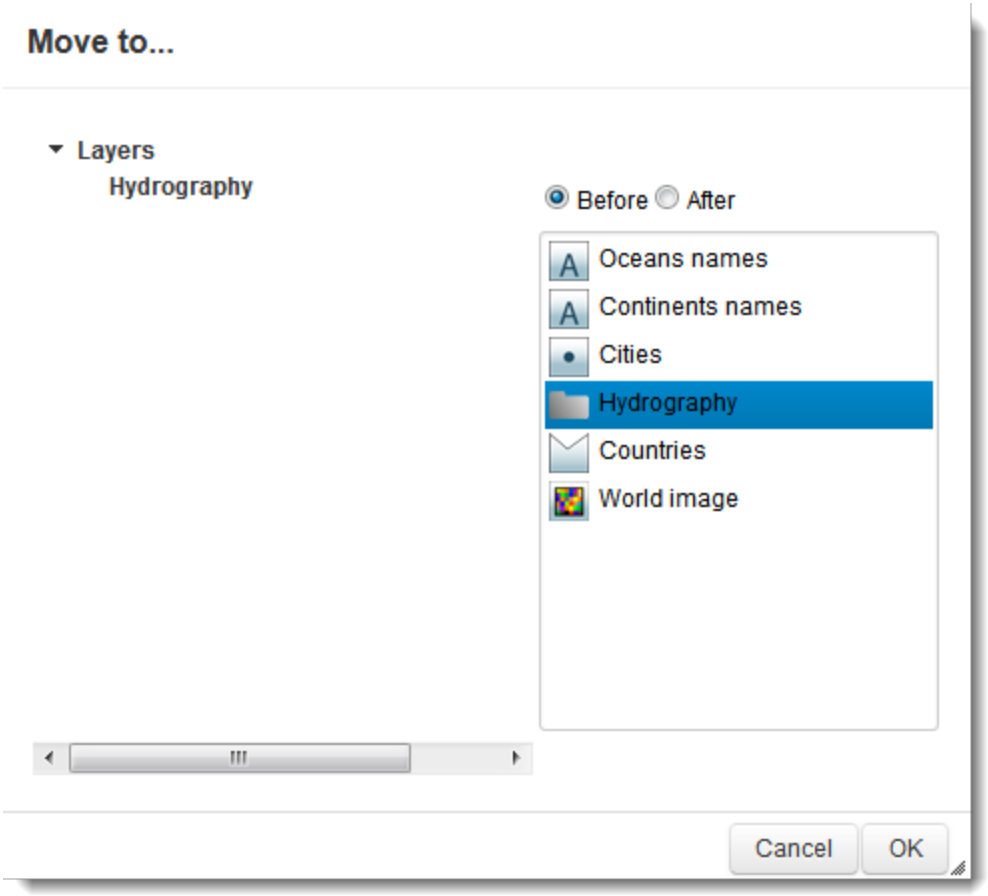
	displayed.
Always listed	Ensures the group is always listed (displayed in the layer bar) even if it contains no layer. By default, empty groups are not listed. A group can be empty if it contains no layer, if all the layers it contains are not listed or if the user doesn't have the permission to see the layers of the group.

Once groups have been created, you can move layers towards these groups using the ***Modify*** menu located at the top of the column displaying the position of each layer.



The menu Modify offers many options to move a layer inside a group or to another group of layers.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



The option Move to... allows for moving a layer to another group.

Attribute Queries

Creating Attribute Queries

Attribute queries are used to find and select map elements using their attribute values or a database associated with the layer. In JMap Admin, JMap administrators create the queries and their associated forms. Then, users of JMap applications use those forms to enter attribute values to search for. All elements whose attribute values match the values entered are then selected or listed in an elements explorer.

You can access the query configuration section by clicking on ***Queries*** in the *Projects* section.

Creating a new attribute query

To create a new query, press the ***Add query*** button in the *Attribute queries* section. This will open the query configuration interface. Parameters will vary depending on the type of query selected.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Query	
Title	Enter a title for the query. Users will see this title in a list of queries.
Layer	Select the layer on which the query will be executed.
Maximum scale	Specify the maximum scale used to present the results on the map. This is used to avoid zooming in too closely on the results.
Max. returned values	Specify the maximum number of elements this query can return. The query will refuse to execute if the return size is higher than this limit. This is used to avoid very long queries that could slow down the system.
Query templates	**Basic**: With this type of query, the search is only performed on the layer attributes. This is the simplest type of query. **External database**: With this type of query, the search is performed in an external database that has a field linking to an attribute of the layer. Setting up this type of query is more complex but offers more searching flexibility.

Layer queries

Layer queries	

WHERE	WHERE clause of the SQL query used to run the search. Here is where all the searching criteria will be defined. Typically, this clause contains numbered parameters ($param1, $param2, etc.) that will be replaced by the values the user enters in the form.
	Examples :
	`COUNTRY='$param1'`
	Selects the layer elements for which the attribute value *COUNTRY* is equal to the value entered by the user. The attribute value must perfectly match the value entered ($param1).
	`lower(COUNTRY) like lower('$param1%')`

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	Selects the layer elements for which the attribute value *COUNTRY* is similar to the value entered by the user. The attribute value must begin with the value entered ($param1). Since the *lower* operator is used, the search is not case sensitive. **POP2000>=$param1 and POP2000<$param2** Selects layer elements that have the *POP2000* attribute value within the range defined by the two values that were entered ($param1 and $param2).
Form	Press this button to configure the query form. Read below for more details on this topic.

External queries

This type of query is used when the search must be conducted within the data of an external database. The external database must contain a field that links to a layer attribute. A select SQL query is executed in the external database and the values returned are then associated with the layer elements using the link field.

External queries	
Database	Select the database in which you would like to perform your query.
SQL query	Enter the SQL query that will be executed in the database to search for elements. Read below for more details on this topic. Examples: **select * from cities where CITY_LANGUAGE='$param1'** Searches the database selected above, in the *cities* table. Retrieves all fields of records for which the value of the *CITY_LANGUAGE* field is equal to the value entered by the user ($param1).
Field	Among the fields returned by the SQL search, indicate which one is used to link with the layer.
Layer attribute	Among the layer attributes, indicate which one is used to link with the database.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Form	Click on this button to configure the query form. Refer to the Forms section for more information on this topic.

Required and optional parameters

Although search forms are designed to mark fields as required or optional, the where clause of the query must be adjusted to support this option. To accomplish this, any part of the query that is associated with optional parameters must be included between braces ({ }).

Example of where clause:

```
CITY = '$param1' and { COUNTRY = '$param2' }
```

This example searches for cities for which the attribute value *CITY* is equal to the value of parameter 1 ($param1) entered by the user and who optionally have their value for the *COUNTRY* attribute equal to the value of parameter 2 ($param2) entered by the user. If parameter 2 is left blank , the entire block *{ COUNTRY = '$param2' }* is removed from the query, along with the *and* operator, which is now an orphan. Note that the administrator must absolutely define $param2 as optional when designing the form. Refer to the Forms section for more information on designing forms.

Multiple values for the same parameter

Multiple values can be entered for the same text field within forms. Values are separated by a delimiter character. This option can be activated in the where clause of the query. The syntax is as follows:

```
$multiple{true|false} {$delimiter{,|;|...}}
```

Example:

```
CITY = '$param1{$multiple{true} $delimiter{,}}'
```

Searches for cities whose *CITY* attribute value is equal to one of the values entered in parameter 1. The values are separated by commas. Note that the default delimiter is the comma (,), therefore it is not necessary to specify it, as indicated in the following example:

```
CITY = '$param1{$multiple{true}}'
```

Managing Attribute Queries

Deleting attribute queries

Deleting an attribute query permanently deletes the query and its associated form. To delete a query, click on the button.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Organizing attribute queries

Attribute queries can be organized into groups. This is particularly useful for projects that have a large number of queries.

To create a new group, click on the *Add group* button. To modify the order of groups, drag and drop them to the desired position. To delete a group, click on . To rename a category, click on . To move a query into a group, drag and drop it towards the desired group, on the left.

Style Templates

Style templates are predefined styles that can be reused across many projects and layers. They help save time because a style can be configured once but used at many places. Style templates also help create standardized maps.

Once a style template is configured, it can be used in every place a style is needed (layer styles, selection styles, thematics, etc.). A style template can be used as a **reference** or as a **copy**. When used as a reference, if the style template is modified, all layers that refer to it will also use the modified style. When used as a copy, the style is detached from the style template and can be modified independently thereafter.

Style templates are associated with only one type of map element (point, line, polygon, etc.) and cannot be used for other types of elements.

To use a style template, click on ***Use a style template...*** from any style configuration interface. See Style for more information.

You can access the style template configuration section by clicking on ***Style templates*** in the *Projects* section.

Creating style templates

To create a new style template, press ***Create*** .

Style templates	
Type	Select the element type associated with the new style template. Depending on the selected type, the style configuration interface will be different.
Name	Enter a unique name for the style template.
Description	Optionally enter a description for the style template.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

The rest of the configuration depends on the selected element type and is identical to normal style configuration. See Style for more information. Press ***Finish*** to complete.

Deleting style templates

To delete a style template, select it in the list and press ***Delete*** .

Personal Layers

Personal layers are layers of data created and populated by the users. When creating a new personal layer, the user specifies a name, a geometry type and a set of attributes. The layer configuration and the data (geometries and attributes) are stored in the JMap Server System database, on the server. Once they have been created, personal layers can be shared between users with a permission system. They can also be converted to normal layers inserted in a project by the administrator. Users need a special permission granted by the administrator to create personal layers.

You can access the personal layers section by clicking on ***Personal layers*** from the *Projects* section.

In JMap Admin, the administrator can see a list of existing personal layers. It can be displayed by personal layer or by user. When selecting a personal layer, you can see which users have access to it. When selecting a user, you can see which personal layers the user has access to. You can also click on a personal layer to open its detailed section.

Deleting a personal layer

To delete a personal layer, select it in the list and press ***Delete*** .

Be aware that deleting a personal layer deletes its configuration and all its data and cannot be undone.

Publishing a personal layer

Publishing a personal layer transforms it into a regular project layer. **Once it is published, a personal layer can no longer be managed by users.** However, it can still be edited if the administrator grants the appropriate permissions to users. To publish a personal layer, select it in the list, press ***Publish*** and select the project in which the layer will be inserted.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Layers

Introduction

A project is composed of an ordered list of layers. Layers are used to display data extracted from spatial data sources. Each layer is related to a specific spatial data source. Vector layers are related to vector data sources and display vector data while raster layers are related to raster data sources. The layer configuration determines the appearance of the data (style of the layer), the visibility thresholds, what information is associated with the spatial data (attributes), etc. Each layer has its own configuration parameters for labeling, reports, thematics, etc.

Layers are created in the project they belong to. Specific permissions can be configured for each layer. Thus, some layers can be accessed only by a subset of users authorized to open the project.

The layers of a project can be organized into a logical tree-like structure or hierarchy. This feature is useful to better organize information when working with projects that have a high number of layers. In client applications, users are able to control the visibility the layers belonging to the same group in one click. Refer to the section titled Organizing Layers for more information on this subject.

Layers can be copied from one project to another or even shared between various projects located on the same JMap Server or on separate JMap Servers. Refer to the section titled Sharing Layers for more information on this topic.

Layers are presented in the *Layers* section, which may be accessed from the details section of a JMap Admin project. The table displays basic information on each of the project's layers. When you click on the name of a layer, a details section displays. This section contains useful information on the layer and buttons that perform management tasks.

Layers	
Add - Create	Initiates the creation of a new layer. Refer to Creating layers.
Add - Clone/Reference	Allows you to duplicate or reference a layer from another project located on the same server or on a different JMap Server. Refer to Sharing Layers.
Permissions	Allows you to configure permissions for the selected layers. Refer to Layer Permissions.
Delete	Deletes the selected layers.
Update data sources	Updates the spatial data sources associated with the selected layers. Refer to Gestion des sources de

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	données spatiales.
Update caches	Launches the preparation of the vector data cache for the selected layers. Refer to Creating Layers.

Creating Layers

Each layer of a project in JMap takes its data from a spatial data source. Thus, before layers can be created, the related data sources must already exist (see Creating Spatial Data Sources for more information).

Creating a new layer

To create a new layer, press ***Create*** in the ***Add*** menu of the Layers section of a project. Note that the new layer will have the same name as the data source by default. The name can be changed later.

Creating a new layer requires completing the following wizard steps.

Spatial data source	
Spatial data source	Select the spatial data source that will provide the data of the layer. Selecting a vector data source will create a vector layer. Selecting a raster data source will create a raster layer.

The next steps are different for vector layers and raster layers. Note that creating a raster layer is also different for each type of raster data sources. Jump to the corresponding section below.

Creating a vector layer

Attributes	
Available attributes/Bound attributes	By default, when layer elements (points, lines, polygons, etc.) are transferred from JMap Server to an application's memory, the element attributes (or descriptive data) are not. This is because the attributes are not “bound” to the elements. Data binding binds attribute data to layer elements. Data binding is necessary for the following client-side functions: labeling, mouseover, thematic mapping and displaying attributes in the elements or selection explorer.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	Select and add the attributes to the list on the right to bind them to the layer. The other attributes will still be available for other functions like attribute queries and information reports. Note that the number of bound attributes has an impact on network and memory usage and thus can reduce the overall performances. Unneeded attributes should not be bound unless they are required on the application side.

Geometry type	
Geometry type	If the data source provides more than one type, select the unique geometry type for the layer.

Geometry angle (layers of points only)	
Attribute angle	This section is only available for layers of points. In this section, select a numeric attribute that contains rotation angles (in degrees or in radians) for the symbols representing the points of the layer. If you select an attribute of the angle, the symbols will be displayed with a rotation following this attribute value. The rotation direction specifies how to interpret the angle values.
Direction	Choose the rotation direction. Angle values can be interpreted clockwise or counterclockwise.

The request mode determines how the vector data is requested from JMap Server. There are 2 available request modes: by tile and by region.

Request mode	
Load by tile	The data is requested by rectangular zones (tiles) defined by a predetermined fixed grid that covers all the layer data. Structuring layer data in tiles makes data management more efficient, for network transfers, memory management and cache storage. If the grid is not properly configured, this can have a negative impact on the system's performance or lead to operational problems. When you press the ***Estimate***

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	button, JMap performs a calculation to determine the best configuration for the grid. You can accept these values or modify them according to your needs. This mode offers the best performance because once a tile has been extracted from a data source, it can be cached for a certain amount of time and reused effectively. This is the recommended mode for most applications.
Load by region	The data is requested by random regions, according to the user's navigation actions. Each time the layer needs to be displayed in the application, a new request is sent to JMap Server and the data is extracted again from the spatial data source. This mode is very dynamic as no caching is used and users can see data changes at every map manipulation (zoom, pan, etc.). Note however that it is much more intensive for JMap Server and, if not used properly, it can affect the system's general performance. This mode must be used for dynamic data. Typically, this data is found in a relational database and can be randomly modified. This is the case for layers that are editable by JMap.

Advanced parameters

Most of the time, the following advanced parameters don't need to be modified.

Advanced (optional)	
Transformation	**Apply a translation**: Translate each geometry of the layer by **X** units horizontally and **Y** units vertically. The original data is not affected. **Generalize geometries**: Generalize (simplify) geometries using the specified **tolerance**. For a given geometry, all nodes that are closer together than the tolerance are eliminated. In addition, all nodes that are located on the same straight line are eliminated.
Filter	**SQL conditions**: SQL conditions are used to filter the elements of the spatial data source. Only the elements

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	that satisfy the SQL conditions will be on the layer. This allows you to create many layers showing different data using the same spatial data source. SQL conditions are interpreted directly by the database system so the syntax is the same as that of an SQL WHERE clause. The *where* keyword is not necessary.
Caching	This section allows you to define data caching rules for the vector data and its attributes. The cache is on the server. This improves performances because once data is in the cache, JMap Server does not need to load it again from the data source. **Activate server data caching for this layer**: Use this option to enable or disable data caching on the server for this layer. **Automatically build the cache when the data source is updated**: If caching is enabled, this tells JMap Server to flush and rebuild the cache for this layer, when the corresponding spatial data source gets updated. Building the cache in advance helps to prevent delays for the users. Building the cache may take a long time, depending on the volume of the data. **Cache timeout**: This instructs JMap Server to cache the data no longer than the specified time period. When the timeout is reached, the data is requested again from the data source.This is mostly useful for spatial data sources that get their data from spatial data servers to which JMap Server is connected (Oracle Spatial/Locator, ESRI geodatabases, PostGIS, MySQL Spatial, etc.). **Update layer cache after I click "Finish"**: Select this option to have the cache built immediately for this layer. Building the cache may take a long time, depending on the volume of data.

Creating a raster layer based on a WMS data source

To create a raster layer based on a WMS spatial data source, you need to tell JMap what data to request from the WMS server. The WMS server provides capabilities information that enumerates all the layers it can serve and their properties. In JMap, the WMS layer creation interface allows you to select the layers to include in the WMS layer you wish to create.

WMS raster layer

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Available layers	The list of layers the WMS server is publishing. If you hold your mouse pointer on a layer name, its description will display automatically, along with its attributes. The attributes determine if the layer is **Queriable** (supports GetFeatureInfo requests), **Cascaded** (comes from another WMS server) or **Opaque** (not transparent, i.e. the layers found under it will not be visible).
Selected layer(s)	The layers selected among those that are available appear in this list. Click on ***Add*** to add a new layer to this list. You can select the style to be used. A default style is always provided.
Connection type (Direct/Server)	The connection type determines if JMap applications will request images directly from the WMS server or if they will send the requests to JMap Server, which in turn will query the WMS server. If direct is selected and a client application fails to connect to the WMS server, the connection mode will revert to server. Note that if JMap Server is behind a firewall/proxy, it may need proxy authentication settings in order to access the Internet. See JMap Server Settings for more information.
S.R.S.	The list of Spatial Reference Systems offered by the WMS server for the layer. You can select the one to use.
Background color	Tells the WMS server what color to use in the background of the map images. Any area where there is no data will be filled with this color.
Use background color as transparent color	Tells the WMS server to use the background color as the transparency color. Using transparency allows the map images to be placed on top of other layers without completely hiding them.
Output format	The list of output formats offered by the WMS server. You can select the format to use.

Creating a raster layer based on a GDAL, TIFF/GEOTIFF or ECW/ECWP data source

Raster layer

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Image format	Select the image format to use for image transfers between JMap Server and JMap applications. For air photos, JPEG usually gives the best results.
Image format parameters	Only used with JPEG image format to specify the quality factor (1 means excellent quality and low compression while 0 means low quality and high compression). Test with different values to determine what fits your needs. A value of 0.5 is usually a good compromise. Example: quality=0.6
Background color	Tells JMap Server what color to use in the background of the images. Any area where there is no data will be filled with this color.
Use background color as transparent color	Tells JMap Server to use the background color as the transparency color. Using transparency allows the images to be used on top of other layers without completely hiding them.

Publishing Layers

Layers can be published or not published. A layer must be published to be accessible to the users. A layer that is not published is not part of the project and in no way can users see it or access it.

When a new layer is created, it is not published by default. This allows you to do further configuration tasks on the layer before making it available for the users. For example, it is important to configure visibility thresholds appropriately according to the scale before the layer can be seen by users.

After layer creation, you must press the ***Publish*** button in the layer's detail section. A layer icon marked with a red X indicates that the layer is not published.

Unpublishing an existing layer can be useful to make it unavailable to the users without actually deleting it.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Layer Permissions

There are several different types of permissions for a project's layers. The following table describe each one of these.

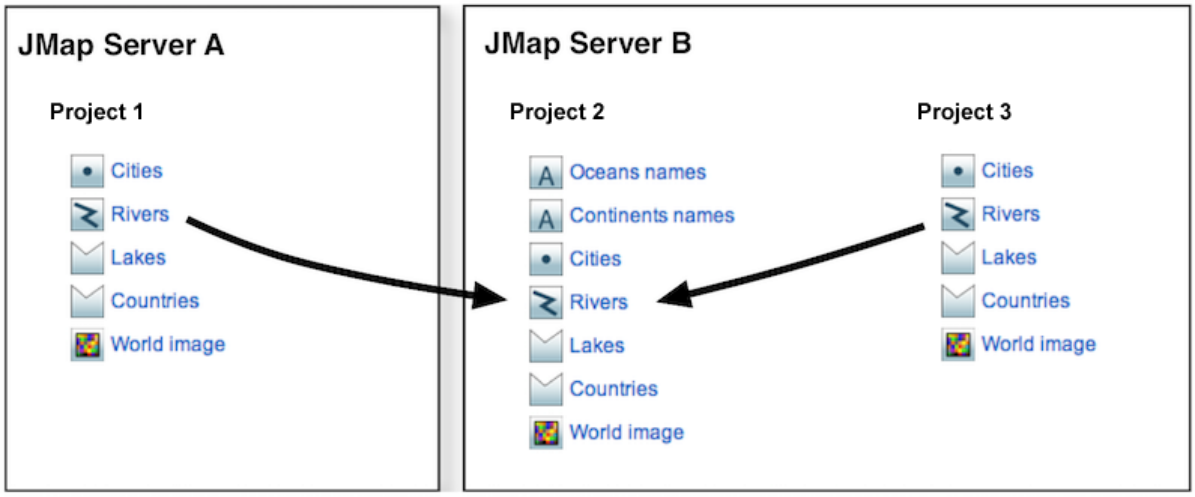
Layer permissions	
View this layer	Allows a user to view a layer in JMap's applications. By default, the *everyone* user can view any new layer. To limit access to this layer, you must remove this permission from *everyone* and only add it to the users of your choice.
Add elements	Allows a user to add new elements on the layer and enter attribute values using the form associated with the layer. Editing must be enabled on this layer in order for this permission to be available.
Modify elements	Allows a user to modify the geometries of the elements (move add/remove nodes, etc.) found on the layer. Also allows the user to modify attribute values using the form associated with the layer. Editing must be enabled on this layer in order for this permission to be available.
Delete elements	Allows a user to delete existing elements on the layer. Editing must be enabled on this layer in order for this permission to be available.
Modify attribute values	Allows a user to open the form of a layer's element attributes and to modify their values. Editing must be enabled on this layer in order for this permission to be available.
Remote access	Allows a user to access this layer through a JMap Server to JMap Server connection. This permission must be granted to the account of the user who established the secure connection between both JMap Servers. For more information on this topic, refer to the JMap Server to JMap Server Connections section.
Copy data	Allows a user to copy the data of the layer to another layer, or to export the data of the layer using JMap Exportation extension.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

To modify layer permissions, press ***Add...*** in order to select the users and groups to which you wish to grant permissions. Only the users and groups who are already authorized to open the project containing the layer can be granted permissions associated with this layer.

Sharing Layers

JMap allows you to share layers between projects that are on the same server or that originate from remote servers that are connected. Layer sharing allows you to manage data more effectively (avoids duplication, saves time) by reusing existing layers instead of creating new layers in each project. When the original layers are modified, the changes can automatically be viewed in all projects that have referenced layers pointing towards these shared layers. Referenced layers cannot be modified directly, save a few basic settings. Only the original shared layer can be modified.



Partage de couches entre projets d'un même serveur et de serveurs distincts. Les propriétés de la couche Rivers ne peuvent pas être modifiées dans les projets 1 et 3.

Sharing layers between projects on the same server and between projects on separate servers. The properties of the Rivers layer cannot be modified in projects 1 and 3.

Sharing layers between projects on the same JMap Server

To share layers between projects on the same JMap Server, no action is required. Layers can be accessed freely from any project on the same server. Refer to Accessing shared layers for more information.

Sharing layers between different JMap Servers

If you wish to share a project's layers in order to access them from another JMap Server, you must assign a special remote access permission to a user for these layers. In order to do this, access the project layers section for which you wish to share these layers.

1. Select one or more layers.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

2. Click on ***Permissions*** .
3. In the permission management interface, select the user account or group to which you wish to assign the remote access permission (you can add user accounts and groups by clicking on ***Add...***).
4. Select the ***Remote access*** permission. The account used must match the user account through which the connection to this JMap Server was established. If you are using a group, the aforementioned user account must be included within it.

Once the layers have been shared, they can be selected from the remote JMap Server and inserted in this server's projects. Refer to Accessing shared layers for more information.

To stop layers from being shared, simply remove the ***Remote access*** permission from these layers.

Accessing shared layers

To access existing layers from different projects located on the same JMap Server or shared layers on other JMap Servers, you must click on ***Clone / Reference*** in the layers section of the project to which you would like to add these layers.

In the ***Clone / Reference layers*** section:

1. Select a JMap Server from which you wish to clone or reference layers. If you choose ***Local server*** , you can select the projects and layers of the local server without these being shared. The other servers in the list are the JMap Servers for which a ***JMap Server to JMap Server connection*** exists. Refer to the JMap Server to JMap Server Connections section for more information on creating JMap Server to JMap Server connections.
2. Select the project from which you wish to clone or reference layers. Once the project has been selected, the list of available layers displays.
3. Select the layers you wish to clone or reference and move them to the list on the right.
4. Select the ***Clone*** or ***Reference*** option.

If you choose the ***Clone*** option, the selected layers will be duplicated towards your project. They will be exact copies of the original layers, but there will be no connection between the copies and the original layers. You can modify the copies without affecting the originals. If you delete a cloned layer, this doesn't affect the original layer. If you delete the original layer, this doesn't affect its cloned layers. However, duplicated layers always use the same spatial data source as the original layer. If this data source is modified or deleted, this will affect the duplicated layers.

If you select the ***Reference*** option, the original layers will be accessed by reference. This means that a direct connection will be maintained between the layers of your project and the original layers. You will not be able to modify these layers in your project. If the original layers are modified, the changes will appear wherever references to these layers exist, after a short delay. If you delete a referenced layer, the original layer will not be affected. If

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

you delete the original layer, the referenced layers will no longer work and will have to be deleted manually.

Configuring Layers
General Settings

The layer general settings section is accessible by clicking on the ***Settings*** drilldown menu, then selecting ***General*** in the layer details section. This section allows you to specify basic layer parameters. These parameters are described below, along with the visibility thresholds.

General

General	
Name	The name for the layer. Names attributed to layers in the same project must be unique. By default, the name of the associated spatial data source is used.
Description	An optional text to describe the layer. In JMap applications, this text can be viewed by users in a mouseover bubble on the layer name.
Published	Determines if the layer is published or not. See Publishing Layers for more information.
Visible	Determines if the layer is visible or not when the project is opened. Users can make layers visible or invisible in JMap applications.
Selectable	Determines if elements of the layer will be selectable or not when the project is opened. Users can determine whether or not layers are selectable in JMap applications.
Use client disk cache	Determines if the layer data will stay on the user's system even when the JMap application is closed. This option improves the overall performance because the locally stored data will be re-used next time instead of being downloaded again.
Show in overview	Determines if the layer will appear in the overview, if present. This overview simplifies map navigation.
Listed	Determines if the layer will be listed in the layer manager in the client applications. A layer that is not listed appears on the map normally.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Visibility thresholds

Visibility thresholds are used to control the visibility of a layer according to the scale of the displayed map. This is useful when you want to hide elements of a specific layer beyond (or under) a certain scale. For example, you might not want to display the local street layer when looking at the whole territory of a country. Using the thresholds, you could specify that the local streets are to be visible only when looking at a map with a scale greater than 1 : 100 000. In that case, you would specify a minimum scale of 1 : 100 000 and leave the maximum scale to 1 : infinity.

General	
Minimum scale	The minimum scale to make the layer invisible when zooming out under the specified scale.
Maximum scale	The maximum scale to make the layer invisible when zooming in over the specified scale.
Read-only for users	Determines if the users are allowed to modify these values. Modifying these scales on the client for layers that contain a high number of elements could cause very long queries that use a lot of resources or even lead to unusual responses from JMap.

Dynamic refresh

The dynamic refresh of the data is used to automatically reload the data of a layer after a configured delay, without the need for the user to manipulate the map. This can be useful for layers that contain data that is updated regularly, such as layers of vehicle tracking (AVL). This is an alternative to the use of layers by region.

Dynamic refresh	
Activate dynamic refresh	Select this option to activate the dynamic refresh.
Refresh every	Specify the delay between each refresh.

Style

The style of a layer determines the graphical representation of its spatial elements of the map. For example, the style of a line is determined by its thickness, color, dash pattern, etc. In JMap, each layer can have multiple styles. Only one style is visible at a time, depending on the scale of the displayed map.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Different styles can be configured for different scales. For example, a layer can have one unique style for all scales while another layer can have one style for scales greater than 1:20000 and another style for scales smaller than or equal to 1:20000.

Layers also have selection styles (one per style). These styles are used to display selected elements at different scales. The selection styles are generated automatically from the layer styles but they can be customized for each layer.

The presence of thematics on a layer will override the layer styles. When a thematic is active on a layer, the style of each element is determined by the value of its attributes and the thematic parameters. See Creating Thematics for more information.

Managing layer styles

You can define one or more styles for a layer. If there are many styles, each one will be used within a certain range of scales. By default, one style exists for each layer and it covers the full possible scale range. To manage the styles of a layer, press ***Style*** from the layer settings menu.

To add a new style, press ***Add***. In the style configuration interface, you must define the maximum scale from which the new style will be used. Its minimum scale will be automatically be set to infinity or to the maximum scale of the next style.

To remove a style, select it from the list and press ***Remove*** . Note that the greater scale style cannot be deleted. When deleting styles, the remaining styles will be adjusted to cover the full possible scale range.

Once you have configured one or more styles, you can click on ***Create template*** (located to the right of each style) to create a new style template from one of the layer's styles. The style template will automatically be linked to the layer. See Style Templates for more information.

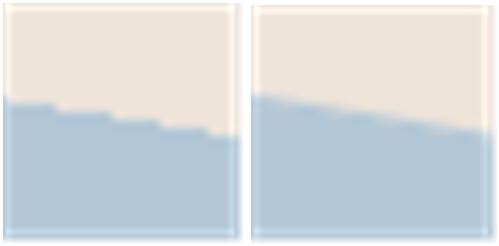
Creating/Modifying a style

You have the option to use an existing style template or to configure your own style. If you want to use a style template, click on ***Use a style template...*** . You will then choose to refer to it or to copy it.

If no style template is used, you need to configure the parameters that will define the style. Style configuration interfaces are different depending on the type of element (points, lines, polygons, text, etc.). Some style parameters are common to many element types but some are specific to certain types.

Antialiasing is a method of representing perfect, continuous vectors on imperfect, discontinuous display devices so that they look as perfect as possible. In every style configuration section in JMap Admin, you can enable antialiasing. This will result in better looking maps. However, display performances are reduced when antialiasing is enabled so use it judiciously.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Example of polygon border without antialiasing (left) and with antialiasing (right)

Partial object **transparency** can be used for every type of map element. A map element with a transparency value of 0% will be completely opaque while one with a 100% value will be invisible.

Example of polygon with 50% (left) and 10% (right) transparency

Styles for points

Style parameters for points	
Symbol	Select the symbol to use for representing the elements. The symbol can be a vector symbol or an image. **Vector symbols** are provided with JMap and offer special characteristics compared to images. They can be resized without distortion and their border and fill color can be modified. However, they cannot be customized easily. **Images** are provided by the administrator and thus can be easily customized. However, their quality will be decreased if they are resized, unless you use SVG images. To provide your own images, place them in the following directory: *JMAP_HOME/jmapadmin/icons* Supported image formats are *svg*, *gif*, *png* and *jpeg*. If subdirectories are created, they will be seen when browsing the image directory. This allows you to organize your image library.
Size	Specify the size of the symbol. A value of 1 corresponds to the original size of the symbol or image.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Proportional size	Select this option if you want the size of the displayed symbols to vary in proportion with the map scale. You must enter the reference scale that will display the normal size of the symbols.
Use antialiasing	Select this option to activate antialiasing.
Transparency	Specify the partial transparency of the symbol.
Offsetted symbol by X/Y	Adjust the original point of the symbol by offsetting the symbol by X and Y according to the specified values. The original point corresponds to the exact coordinates of the point element.
Rotate symbol with the map	Select this option to have the symbol rotated when the map is rotated. If this option is not selected, the symbol will always have its default angle, regardless of the map rotation.
Rotation	Specify the rotation to apply to the symbol.
Border thickness	Specify the border thickness of the vector symbol. **For vector symbols only.**
Border color	Specify the color of the lines of the vector symbol. **For vector symbols only.**
Transparent fill	Select this option to have the inside of the vector symbol completely transparent. **For vector symbols only.**
Fill color	Specify the color of the interior of the vector symbol. **For vector symbols only.**

Styles for lines

Style parameters for lines	
Line thickness	Specify the thickness of the line, in pixels.
Line border thickness	If a line stroke with a border is used, specify the thickness of the border.
Arrow type	Specify the arrow option to use:

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	None: No arrow. **Forward**: Place an arrow on the line pointing toward the last point of the line. **Backward**: Place an arrow on the line pointing toward the first point of the line.
Arrow position	If an arrow is used, determines the relative position of the arrow. A value of 50% places the arrow in the center of the line.
Transparency	Specify the partial transparency of the line.
Use antialiasing	Select this option to enable antialiasing.
Line color	Specify the color of the line.
Border color	If a line stroke with a border is used, specify the color of the border.
Stroke style	Specify the stroke style (dashed, solid, with border, etc.) to use to draw the line. JMap provides many stroke styles.

Styles for polygons

Style parameters for polygons	
Border thickness	Specify the thickness of the borders of the polygon.
Transparency	Specify the partial transparency of the polygon.
Transparent fill	Select this option to have the inside of the polygon completely transparent.
Transparent pattern fill	If a fill pattern is used, select this option to make the pattern background completely transparent.
Use antialiasing	Select this option to enable antialiasing.
Border color	Specify the color of the border of the polygon.
Fill color	Specify the color of the interior of the polygon.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Stroke style	Specify the stroke style (dashed, solid, with border, etc.) to use to draw the border of the polygon. JMap provides many stroke styles.
Pattern	Specify the fill pattern to use. JMap provides many patterns.
Pattern color	If a pattern is used, specify the color of the pattern.

Styles for annotations

Style parameters for text	
Use antialiasing	Select this option to enable antialiasing.
Transparency	Specify the partial transparency of the text.
Font	Specify the font used to display the annotation text.
Bold	Select this option to use bold text.
Italic	Select this option to use italic text.
Underlined	Select this option to use underlined text.
Striked through	Select this option to use strikethrough text.
Outlined	Select this option to use outlined text. Outlined text has an outline that may be of a different color. This helps make the text on the map more readable.
Outline color	If outlined text is used, specify the color of the outline.
Text color	Specify the color of the text.

Styles for images

Style parameters for images	
Transparency	Specify the partial transparency of the image.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Selection style

There is a selection style for each style of the layer. The selection styles are used to represent the elements when they are selected on the map. By default, the selection styles are generated automatically using the layer's basic styles and the project's default selection color.

To modify the selection style, open the ***Selection style*** tab from the style configuration interface. By default, the option ***Generate from default style*** is selected. To customize the selection style, unselect this option and adjust the style parameters as needed.

Thematics

Creating Thematics

Thematic mapping is the production of maps to express information about a specific phenomenon. Examples of thematic maps include: polygons representing sectors of a city colored differently based on the crime rate of each sector; points representing cities displayed using different symbol sizes based on the population in the city, etc. In JMap, you can create thematic maps using the bound attributes of a layer. Depending on the value of their attributes, map elements will then be displayed differently. Using JMap Admin, you can create as many thematic maps as you want and you can also create many thematics using the same layer.

In JMap, there are 2 main categories of thematics: **classifications** and **proportional quantities**.

To create a thematic, press ***Create*** in the thematic section of the layer parameters.

New thematic	
Name	Enter a unique name for the thematic. This name will be visible by users.
Description	Optionally, you can provide a description for the thematic.

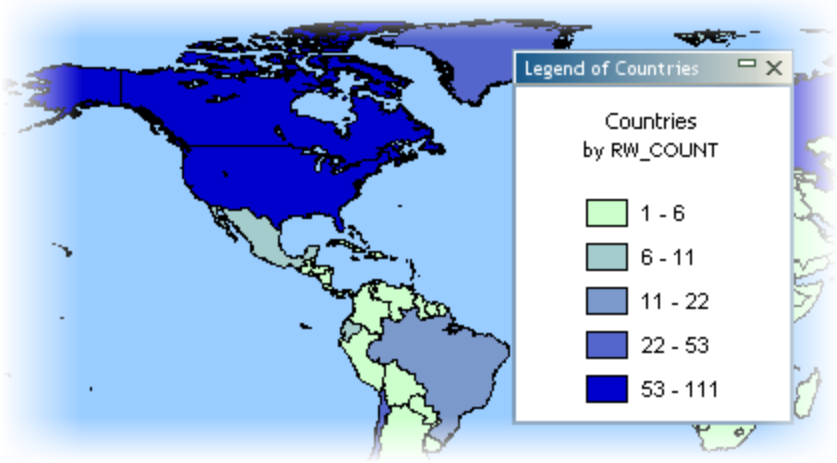
Next you must select the type of thematic to create.

Classification

Thematics that use a classification separate map elements in a finite number of categories (also called classes), each having a specific style. When a map element part of such a thematic is displayed, it uses the style of the category it belongs to in order to render itself on the screen.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Creating a graduated style thematic



Graduated style thematics use a graduation of one or more visual variables to represent the elements of the different categories. Examples of such graduations include: the fill color of polygons that is graduated from white to red, the size of point symbols that is graduated from size 1 to size 5, the line width of elements that is graduated from 1 to 4, etc. In all cases, there is a finite number of categories and every element of the layer falls in one of those categories. Only a numeric attribute can be used for this type of thematic.

To create a new thematic of this type, you need to select the numeric attribute to use, define the number of categories, select the range calculation method and define the category styles.

There are several methods for calculating the ranges of values for the categories of this type of thematic. See Methods for calculating ranges for more information.

Graduated styles thematic	
Attribute	Select the numeric bound attribute to use.
Do not draw elements with out-of-sample values	If this option is selected, elements with values outside of the value range will not be displayed. This can happen when the data is modified after the thematic was created.
Categories	Enter the desired number of categories.
Remove duplicate categories	In some cases, categories can have the exact same value limits. Select this option to avoid having identical categories. This can happen with very small data sets or if limits are rounded to big numbers.
Round at	Select the precision to use to round category range limits. It is often more useful to have rounded limits than

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	very precise ones (e.g. country populations rounded to the nearest million).

Range calculation method	
Calculated categories	Select the method to use for calculating the range limits of the categories. There are 5 choices: Equal ranges, Equal count, Standard deviation, Defined interval, Percent ranges. See Methods for calculating ranges for more information.
Custom categories	Select this option to manually specify the range limits of the categories.

The next section allows you to define the styles of the categories. There are two possibilities: create custom range styles or use color schemes.

Custom range styles

You must define the *from* and *to* values of the style by indicating the style variables that will vary (e.g. border thickness, symbol size, fill color, etc.). The category styles are then generated by interpolation between the *from* and *to* styles. Optionally, a third style can be used to create an inflexion point. If an inflexion is defined, the generated styles will pass through the inflexion point at the specified position in percentage. The interface is different based on the element type of the layer.

Custom range styles	
Use inflexion point at	Select this option to use an inflexion point and specify the position of the inflexion.
Edit base style	Use this link to modify the style of the layer without leaving the **Thematic** section. The base style is used to produce the styles of the categories.

Color schemes

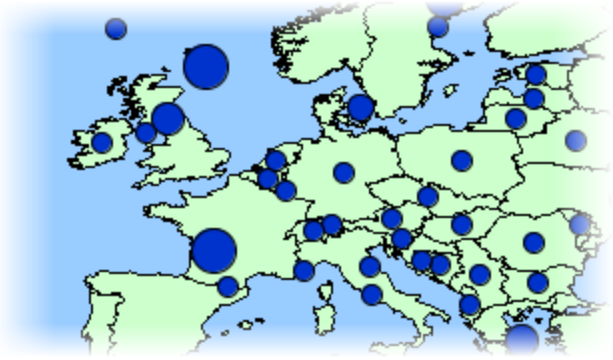
Instead of manually defining styles, you can select a color scheme to generate the styles of the thematic's categories.

Color schemes

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Type	3 types of colors are available: **Sequential**: The colors form a gradient of sequential colors (e.g. from white to red). **Diverging**: The colors form a gradient with a central color (e.g. from blue to white to red). Here emphasis is placed on central categories. **Qualitative**: Colors do not follow any sequence.
Apply to	You can choose to apply the palette to the available visual variables (e.g. fill, border, etc.), depending on the type of element on the layer.

Creating a graduated symbols thematic



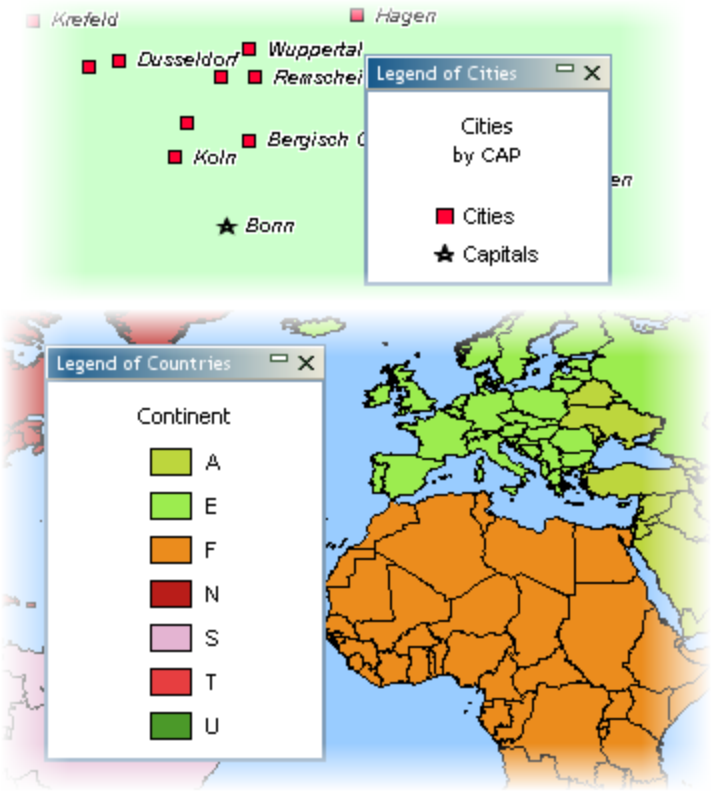
Graduated symbols thematics draw symbols superposed on the elements they qualify. The symbol sizes are graduated according to a finite number of categories based on a numeric attribute. The symbols can be used with any map element type. Only numeric attributes can be used for this type of thematic.

There are several methods for calculating the ranges of values for the categories of this type of thematic. See Methods for calculating ranges for more information.

The creation process is the same as for creating a graduated styles thematic.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Creating an individual values thematic



Examples of thematics using individual values classification

Individual values thematics represent all elements that have the same attribute value with the same style. This type of thematic is not using a range of values for each category but rather a specific value. The maximum number of unique different values is 512. If your layer has more different values, it will not be possible to create this type of thematic on that layer. Numeric and non numeric attributes can be used with this type of thematic.

To create a new thematic of this type, basically all you need to do is to select the attribute to use.

Individual values thematic	
Attribute	Select the bound attribute to use. It can be numeric or alphanumeric.
Do not draw elements with out-of-sample values	If this option is selected, elements with values not present in the value sample will not be displayed. This can happen when the data is modified after the thematic was created.

JMap proposes random colors for this type of thematic. You can accept the proposed set of colors or press ***Regenerate*** to generate new colors. You can also click on ***Color***

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Schemes to use a predefined color scheme. When the thematic is created, each style can be manually edited.

Creating an individual custom values thematic

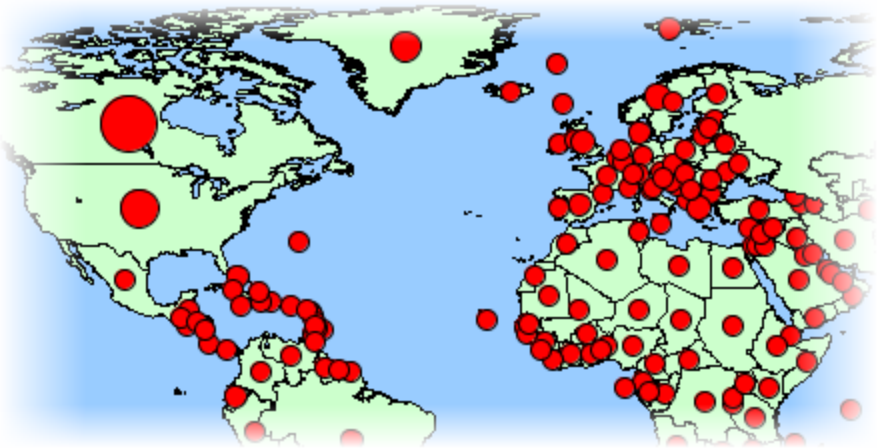
Individual custom values thematics are similar to individual values thematics except that you can define your own values, instead of being limited to values already present in the data. This is useful when you create thematics using a data set that does not contain all the known possible values for an attribute. When new data is later added to this data set, the new values will be handled properly by this type of thematic.

The creation process is similar to creating an individual values thematic except that you have the option to modify the list of individual values by adding, removing or modifying categories.

Proportional quantities

Proportional quantities thematics represent map elements using a continuous variation of a visual variable (e.g. symbol size, fill color, etc.) based on a numeric attribute or set of attributes.

Creating a proportional symbols thematic

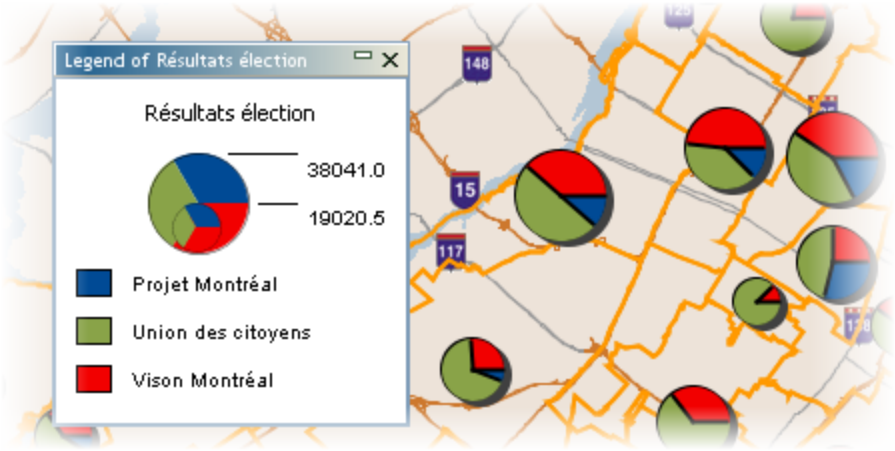


Proportional symbols thematics draw circular symbols superposed on the center of the elements they qualify. The symbol sizes are determined by interpolation between the minimum and maximum values of the attribute. Only numeric attributes can be used for this type of thematic.

To create a new thematic of this type, you need to select the numeric attribute to use and define the *from* and *to* styles. The symbol size and color will be interpolated between the *from* and *to* values.

Creating a pie charts thematic

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Pie charts thematics draw pie chart diagrams on the center of the elements they qualify. This type of thematic works with one or many numeric attributes. Each part of the diagram (piece of the pie) is associated with a different attribute. The size of the diagram is proportional to the sum of the attribute values. Only numeric attributes can be used for this type of thematic.

To create a new thematic of this type, you need to select one or more numeric attributes to use and define the chart style.

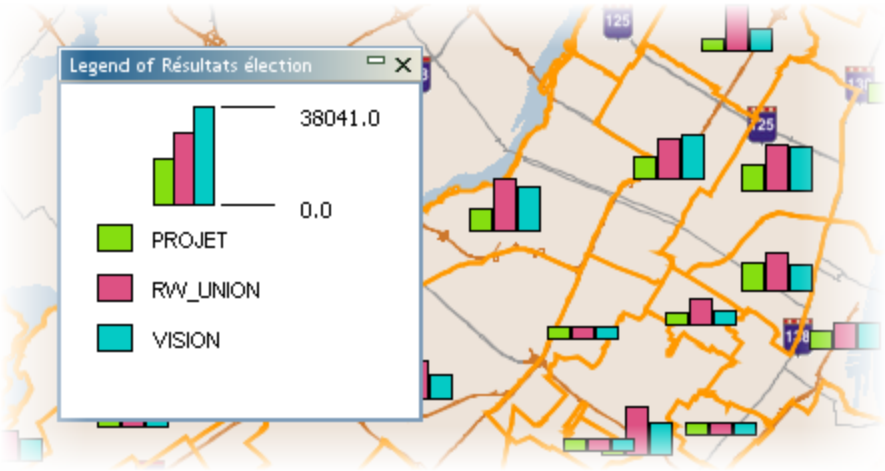
Pie charts thematic	
Attributes	Select one or more numeric attributes. Each attribute will be represented by a piece of the pie chart. The size of the chart will be determined by the sum of those attribute values.
Skip elements with out of range values	If this option is selected, elements with values not present in the value sample will not be displayed. This can happen when the data is modified after the thematic was created.
Ignore negative values	Select this option to ignore negative values.

Pie chart style	
Chart size	Select the ***from*** size (smaller) and the ***to*** size (bigger). The chart size will be determined by interpolation between these two sizes.
Border thickness	To draw a border around the chart, select a non zero border thickness.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Start angle	Select one of the directions to use as the starting angle of the chart. The first piece of the pie chart will start at the specified angle.
Draw shadow	Select this option to draw a shadow for the pie charts.
Labels	Select the label type (or none) to indicate the value or relative percentage of each piece of the pie chart.

Creating a bar charts thematic



Bar charts thematics draw bar chart diagrams on the center of the elements they qualify. This type of thematic works with one or many numeric attributes. Each bar of the diagram is associated with a different attribute. The size of the diagram is proportional to the sum of the attribute values. Only numeric attributes can be used for this type of thematic.

The creation process is similar to creating a pie charts thematic except for the chart style interface that is slightly different.

Methods for calculating ranges

Several different methods can be used to calculate the ranges of values for the categories of thematics using classifications. These methods are described below.

Method	Description
Equal ranges	The ranges will have equal sizes between the minimum and the maximum values (e.g. 0-10,10-20, 20-30).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Equal count	The range limits will be calculated so that an equal count of elements falls in each category.
Standard deviation	The range limits will be calculated so that the average value falls in the middle of the categories and each category range size is equal to the calculated standard deviation value.
Defined interval	The range size is user-defined and constant for all categories, starting from the minimum value, and adding the defined interval for each category.
Percent ranges	The range for each category is expressed as a percentage of the full value range (e.g. 4 categories with 20%, 20%, 35% and 25%). The total must be equal to 100%.
Custom ranges	All range limits are user-defined.

Managing Thematics

You can create many thematics for the same layer. Once they are created, you can decide to enable or disable them, modify their order and delete them.

Enabling and disabling thematics

Enabled thematics are displayed automatically when the layer is displayed in JMap on the client. Disabled thematics are still available but are not displayed by default. They need to be enabled by the user to be displayed. You can enable and disable thematics from the thematics section in JMap Admin.

Reordering thematics

In JMap, thematics are displayed in the order they are created. It is important to set the order appropriately because some thematics can completely hide others if they are placed on top. Use the arrow buttons to modify the order of the thematics to control how they are displayed in JMap.

Deleting thematics

You can delete a thematic by selecting it and pressing ***Delete*** in JMap Admin.

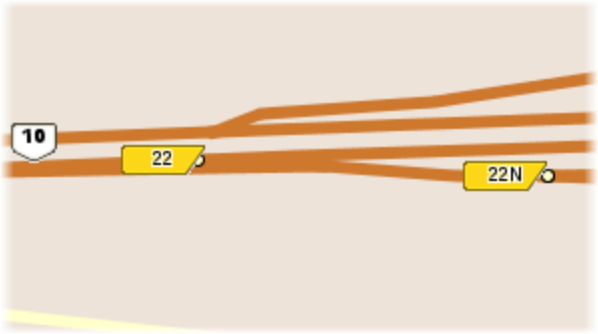
Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Labels

In JMap, labels are text that is related to map elements. They are used to display information about the elements on the map. For example, you can use labels to display the city names for a layer of points representing cities.

Labels can either be placed manually using the labeling tool or generated automatically by JMap at display time. Depending on the type of elements of the layer, the labeling configuration section can slightly vary.

Example of curved labels (left) and labels with a frame (right)



Example of labels with a background symbol

Labeling is configured by specifying text that defines the label's content; this text can contain static parts, variable parts (functions) and *javascript* programs. At display time, functions are executed and replaced by the result. For example, the *ElementValue(attrib)* function (or *ev(attrib)*, in its short form) will be replaced by the value of the corresponding attribute. Javascript programs can be used to perform operations on attribute values. Label text can span multiple lines.

The functions supported by labels are the same as those supported by mouseover. For more information on these functions, refer to the Mouseover section.

Labeling parameters

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Label text	The text of the label. Static parts will be displayed as is while *ev(attrib)* functions will be replaced by the corresponding bound attribute values. Unlike mouseover bubbles, labels don't support HTML formatting or hyperlinks. See the following examples. `Country: ev(name)` will produce **Country: Canada** `City: ev(name) Population: ev(pop)` will produce **City: Paris (France)** **Population: 2150000** Labels also support *javascript* programming to perform mathematical operations as well as operations on character strings using attribute values. The *println* function is used to print content in the label. `Area:` `ev(area_km2) km2` `<script>` `var SQ_KM_IN_SQ_MI = 2.58998811;` `var area_sq_mi = ev(area_km2) / SQ_KM_IN_SQ_MI;` `println(area_sq_mi.toFixed(1) + " sq. mi");` `</script>` `/]`

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Label style	
Font	Select the font to use to display the labels.
Size	Select the size of the font.
Bold, Italic, Underline, Striked through	Select the font attributes.
Outlined	Select this option to display an outline around the label text. This makes it easier to read labels on the map.
Use antialiasing	Select this option to enable antialiasing.
Text color	Select the color of the label text.
Outline color	If the Outlined option is selected, choose the color of the outline. White is the default.

Automatic labeling	
Automatic labeling	Automatic labeling adds labels to map elements automatically, without user interaction. For each vector layer, you can enable or disable automatic labeling and define scales between which automatic labeling will be activated. It is often useful to set a minimum scale limit for automatic labeling to avoid overcrowding the map.
Minimum scale	Minimum scale over which automatic labeling will be activated.
Maximum scale	Maximum scale under which automatic labeling will be activated.
Label position	Select the position of the label text with regard to the map element.
Label offset	Enter an offset in X and Y to modify the position of the label text.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Allow labels overlapping	Allow the labels of one layer to overlap and to overlap the labels of other layers. This option overrides the global project setting that prevents label overlapping. This can be useful to ensure that all labels of this layer are displayed.
Prevent label duplication	Select this option to avoid having the same label text displayed many times. Useful for displaying street names..
Parse numeric labels	If label text contains text and numbers, display only numeric values. Useful when you want to display only highway numbers using an attribute containing other text (e.g. "Highway 40" becomes "40")..
Oriented labels (along the line)	**Only for line elements**. Select this option to display the label text along the lines.
Curved labels	**Only for line elements**. Select this option to have the label text follow curved lines.
Proportional size	By default, label text is always displayed at the specified font size, independently of the scale of the map. Use this option to have the label text size adjusted proportionally to the scale of the map. The text size will be displayed at its specified font size when looking at the map at the specified reference scale. When the scale of the displayed map is changed, the text size will be modified accordingly.
Background symbol	Select this option to select a symbol to display behind the label text. Note that the label text should fit in the selected symbol. This is used mainly for highway shields containing highway numbers.
Draw frame	Select this option to draw a frame around the label text. You can also select the color of the background of the frame as well as the color of its border.
Rotation	Select this option if you want the labels to have a rotation.
Angle attribute	If needed, select a bound attribute that contains the rotation angle of the text. The labels will follow this rotation.
Rotation direction	If an angle attribute is used, select the direction of the rotation.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Follow map rotation	Select this option to have the labels rotated with the map if the user sets a map rotation.

Mouseover

In JMap, mouseover refers to the information bubbles that pop up on the map when you position the mouse cursor over a map element. This is a very quick and easy way to obtain information about map elements. The administrator determines what information is displayed in the bubbles. Mouseover is configured independently for each layer.

Mouseover bubbles are meant to display information about the elements they are pointing to. This information typically includes the attribute values (bound attributes) of the elements in question. The content can be formatted using basic HTML tags. The bubbles can also display simple HTML documents coming from the network and referred to by a URL. Lastly, mouseover bubbles can also contain simple javascript programs.

To configure the mouseover for a layer, press ***Settings*** from the layer detail section. Then press ***Mouseover*** .

Mouseover	
Mouseover	Enter the content of the mouseover bubble. See sections below for an explanation of the syntax.
Background color	Select the background color of the bubble.
Prevent text duplication	Select this option to prevent the same text from being repeated many times within the same bubble. This can happen when pointing to many map elements that have the same mouseover content on the same layer (e.g. street segments at an intersection).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Minimum scale	Activate this option and enter the minimum scale from which the mouseover must be displayed.
Maximum scale	Activate this option and enter the maximum scale from which the mouseover must be displayed.

Providing mouseover content

You must provide the text that will be used as the content of the bubble. This text can be comprised of static parts (displayed literally), variable parts (replaced at display time by another value), simple javascript programs, and HTML tags. For instance, the *elementValue(city)* will be replaced at display time by the value of the *city* attribute for the pointed element.

Mouseover syntax

JMap 6.0 introduces a syntax that is different from previous versions. The new syntax is comprised of functions such as *id()*, whilst the previous syntax used variables such as *%i*. The previous syntax is still supported to ensure compatibility.

Functions and their parameters are generally not case sensitive. For instance, *ev(city)* is equal to *Ev(CITY)* .

The following table explains the various available functions.

Function	Description
elementValue (*attrib*) or **ev** (*attrib*) *attrib* : the name of an attribute	Replaced by the value of the bound attribute whose name is passed as a parameter for the pointed element. For example, *ev(id)* will be replaced by the value of the *id* attribute for this element.
elementId()	Replaced by the element identifier.
polygonArea()	Replaced by the area of a pointed polygon type element.
lineLength()	Replaced by the length of a line type element.
centroid()	Replaced by the coordinates of the geometric centroid of the element's geometry.
format(*attrib* , *format*)	Replaced by a number or date that was formatted according to a specific format. **Example**: format(*date_insp* , *dd/MM/yyyy*)

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

attrib: the name of a date or numerical attribute *format* : the desired date format	where date_insp is the name of an attribute containing a date and *dd/MM/yyyy* is the desired date format, as indicated in the documentation of the java.text.SimpleDateFormat Java class. **Example**: format(*value* , ##0,00) where *value* is the name of an attribute containing a number and *##0,00* is the desired number format, as indicated in the documentation of the java.text.NumberFormat Java class.
ifNull(*attrib* , *value*) *attrib* : the name of the attribute to test *value* : the value to display if *attrib* is null	Replaced by the *value* value only if the value of the *attrib* attribute is null. If the attribute value is not null, nothing is displayed. **Example**: ifNull(*temp, N/A)* Displays *N/A* if the value of the *temp* attribute is null. **Example**: ifNull(*attrib_a, attrib_b*) Displays the value of the *attrib_b* attribute if the value of the *attrib_a* attribute is null.
ifNotNull(*attrib* , *value*) *attrib* : the name of the attribute to test *value* : the value to display if *attrib* is not null	Replaced by the *value* value only if the value of the *attrib* attribute is not null. If the attribute value is null, nothing is displayed. **Example**: ifNotNull(*land_value* , $) Displays $ only if the value of *land_value* is not null.
subString(*attrib* , *startIx* , endIx) *attrib* : the name of the attribute for which a part must be extracted. *startIx* : starting position in the character string. *endIx* : ending position in the character string.	Replaced by a portion of the value (as a character string) of the *attrib* attribute, between the *startIx* position and *endIx* position. **Example**: subString(*name* , *0*, *5*) Replaced by the first five characters of the *name* attribute value. If this value is *Montreal* , the mouseover bubble will display *Montr* .
encode(*attrib* , *encoding*)	Replaced by the value of the *attrib* attribute once it is encoded with the specified character encoding (UTF-8, CP437, ISO 8859-1, etc). **Example**: encode(*name, UTF-8*)

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

attrib : the name of the attribute to code *encoding* : the name of the encoding	Replaced by the value of the *name* attribute encoded in UTF-8 characters.
<**script**> *javascript code* <**/script**>	Runs the javascript code found between the tags. In javascript, the attribute values of the elements are accessible through the *elementValue()* or *ev*() function. Mathematical operations or character string operations can be performed on attribute values. To display content in the bubble, the script must call on the *print()* function. **Example**: <script> print (ev(*population*) / ev(*area*)); </script> Calculates and displays the result of the value of the *population* attribute divided by the value of the *area* attribute. **Example**: `<script> var KM_IN_MI = 0.621371; var dist_mi = ev(km) * KM_IN_MI; print('ev(osm_name)'); print(dist_mi.toFixed(1) + " mi"); </script>` Converts the distance in kilometers contained in the value of the *km* attribute into miles. Displays the value of the *osm_name* attribute (notice the apostrophes (' ') because it is a character string) and the distance in miles with a decimal figure.
photos()	Replaced by hyperlinks that allow you to open or download the images attached to the element. These images are photos taken on JMap Mobile or images selected with JMap Pro and associated with map elements.
photosAsThumbnails()	Replaced by smaller versions of the images attached to the element. The user can click on a thumbnail to open the full size image.
projectName()	Replaced by the name of the current project.
userName()	Replaced by the user code of the user that is currently connected.
sessionId()	Replaced by the identifier of the current session.
host()	Replaced by the name of the host or address of the JMap Server instance to which the application is connected.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

port()	Replaced by the port number (http or direct) of the JMap Server instance to which the application is connected.
date()	Replaced by the current date and time.

HTML content

The content of the bubble can be formatted using simple HTML tags. Mouseover bubbles do not support CSS or advanced tags such as <DIV>. The following HTML tags are supported and frequently used in mouseover bubbles:

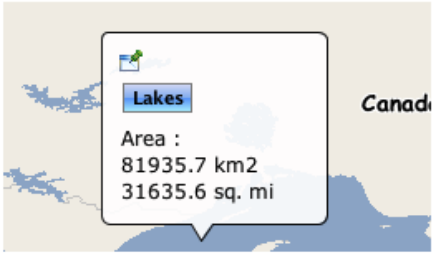
<B>, <I>, <U>, <A>, <IMG>, <BR>, <TABLE>

Examples

Examine the following examples.

Mouseover content	Display
City : ev(CITY) A simple example of static text with the value of an attribute.	
City: ev(CITY) **(ev(COUNTRY))** Example containing static parts and displaying 2 attribute values on 2 lines.	
ev(STATION_NAME) **Site web** An example of basic formatting using HTML tags and a hyperlink where the URL comes from the value of the URL attribute.	

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

ev(DESCRIPTION) **** An example of an HTML tag that takes the image URL from the value of the IMAGE_URL attribute	
Area: **ev(AREA_KM2) km2** **<script>** **var SQ_KM_IN_SQ_MI = 2.58998811;** **var area_sq_mi = ev(AREA_KM2) / SQ_KM_IN_SQ_MI;** **print(area_sq_mi.toFixed(1) + " sq. mi");** **</script>** An example of a <script> tag with javascript code. The value of the AREA_KM2 attribute is converted from square kilometers to square miles.	

Locating map elements or coordinates using mouseover

Mouseover supports a function to locate map coordinates or elements using a special URL syntax. A hyperlink is displayed in the bubble and when clicked, the map locates the specified element(s) or region.

Mouseover locate example	Description
Locate	Displays a *Locate* hyperlink. When clicked, locates the region defined by x=-73, y = 45, width = 5, height = 5 in the same map. This is expressed in the map's units.
Locate	Displays a *Locate* hyperlink. When clicked, locates the elements on layer

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	subway that have their attribute *name* equal to *atwater* in the same map.
Locate	Displays a *Locate* hyperlink. When clicked, locates in the same map the elements on layer *subway* that have their attribute *name* starting with letter *a*.
Locate	Displays a *Locate* hyperlink. When clicked, locates the elements on layer *subway* that have their attribute *name* equal to *atwater* in the same map.The resulting map has a scale of 1 : 1000.
Locate	Displays a *Locate* hyperlink. When clicked, locates in a new map called *Result* the elements on layer *subway* that have their attribute *name* equal to *atwater.* If a map called *Result* already exists, it is reused. If the name of the map was *new*, a new map (with an automatically generated name) would be created each time.

Using a URL to display content

You can specify a URL that opens an HTML page to display in the mouseover bubble (only supported in JMap Pro). The HTML page will occupy 100% of the bubble. The syntax is as follows:

$URL{http://awebsite.com}

The specified URL can be static or it can come from an attribute. It can also use attribute values as parameters, as shown below:

$URL{http://awebsite.com?param1=ev(ATTRIB_A)&param2=ev(ATTRIB_B)}

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

An example of mouseover HTML content referred to by a URL

Information Reports

Information reports are used to display descriptive information regarding map elements. These reports can display attributes extracted from the underlying spatial data source or information from databases outside JMap. Each layer can have zero, one or more reports. The information reports are presented as Web pages or PDF documents.

To configure reports for a layer, click on ***Settings*** in the layer's details section, then select ***Reports*** .

The reports section shows the list of existing reports for a layer. In JMap applications, reports are presented in this order. You can change the order using the arrows. To delete a report, press ***Delete*** . To create a new information report, press ***Create*** .

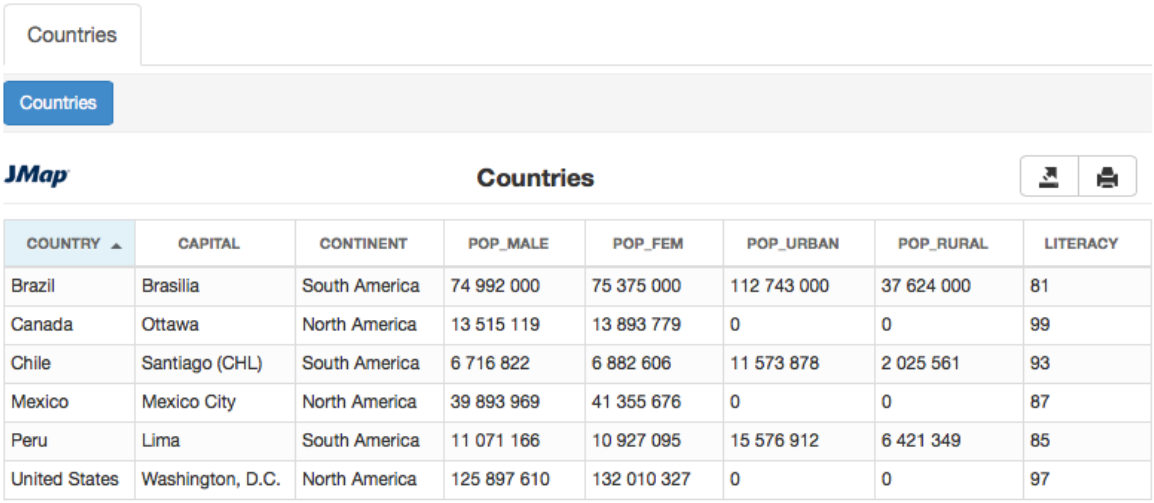
Creating a report

There are three different types of reports: ***Basic*** , ***Advanced*** and ***Custom*** .

Basic

Basic reports are generated as web pages. They contain features to be printed and exported in Excel. Tables containing the values can be sorted by clicking on the column headers. You can also configure the names of the fields to be displayed in the reports.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



COUNTRY	CAPITAL	CONTINENT	POP_MALE	POP_FEM	POP_URBAN	POP_RURAL	LITERACY
Brazil	Brasilia	South America	74 992 000	75 375 000	112 743 000	37 624 000	81
Canada	Ottawa	North America	13 515 119	13 893 779	0	0	99
Chile	Santiago (CHL)	South America	6 716 822	6 882 606	11 573 878	2 025 561	93
Mexico	Mexico City	North America	39 893 969	41 355 676	0	0	87
Peru	Lima	South America	11 071 166	10 927 095	15 576 912	6 421 349	85
United States	Washington, D.C.	North America	125 897 610	132 010 327	0	0	97

Exemple de rapport d'information de base

General information	
Title	The title of the report.
Extract data from	**Current layer**: Obtain report data directly in the layer attributes. Refer to Report data sources - Current layer. **External database**: Obtain report information from an external database connected to JMap. The database must contain a field that links to an attribute of the layer. Refer to Report data sources - External database.
Template (single)	Template used for reports on a single map element.
Template (multiple)	Template used for reports on multiple map elements.
Attributes	
Title	Text to be displayed in the report instead of the attribute name.

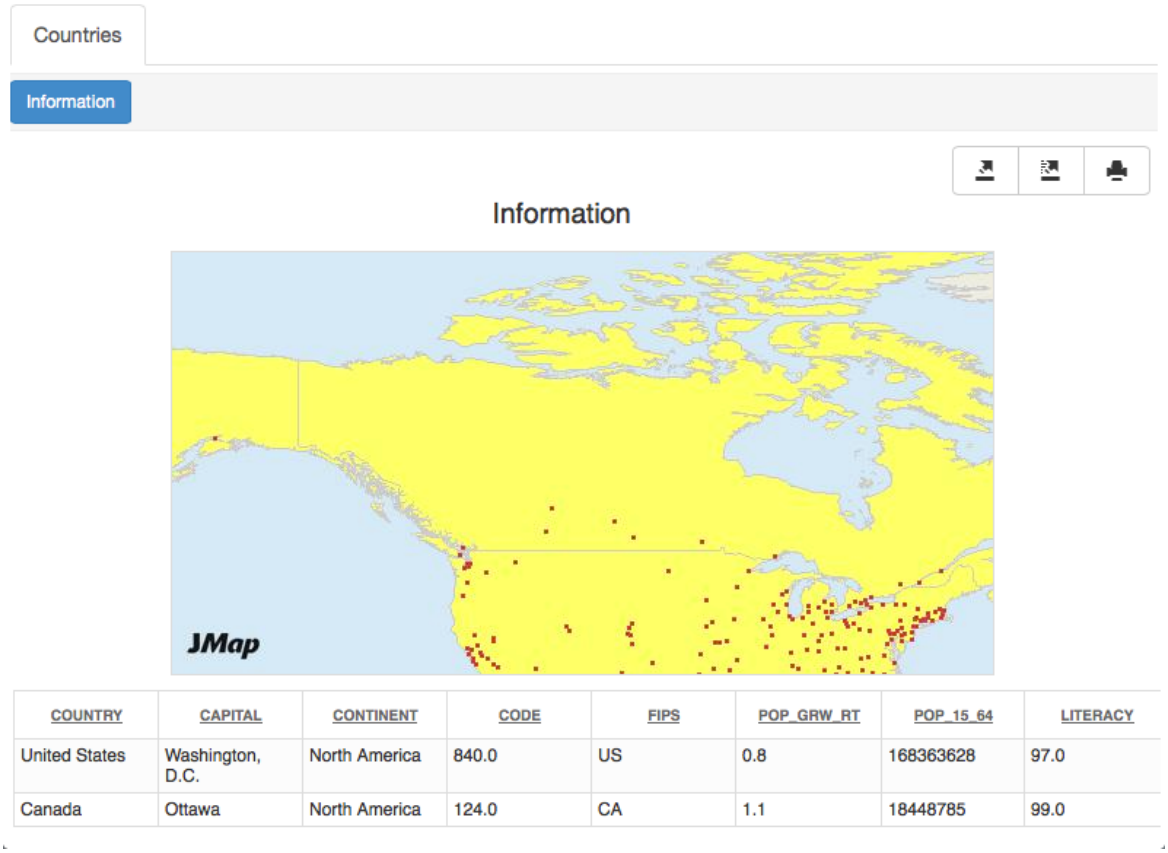
Advanced

Advanced reports are based on the **BIRT reporting tool** (http://www.eclipse.org/birt/). A default report template is provided with JMap. You can also use the ***BIRT report Designer*** application to create custom reports or to edit the template provided in order to

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

adapt it to your needs (add a logo, change the colors, etc.). For more information on report development, visit the *BIRT* website (http://www.eclipse.org/birt).

Reports can be generated in HTML or PDF format. Geographic map integration is also supported.



COUNTRY	CAPITAL	CONTINENT	CODE	FIPS	POP_GRW_RT	POP_15_64	LITERACY
United States	Washington, D.C.	North America	840.0	US	0.8	168363628	97.0
Canada	Ottawa	North America	124.0	CA	1.1	18448785	99.0

Exemples de rapport avancé avec carte

Sample advanced report with map

Advanced **reports**	
Format	**HTML**: The report is generated as a web page. Tools allow you to export and print the report's contents. If the report is created for multiple map elements, its content can be sorted by clicking on the column headers. **PDF**: The report is generated in PDF format. This format is better suited for printing because the page layout is better. However, the content of this type of report is more static compared to the HTML report.
Title	The title of the report.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Extract data from	**Current layer**: Obtain report data directly from layer attributes. Refer to Report data sources - Current layer. **External database**: Obtain report data directly from an external database connected to JMap. The database must contain a field that links to an attribute of the layer. Refer to Report data sources - External database.
Template (single)	Template used for reports on a single map element. Two templates are available: **inforequest.rpttemplate**: Basic template containing a table, arranged vertically. **inforequestMap.rpttemplate**: Similar to basic template but also contains a geographic map. Refer to Report templates (Advanced reports).
Template (multiple)	Template used for reports on multiple map elements. Two templates are available : **selectionreport.rpttemplate**: Basic template containing a table, arranged horizontally. **selectionreportMap.rpttemplate**: Similar to basic template but also contains a geographic map. Refer to Report templates (Advanced reports).

Report templates (Advanced reports)

With ***advanced*** reports, you can choose the report template you wish to use. By default, two templates are provided with JMap: a basic report template and a report template with an integrated geographic map. Each one of these templates is also available in two versions: one version is for a single element and the other is for a selection of multiple elements. You can create your own report templates based on the existing templates and add them to those provided by JMap. You can then select your templates to configure reports. The report template files (.rpttemplate) are placed in the *JMAP_HOME/applications/templates/reports* directory. Your templates must be placed in the *single* or *multiple* sub-directory, depending on whether they are in single element or multiple element version.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Custom

Custom reports are external to JMap and can be called using a URL. These reports can come from reporting tools (e.g. *Crystal Reports* , *Jaspersoft* , etc.) or from simple web pages.

A special syntax allows you to format the parameters to be passed in order to open the report.

General information	
Title	The title of the report.
Report URL	Enter the URL that will allow you to open the external report. You will probably have to pass certain parameters in the report URL to identify the elements for which you wish to open a report. The parameter values usually come from the linked attributes of map elements. A special syntax is used to format the parameters. For example, if your report must be called by this URL: http://myserver/reports/myreport?id=3 Therefore, if attribute 0 contains the parameter values, the following syntax must be used: http://myserver/reports/myreport?id=%0 However, if your report can include information on a selection of multiple map elements, the parameter syntax can take one of two different forms. If your report must be called by the following URL: http://myserver/reports/myreport?id=3,4,5 then, if the 0 attribute contains the parameter values, the following syntax should be used: http://myserver/reports/myreport?%param[%0,'id',','] This syntax uses the expression **%param[Attribute, Parameter, Separator]**. If your report must be called by this URL:

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	http://myserver/reports/myreport?id=3,id=4,id=5 then, if the 0 attribute contains the parameter values, the following syntax should be used: http://myserver/reports/myreport?%param[%0,'id'] This syntax uses the expression **%param[Attribute, Parameter, Separator]**. It is also possible to include other variables to compose the URL, such as %f, %p, %u, %h, etc. (refer to Supported variables).

Supported variables in custom reports URL

Variable	Display
%n	Replaced by the corresponding bound attribute value for the element. For example, %0 refers to the 1st bound attribute, %1, to the second one, etc.
%f	Replaced by a formatted number or date. There are 2 possible formats: %f[%n^D^dd/MM/yyyy] where %n refers to an attribute containing a date, D indicates that we want to display a formatted date and dd/MM/yyyy is the format pattern, as indicated in the Java class java.text.SimpleDateFormat documentation. %f[%n^N^##0,00] where %n refers to an attribute containing a number, N indicates that we want to display a formatted number and ##0,00 is the format pattern, as indicated in the Java class java.text.NumberFormat documentation.
%p	Replaced by the currently opened project name.
%u	Replaced by the name of the user currently logged in.
%s	Replaced by the current session id.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

%h	Replaced by the host name or address of the JMap Server instance the client is connected to.
%o	Replaced by the port number (http or direct) of the JMap Server instance the client is connected to.
%t	Replaced by the current time (date and time).

Sources of data for the report

Basic and ***advanced*** reports can take their data from layer attributes or from an external database connected to JMap.

Current layer

Select the ***Current layer*** option to create a simple report that will only query the layer attributes (read below for the ***External database*** option). Afterwards, select the attributes to include in the report using the check boxes. Only the selected attributes will be displayed to the user; the others will be excluded from the report. Lastly, you can specify titles for the attributes; these will be displayed to the user instead of the actual attribute names.

External database

Selecting the ***External database*** option will instruct JMap to display information taken from another database, instead of the layer. This option allows you to query any database that has a field corresponding to one of the layer's attributes.

Attributes	
Database	Select the database from which the report data will be extracted. The database to query must have been configured in JMap Admin beforehand.
SQL query	Enter the SELECT SQL query that will be used to extract the data from the database. This query can have several tables. The query must include the key field used to join with a layer attribute. Afterwards, you must click on ***Execute*** in order to execute the query once.
Join fields	
Table	Select the table containing the join field.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Field	Among the fields in the selected table, select the field that will be used to join with the layer.
Attributes	Select the layer attribute that will be used to join with the data from the database.

Captions

For reports that take their data from an external database, you can define the names of the fields to be displayed in the report, instead of using the field names in the database. Click on ***Captions*** to define these field names.

Forms

Introduction

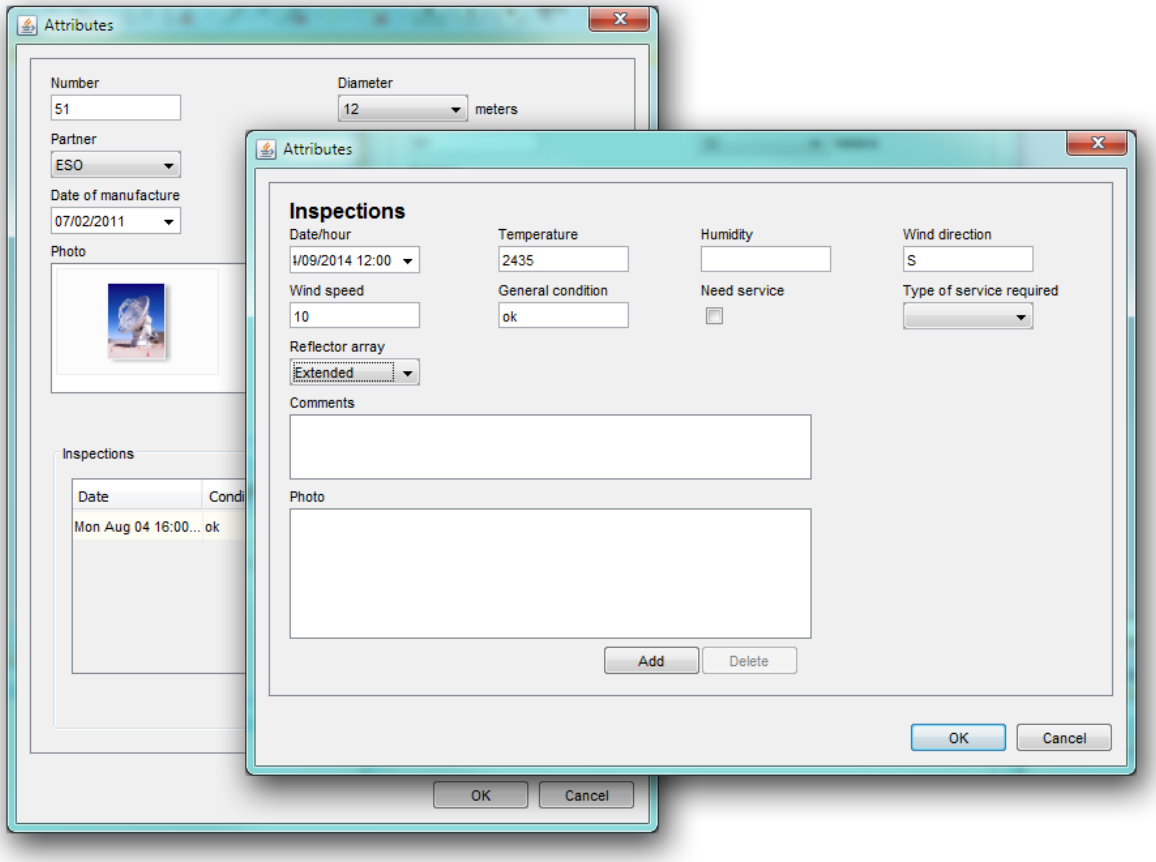
In JMap, forms are used for attribute queries to enter the search parameters, to enter attribute values of editable layers and to manage data stored in databases. This is always done in relation with the elements of a layer. A type of form called a *subform* can also be accessed from another form.

The JMap administrator designs the forms using the form designer. Afterwards, users can use them in JMap Pro, JMab Web and JMap Mobile. Depending on access privileges, users can use data entry forms to view, add, modify or delete data.

To enter the attributes of a layer's elements, JMap generates a default form if none has been created. This simple form shows all available attributes. In general, it is much more convenient to create a form adapted to your needs.

The following sections explain the form creation process in detail and the functionality of each type of form.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Examples of forms displayed in JMap Pro

Form Designer

The interface of the form designer allows you to define the content and layout of the form.

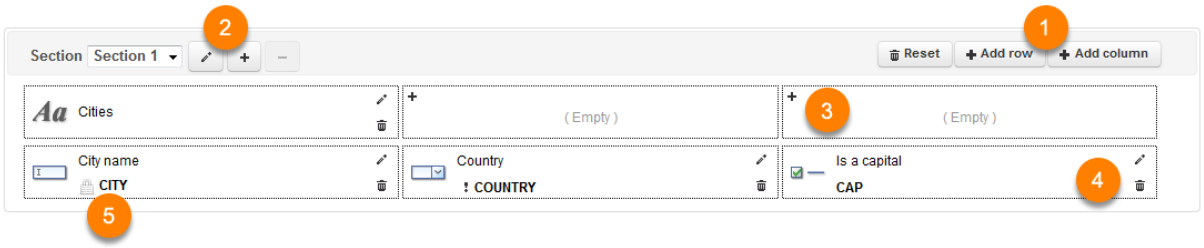
Forms are organized in a grid, and you can configure the number of rows and columns. Columns and rows can be added to the grid at any moment. All empty rows at the bottom of the form and empty columns at the right of the form will be automatically eliminated when the form is saved.

Each cell of the grid can contain a component of the form (label, text entry field, value list, etc.) but each component can also span several cells horizontally.

Each form can have one or more sections. The user can move from one section to another within a form. This can be especially useful if the form is long or complex.

The following image shows the main parts of the form designer.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Interface du designer de formulaires

1 Click on ***Add row*** or ***Add column*** to modify the form grid.

2 Click on these buttons to create a new section, to delete an existing section or to rename a section.

3 Click on + to add a new form component in a cell.

4 Click on to modify the settings of a form component, or click on to delete the component.

5 The ! symbol indicates a required field. If this symbol is not displayed, the field is optional. The indicates a read-only field; users cannot modify its value.

Most form components must be associated with either an attribute layer, a database field or a search criterion, depending on the type of form created. The *Label*, *Photo*, and *Group* components are exceptions to this rule.

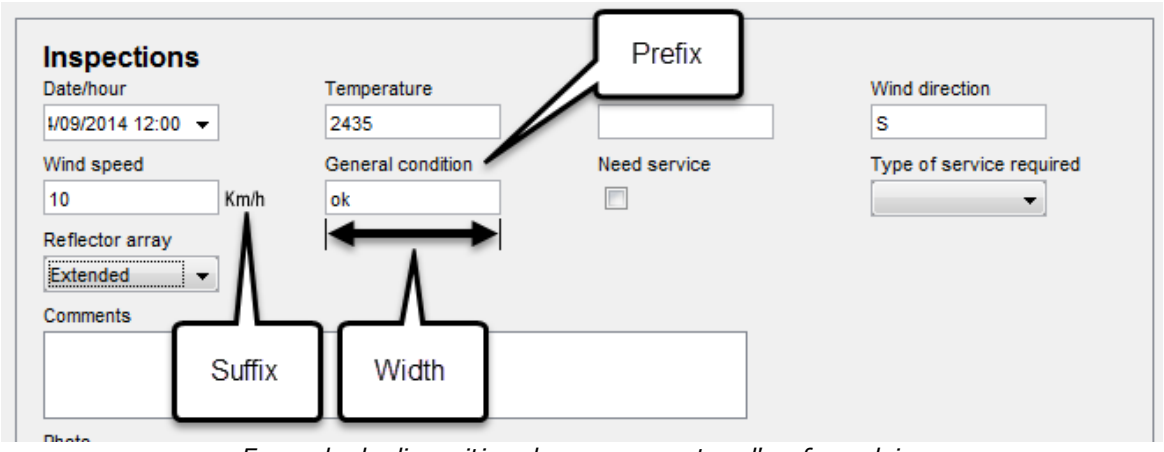
Component settings

Each type of component has its own configuration window. The settings allow you to control the behavior and appearance of the component. The following table describes some of the settings that are common to several components. A comprehensive description of available components is provided further below.

Form component settings	
Attribute	Select the attribute of the layer to which this component is associated. This is the attribute the form component will modify.
Required	Determines if this is a required field. The user cannot submit the form until all required fields have been populated. To make a field optional, you must unselect this option. Required fields are identified with a ! in the form designer.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Read only	Select this option to make this a read-only component. The user will not be able to modify the content. This option should be used to modify a component with a default value.
Column span	By default, each component occupies only one cell. For a component that spans several cells horizontally, enter the number of cells the component will span. Cells occupied by a spanned component are labeled *Spanned* .
Tooltip	This text is displayed in a tooltip when the user places the mouse pointer on this component.
Label (prefix)	Enter static text that will appear above the component.
Label (suffix)	Enter static text that will appear at the right of the component.
Width (pixels)	Specify the width in pixels of the component entry field, excluding the suffix label. The default value is 100. The width of each column of the form will automatically be the same as the widest component in the form.
Default value	Optionally enter a default value to initialize the data entry field. You can use certain functions to initialize the default value of a component.



Exemple de disposition des composantes d'un formulaire

The following table describes the various components available to create forms and their specific settings. Note that some components are not available to create attribute queries.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Form components	
Label	Static text to be displayed in the form. The text's alignment (left, right, center) can be specified, along with the font style used to display the text. Certain functions can be used in the label text.
Text	A field used to enter an alphanumeric value. The associated field must be alphanumeric or numeric. **Mask formatter**: A mask formatter can be used to control the format of the value entered. **Multiline**: (alphanumeric fields only) If this option is enabled, the entry field will cover several lines of text, making it easier to enter longer text. **Max. number of characters**: (alphanumeric fields only) Determines the maximum length of the text a user can enter. This must comply with the restrictions of the database field containing the data. **Range validation**: (numeric fields only) Allows you to define a range of accepted values (e.g. from 0 to 100).
List (single choice)	A list of values from which only one value can be selected. The associated field must be numeric or alphanumeric. The values in the list can be entered manually or be taken from a database: **Values** Enter the values in the space provided, indicating, for each one, the value to use in the database and the label to display in the list. This value will be used as the data. The label is only used for the information the user will see. If the value and the label are the same, enter the same value twice. **Get values from a database** You must select the database from which you wish to obtain the values. Afterwards, enter an SQL query that will be executed to obtain the values and labels to be displayed. The order of the fields is important (first the values field, then the labels field). Normally, labels must be unique and sorted.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	Example: **select distinct ID_CITY, CITY from CITIES order by CITY** In this example, the *ID_CITY* field provides the values and the *CITY* field provides the labels that will appear in the list. Note: At times, labels to be displayed in a list come from a table associated to a data source stored in JMap Server's *System* database. In such a case, the name of the physical table cannot be known. To solve this problem, you can use this simple approach: instead of entering the name of the table, enter the name of the data source between dollar signs ($). Example: **select distinct ID_CITY, CITY from $World cities$ order by CITY**
List (multiple choice)	A value list from which one or more values can be selected. The associated field must be alphanumeric. The value saved in the field is the list of selected options, separated by commas (,). The values in the list can be entered manually or they can come from a database. Refer to **List (single choice)** for more information.
Check box	Populates the associated field for which there are only 2 possible values. The 2 possible values must be specified and be character strings (e.g. true or false) or numerical values (e.g. 0 or 1). If the associated field is boolean, you must use *true* and *false*. **Checked value**: Value to be recorded if the check box is selected. **Unchecked value**: Value to be recorded if the check box is not selected.
Calendar (unavailable for attribute query forms)	Allows you to select a date. The layer attribute must be of one of the following types: *date*, *datetime* or *timestamp*. This type of component is not available for attribute query forms. **Date format**: This is the format that the calendar component will use to display the selected date. If the user enters the date manually, he or she must also use this format (e.g. dd/MM/yyyy, yy/MM/dd H:ss, etc.).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Photo

(unavailable for attribute query forms)

This component allows the user to insert images in a form. In JMap Mobile, it allows the user to take photos with the device's integrated camera. In JMap Pro, the user can select existing images to insert in the form. This component cannot be present more than once in the same form.

For a layer attributes form, the photos can be stored in the JMap Server System database (in this case, no configuration is required) or in an external database. When this component is added to a database form, the photos must be stored in an external database. You must then define all required parameters for storing the photos.

Storage: Choose the ***JMap*** option to store the photos in the JMap database (only available for layer attributes forms) or ***External*** to store them in the database of your choice. If you choose ***External***, you must specify the following configuration in its entirety.

Database: Select the database where the photos must be stored. This database must be configured beforehand in JMap Admin.

Table: Select the table that will contain the information on the photos. This table must have the following structure. The name of the table and fields may vary.

MY_PHOTOS	
ID_PHOTO	INT
ID_ELEMENT	VARCHAR
FILE_PATH	VARCHAR
PHOTO	BLOB

The *BLOB* field is not required if the photos are stored on the drive and not in the database. Refer to the photo *Storage* option for more details.

Photo ID field: Select the field in the table that will contain the photo's unique numerical identifier.

Element ID field: Select the field in the table that will contain the attribute identifying the layer element. This attribute is called the *key attribute* and it is selected when the spatial data source associated with the layer is created.

File name field: Select the field in the table that will contain the name of the file for the photos.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Photos persistence: Choose the ***Database*** option to save the photos directly in the database, in a BLOB field existing in the table. You must then select the BLOB field. Choose the **File system** option to save the photos in a folder of the server's file system. You must then enter the path of the folder that will contain the photo files.

Tree

This component displays a value tree structure. The user can select a value in the tree, leaf or branch. The associated field must be alphanumeric.

The tree's values can be entered manually or they may come from a database:

Values

Enter the values in the space below according to the following format:

```
 PARENT  CHILD
Zone A  District
Zone A  District
Zone B  District
Zone B  District
Zone C District
```

will result in the following tree:

```
Zone A
  District 1
  District 2
Zone B
  District 3
  District 4
Zone C
  District 5
```

Get values from a database

You must select the database from which you wish to obtain the values. Afterwards, enter an SQL query that will be executed to get the values from a table with a parent-child relationship.

An example of a table containing the tree's values:

PARENT	CHILD
Zone A	District 1
Zone A	District 2
Zone B	District 3
Zone B	District 4

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	Zone C | District 5 An example of an SQL query used to read the data and initialize the tree (the order of the fields in the query is important): select parent, child from mytable
Table (unavailable for attribute query forms)	Allows you to manage data originating from databases external to JMap and for which a 1 to N relationship exists with the layer elements. Example: Suppose a points layer represents fire hydrants in JMap, and a database external to JMap contains data on the inspections performed on these fire hydrants. For each fire hydrant, 0, 1 or several inspections can be performed. In the layer attributes form of the fire hydrants, the table allows you to display inspection data regarding a fire hydrant, where each line in the table represents an inspection. Depending on the permissions configured, the table can also be used to add, modify or delete the inspection data. The table is always associated with a subform. This subform defines how external data is accessed and how this data can be entered. **The subform must be created before the table can be configured.** The table parameters allow you to define the external data fields that will be displayed in the table and their order of appearance. **Subform**: Select an existing subform that will be used to populate the values associated with the table. **Fields**: Allows you to manage the fields displayed in the table. These are the fields of the subform associated with the table. You can modify the field names, their display order, and their visibility in the table. For more information on using external data with JMap forms, refer to the Database Forms section.
Group	This component is used to group form components together. A frame with a title will be drawn around the components belonging to the same group. Insert this component in the cell of an empty row to start a new group. This component automatically spans all cells of

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	the row. It cannot be inserted on a row that already has other components.

The following functions can be used to initialize form components.

Functions	
username()	Replaced by the user's code.
fullname()	Replaced by the user's full name.
date()	Replaced by the current date.
datetime()	Replaced by the current date and time.

Layer Attributes Forms

These forms are used to enter the attribute values of an editable layer. Only one attribute entry form can exist per layer. The user must have the required permissions to modify the values of a layer's attributes. Refer to the Layer Permissions section for more information on this topic.

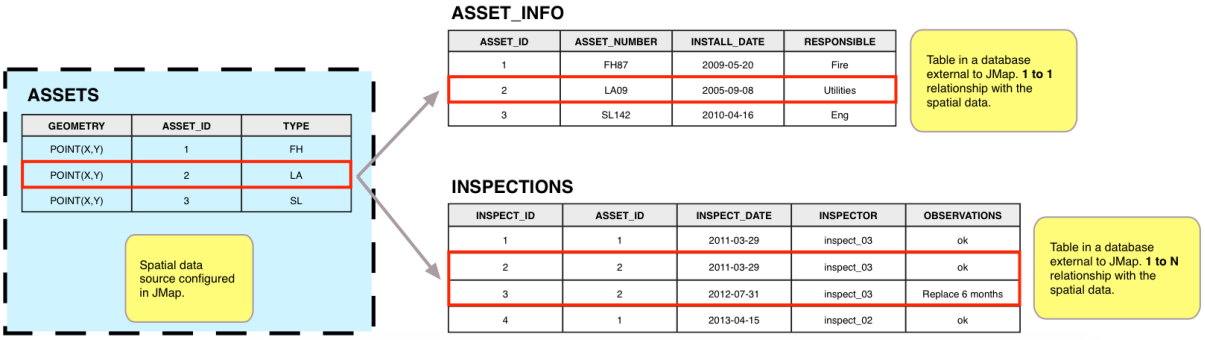
Creating a layer attributes form

To create a form that will be used to enter a layer's attributes, select ***Forms*** in the layer's settings menu, then click on ***Create*** .

Enter a name for the new form. You must then select the type of form to create, ***Layer attributes*** . Click on ***Save*** .

Afterwards, select ***Form layout*** in the ***Settings*** menu to go to the form designer and add components. Each component of the form must be associated with an attribute of the layer. The component provides the attribute value, and the value is updated when the user closes the form and saves the changes. Refer to the Form Designer section for more information.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



The layer attribute form is used to manage attributes of the spatial data source that are bound to the layer.

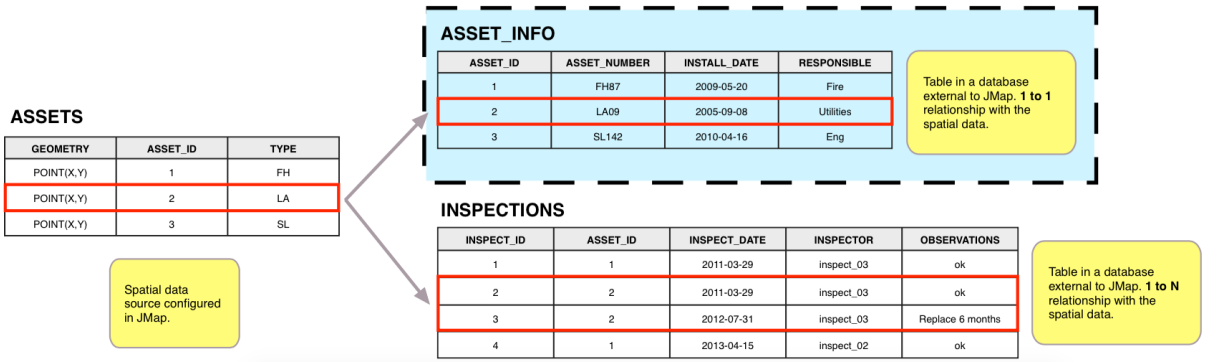
Database Forms

Database forms are used to manage data stored in databases that are external to JMap. They allow you to add new data as well as modify or delete existing data. You can create several database forms for one layer. Each database form has its own permissions to control which users can make changes to the data.

These forms can be used to manage data using a **1 to 1** relationship with a layer's data. In this case, a record is added when an element is created, and this record is usually deleted when the element is deleted.

They can also be used to manage data using a **1 to N** relationship with the layer data. In this case, a special type of form called a **subform** is used and is always associated with a *table* form component. Refer to the subforms section for more information on this topic.

Configuring this type of form is an advanced JMap function that requires writing SQL queries to extract, add, modify and delete data.



Database forms are used to manage data external to JMap, with a relationship with the layer data using a common field.

Creating a database form

To create a database form, select ***Forms*** in the layer parameters menu. Make sure you open the ***Forms*** tab, then click on ***Create*** .

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

You must enter a name for the new form. Afterwards, you must select the type of form to create, ***Database*** , then select the database containing the data to be used in the forms.

At the following step, a window allows you to enter the form's SQL queries. These queries are used to extract, add, modify and delete data. The ***SELECT*** query is required, but the others are optional. Only operations for which SQL queries have been provided can be performed.

A special syntax is used for SQL query configuration. In general, each line of this syntax must end with a semicolon (;). The syntax is not case sensitive.

The following table provides a detailed explanation of how this syntax works.

Syntax for database forms	
ev(*attrib*) or **elementValue(*attrib*)**	This function returns the value of the attribute specified as a parameter for an element. Example: ev(city); (Returns the value of the element's *city* attribute.)
fv(*field*) or **formValue(*field*)**	This function returns the value in the form for the field specified as a parameter. The name of the table must be the prefix of the field name. Example: fv(table.name); (Returns the value entered in the form component associated with the *table.name* field of the database.)
ei() or **elementId()**	This function returns the element's JMap identifier (jmap_id).
$*variable*	Allows you to create and initialize variables that can be used in the various expressions. For the ***INSERT*** query of a form, a variable containing the unique identifier of the inserted record must be used. Example: $city = EV(*city*); (Creates a *$city* variable initialized with the value of the element's *city* attribute.)
nti(*table, field*) or **nextTableId(*table, field*)**	This function returns the next value to use as a numeric identifier for the table and field specified as parameters. The specified field must exist in the specified table and must be an integer field. The function determines the maximum value existing in the table and returns this value incremented by 1 (max +

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	1). This function is useful when adding a new record in the database when the table has a unique identifier. Example: $id = nextTableId(*inspections* , *inspection_id*) (Creates and initializes a *$id* variable with the value of the next *inspection_id* identifier in the *inspections* table. If the maximum value present is 100, the value returned is 101.)

The following provides a detailed explanation of each parameter in the database form creation window.

Form properties	
Database	Select the database containing the data that must be managed by the form.
SELECT query	SQL query that provides the data to populate the form's fields. All fields returned by this query can be used to configure form components and also within the other queries defined in the form using the *fv()* function. The query must have a condition to link a layer attribute with a database field. Example: select * from assets where asset_id = ev(asset_id); In this example, all the fields of the *assets* table are obtained and available to configure form components. The *asset_id* field is used to link towards the layer element using the *ev(attrib)* function.
#Unique identifier#	The SELECT query must include a unique identifier field (numeric or alphanumeric). Select the field that must be used as a unique identifier.
INSERT query	SQL query used to insert new data in the database. You should only configure this query if the form must allow records to be added to the database. You must define a variable that contains the value of the unique identifier for the new record. Example: $id = ev(asset_id);

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	insert into assets (asset_id, date_inst, asset_type) values ($id, fv(assets.date_inst), fv(assets.asset_type));
	
	In this example, a *$id* variable is created and initialized with the map element's *asset_id* attribute value using the *ev(attrib)* function. The form data is inserted in the *assets* table when the *insert* SQL query is executed. The values of the *assets.date_inst* and *assets.asset_type* fields are provided by the values the user has entered in the form using the *fv(field)* function. The value of the *asset_id* field is provided by the *$id* variable.
	
	Example: $id = nti(inspections, id);
	
	insert into inspections (id, date_insp, insp_by, notes) values ($id, fv(inspections.date_insp), fv(inspections.insp_by), fv(inspections.notes));
	
	In this example, a *$id* variable is created and initialized with the next value (max + 1) of the *id* field from the *inspections* table. The form data is inserted in the *inspections* table when the *insert* SQL query is executed. The values of the *date_insp, insp_by* and notes fields are provided by the values the user has entered in the form using the *fv(field)* function. The value of the *id* field is provided by the *$id* variable.

#Return variable#	Select the variable that contains the value of the unique identifier of the new record inserted in the table. It must be defined with the ***INSERT*** query.
UPDATE query	This SQL query updates the data in the database. You should only configure this query if the form must allow data to be updated. Example: update assets set date_inst = fv(assets.date_inst), asset_type = fv(assets.asset_type) where asset_id = ei(); In this example, the form data is used to update the *assets* table when the *update* SQL query is executed. The values of the *assets.date_inst* and *assets.asset_type* fields are provided by the values the user enters in the form using the *fv(field)* function. The *where* clause allows you to

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	update the record containing the element's unique identifier using the *ei()* function. Example: update inspections set notes = fv(inspections.notes) where inspection_id = fv(inspections.inspection_id); In this example, the form data is used to update the *inspections* table when the *update* SQL query is launched. Only the value of the *notes* field is updated and it is provided by the value the user enters in the form using the *fv(field)* function. The *where* clause uses the *fv(field)* function to obtain the value of the record's unique identifier. Note that in this case, the *inspection_id* field is not associated with a form component, however, its value is still accessible through the *fv(field)* function.
DELETE query	This SQL query deletes the data from the database. You should only configure this query if the form must allow data to be deleted. Example: delete from assets where asset_id = ev(asset_id); In this example, the record corresponding to the element's *asset_id* attribute value is deleted from the table using the *ev(attrib)* function to obtain the value of the element identifier. Example: delete from inspections where inspection_id = fv(inspections.inspection_id); In this example, the record corresponding to the inspection's unique identifier is deleted from the table using the *fv(field)* function to get the value of the identifier.

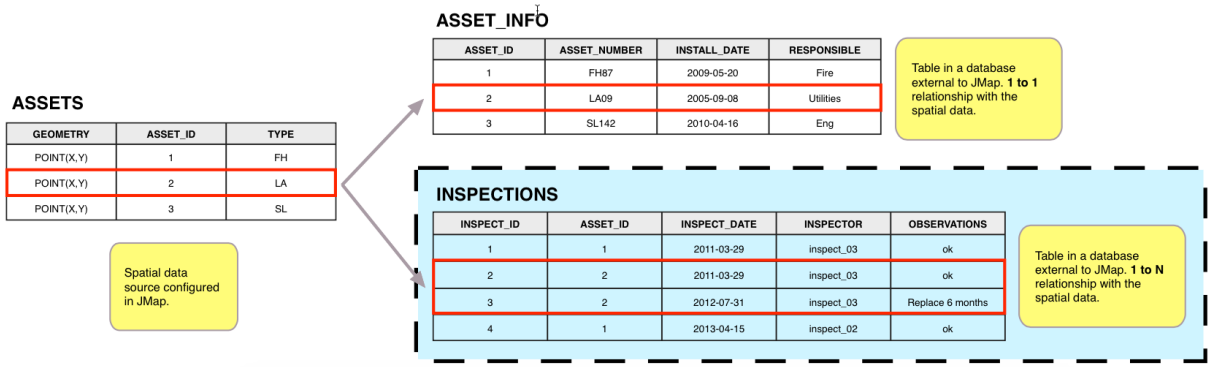
Creating a subform

Subforms are database forms that are opened from a *Table* component that exists in another form. They are normally used to manage data that has a 1 to N relationship with the layer's elements. They could be used to manage data for inspections on assets (N inspections can be associated to the same object), for example. They are configured similarly to the other database forms.

To create a subform, select ***Forms*** in the layer parameters menu. Make sure you open the ***Subform*** tab, then click on ***Create*** . You must enter a name for the new form and select the database containing the data to be used in the forms.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

At the following step, you must configure the SQL queries of the subform, as explained above for the creation of a database form.



Sub forms are database forms that are used to manage external data with a 1 to N relationship with the layer data using a common field.

Permissions of database forms

Database forms have their own permissions. Available permissions are described in the table below.

Form permissions	
Add data	Allows a user or group to use the form to add new data in the database.
Modify data	Allows a user or group to use the form to modify existing data in the database.
Delete data	Allows a user or group to use the form to delete data existing in the database.

Attribute Query Forms

Forms used for attribute queries are created using the form designer. They allow the users to enter query parameters. Unlike the other types of forms, they cannot be divided into sections. In addition, the ***Calendar*** and ***Photo*** components are not available for this type of form.

These forms are created when configuring attribute queries, by clicking on ***Form layout*** .

When creating an attribute query form, it is important to consider which parameters are required and which are optional in the query definition. For instance, if ***Required*** is not selected for a form component, the query must consider this parameter as optional. Refer to the Creating Attribute Queries section for more information on optional parameters in queries.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Extensions

JMap Extensions

JMap standard features can be extended to provide new specialized functions. This is done using JMap extensions. A JMap extension is an optional module that can be plugged into JMap Server and/or JMap applications in order to provide the desired set of functions. Some JMap extensions already exist and are available as separate products and some others will be available in the future. Organizations can also develop their own extensions using the JMap SDK.

For more information on extensions offered by K2 Geospatial, refer to the section on JMap extensions on our website: http://k2geospatial.com/produits/extensions-jmap/.

The extensions section shows the list of existing extensions of each type. The extension types are Server, Client and Mobile.

Server extensions

JMap Server extensions add new functionality on the server side. Optionally, they provide their own configuration interfaces, which are integrated to JMap Admin. Simply click on the name of a server extension to access its configuration interface.

Server extensions can be enabled or disabled by clicking on the ***Enable*** and ***Disable*** buttons. Disabled extensions are inactive and cannot process requests. Extensions can also be reinitialized by pressing the ***Reinitialize*** button. In this case, they are stopped and restarted, which can be useful if an extension must read configuration files that have been modified, for instance.

Client extensions

JMap Client extensions add functionality to JMap Pro applications. Generally, an extension adds a new toolbar or new menu items to an application. Using the application deployment tool, you can select the extensions that will be included in a JMap Pro application. Refer to the Deploying JMap applications section for more details on this topic. JMap client extensions are presented in this section for information purposes only.

Mobile extensions

JMap Mobile extensions add functionality to JMap Mobile applications. JMap Mobile extensions are presented in this section for information purposes only.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Web extensions

JMap Web extensions add functionality to JMap Web applications. JMap Web extensions are presented in this section for information purposes only.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Deploying JMap applications

Introduction

Deploying a JMap application consists of preparing the application and placing it online to be accessed by users. You can select the desired options (application type, activated extensions, access controls, etc.) to customize the application according to your needs. In order to allow a user to open a deployed JMap application, simply give the user the application URL.

Deployed JMap applications are placed online in the web server integrated to JMap Server. They can also be copied manually to other web servers.

To access the application deployment tool, click on ***Tools*** in JMap Admin's upper toolbar and select ***Deployment*** . The deployment section displays a list of applications that have already been deployed.

Some parameters are common to all types of applications. The following tables describe these parameters.

Identification	
Name	Enter a name for the new deployed application. Names must be unique. The name can contain spaces and any other characters.
Project	Select the project the deployed application will open by default.
Application type	There are 3 types of JMap applications: desktop, web/mobile and web service. Each type of application has different characteristics that are adapted to different needs. **JMap Pro applications**: This type of JMap application offers advanced functionality and allows you to add extensions. It offers rich functionality and highly interactive maps. It requires more IT resources and a Java Runtime Environment (JRE) must be installed. If no suitable JRE is found, it will be automatically downloaded and installed. You can run it from a web browser or from its own window. **JMap Web and JMap Mobile applications**: These JMap applications are lighter and you can run them from a web browser or mobile device. They don't offer as many advanced functionalities as JMap Pro applications. Web applications can be easily

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	integrated to websites. Some of these applications work well with tablets or smartphones. **Web services**: These applications are in fact web services that produce map images and vector data destined to provide maps for third-party applications. The Web Map Service (WMS) and Web Feature Service (WFS) are included in this type of application.

In the following step, you must select the type of application template to deploy. Each type of application has several models; these are described below. Choose the template that best meets the users' needs.

In the following step, you must specify information on the application's network access.

Path	
Protocol	The protocol to be used for communication between the JMap application and JMap Server. Select ***https*** for secure communication.
Application host	The host name or IP address that will be included in the deployed application. If your server has several IP addresses, specify the one that must be used.
Application port	The TCP/IP port used in the URL of the deployed application.
Relative path	The path used in the URL of the deployed application, taken from the name given to the application.

The following steps depend on the type of application you selected. Refer to the following sections: JMap Pro Applications, JMap Web and JMap Mobile Applications and Web Services.

JMap Pro Applications

The following settings apply to JMap Pro applications.

Application options	
Embedded in the browser	Select this option to integrate the JMap application in a web browser window as a Java applet. Otherwise, the

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	application will open in its own window.
Language	Select the language to use in the application's graphical user interface (menus, buttons, window text, etc.). By selecting *Default* , you will allow JMap to select the language based on the regional parameters defined in the user's operating system.
Connection type	Select the connection method to be used between the client application and JMap Server. ***Direct*** connections are usually appropriate for internal use; ***proxy*** connections are destined to users outside the local network. Proxy connections use the HTTP protocol and therefore can go through firewalls more easily.
Max. memory for data	Select the maximum amount of memory that can be used to store vector data in the client application. When this limit is reached, the application will free up memory by deleting old data in order to store new data. The default value of 64 Mb is appropriate for most sets of data but you may have to adjust it when you have a large amount of data to display.
Max. Heap size	Select the maximum amount of memory that can be assigned to the application to store all the settings and data needed to run it. This memory includes the memory previously configured for vector data. This amount of memory should always be higher than the maximum memory for data. The default value of 384 Mb is suitable for most applications, but you may have to adjust it in some cases. Note that the amount of memory used by the application process (as seen in task managers) can exceed this value.
Do not list users	Select this option to hide the list of users in the deployed application. This application can be useful if you must hide the accounts of internal users when you deploy an application that is accessible to the general public via the Internet. The users list serves various purposes, such as sharing contexts and sending maps by email.
Show map overview by default	Select this option to display the overview window when the application opens.

Login options

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Controlled access	This option allows you to determine if access to this application must be controlled. If this option is activated, an authentication window will appear when the application is launched. Note that this option must match the permissions defined when the project was configured. If anonymous access to the project is not authorized, a connection window should always be displayed. Otherwise, access will systematically be denied.
Enable single sign-on	Select this option to activate single sign-on for this application. Note that single sign-on must be configured on JMap Server for this option to be available. If single sign-on cannot work, an authentication window will be automatically displayed. Refer to the Single Sign-On section for more information.
Display projects list in login window	Select this option to display a list of available projects in the connection window. Users can then choose the project they wish to open. The project's security settings will be used to determine whether or not a user is authorized to open a particular project.
Display this message in login window	You can optionally add a message that will be displayed in the connection window to all of the application's users.

Map options	
Display scalebar	Select this option to display a graphic scalebar in each application map. The user can add or remove the bar during his/her session.
North arrow	Select this option to display a graphical arrow pointing north in every map of the application. The user can add or remove the bar during his/her session. You can decide which model you wish to use and where it will be positioned on the map.
Logos	Click on ***Edit*** to add a logo on the map. You can add your company logo, for instance. Select the image you wish to use and define its position and display parameters. Image files (GIF, PNG, JPEG) must be located in the *JMAP_HOME/applications/deployed/jmap/logos* directory.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Click on **Next** to navigate to the next section. This section displays the options related to JMap extensions.

Extensions	
Name of extension and version	Extensions available for JMap desktop applications are indicated here. Select the ones you wish to deploy with the application. Extensions will usually add new windows, menus or toolbars to the application.
Toolbar visible	Select this option to make the toolbars of the selected extension visible when the application starts up. Otherwise, the user can display the toolbars on request.
GUI visible	Select this option to display the windows and other components of the selected extension's graphical interface when the application starts up. Otherwise, the user can display them on request.
Extra parameters	Some extensions can take entry parameters when the application starts up. If this is the case, these parameters can be inserted in this field for the selected extension.

Click on ***Update*** to complete the deployment process.

JMap Web and JMap Mobile Applications

Deploying JMap Web and JMap Mobile applications requires a layer configuration that is different from the configuration existing in the project to be disseminated. Each layer is comprised of a combination of the layers found in the selected project and is produced in the form of images. The images can be produced as tiles that are adjacent to one another and possibly produced in advance and cached, or they can take the form of unique images covering the entire region displayed in the application and produced on demand.

There are basic layers and overlays. Only one basic layer can be displayed at a time in the application but the user can select the basic layer of his/her choice. Overlays are drawn over the basic layer and it is possible to display several of them simultaneously. The user can make each overlay visible or invisible.

The following settings apply to web and mobile applications.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

General	
Controlled access	**Available for JMap Web only**. This option determines if access to this application must be controlled. If this option is activated, an authentication window will display at application startup. Note that this option must be consistent with the permissions defined at project configuration. If anonymous access is not authorized for this project, a connection window should always be displayed. Otherwise, access will systematically be denied.
Track devices	**Available for JMap Web only**. Activate this option in order for JMap Mobile applications to continuously send their geographic position to JMap Server. This option allows you to track the movement of mobile devices in real time when the JMap Mobile application is running. Note that this requires installing JMap's Tracking extension on the server.
Geographic properties	Press this button to modify the application's geographic properties. Read below for more information on this topic.
Offline levels	**Available for JMap Mobile only**. If a ***GeoWebCache*** server is configured, it is possible to make some map levels available offline to navigate the map without a network connection on mobile devices. Refer to the Using a GeoWebCache Server section for more information.

GeoWebCache authentication	
Username	If you are using a ***GeoWebCache*** server, enter the user account that ***GeoWebCache*** must use to access the deployed application and selected project. This user account must have the required permissions to open the project from this deployed application. Refer to the Using a GeoWebCache Server section for more information.
Password	Enter the password ***GeoWebCache*** must use to access the deployed application and selected project.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Afterwards, you must create layers for your JMap Web or JMap Mobile application. To create a new layer, click on ***Add new layer*** and choose the type of layer to add.

Layers	
Base layer	Create a base layer from the layers of the selected JMap project.
Google Maps	Create a base layer that displays the Google Map. In order for this layer to display correctly with the other layers, the projection of the JMap project **must** be identical to the projection used by Google Maps, i.e. ***WGS84 / Pseudo-Mercator*** (EPSG:3857). You can choose the types of maps (road, satellite, etc.) that you wish to add. You can enter the API key if you have one. **Important**: You must make sure you use this option in accordance with Google's license agreement.
Bing Maps	Create a base layer that will display the Bing Map. In order for this layer to display correctly with the other layers, the projection of the JMap project **must** be identical to the projection used by Bing Maps, i.e. ***WGS84 / Pseudo-Mercator*** (EPSG:3857). You can choose the types of maps (road, satellite, etc.) that you wish to add. You **must** enter the API key you obtained from Microsoft. **Important**: You must make sure you use this option in accordance with Microsoft's license agreement.
OpenStreetMap	Create a base layer that will display the OpenStreetMap map. In order for this layer to display correctly with the other layers, the projection of the JMap project **must** be identical to the projection used by OpenStreetMap, i.e. ***WGS84 / Pseudo-Mercator*** (EPSG:3857). **Important**: You must make sure you use this option in accordance with OpenStreetMap's license agreement.
Overlay	Creates an overlay from the layers of the selected JMap project.
Overlay vector	**Available for JMap Mobile only**. Creates an overlay that will be loaded on mobile applications in the form of vector data. Only the point layers in the selected JMap project can be used for this type of layer. If the mobile

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	application user has the required permissions, he/she can modify the data of this layer in the JMap Mobile application.

The following settings apply when creating a base layer for JMap Web or JMap Mobile applications.

Properties	
Layer name	Name that identifies the layer. This name will be presented to the user in the application's layer manager. The name must be unique.
Image format	Select the format used to produce the layer images. For layers with air or satellite photos, the jpeg format offers the best compression rate.
Tiled	Determines if the layer images will be produced as a series of tiles or as images generated on the fly and adjusted to the map's dimensions. Only tiled layers can be cached.
Cached	Select this option if you want ***GeoWebCache*** to be used to cache the images generated by this layer. This option is only available if ***Tiled*** is selected for this layer. Refer to the Using a GeoWebCache Server section for more information.
Offline	Select this option if you want this layer to be accessed offline by JMap Mobile applications. This option is only available if the ***Tiled*** and ***Cached*** options have been selected for this layer. Refer to the Using a GeoWebCache Server section for more information.
Transparent	Activate this option if you want the background of the images to be transparent. This option is generally used for overlays to avoid hiding the base layer. This option is only available for overlays.
Visible	Determines if the layer will be initially visible or invisible when the application opens. This option is only available for overlays.
Listed	Determines if the layer will be displayed in the layer list presented ti the users. A layer may be displayed on the map without being displayed in the list of layers.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Layer composition	
Available layers	List of project layers available to include in the new layer.
Selected layers	List of layers selected to be included in the new layer. You can define the display order of the project layers that make up the new layer. All selected layers will be drawn together in the images produced by JMap Server.

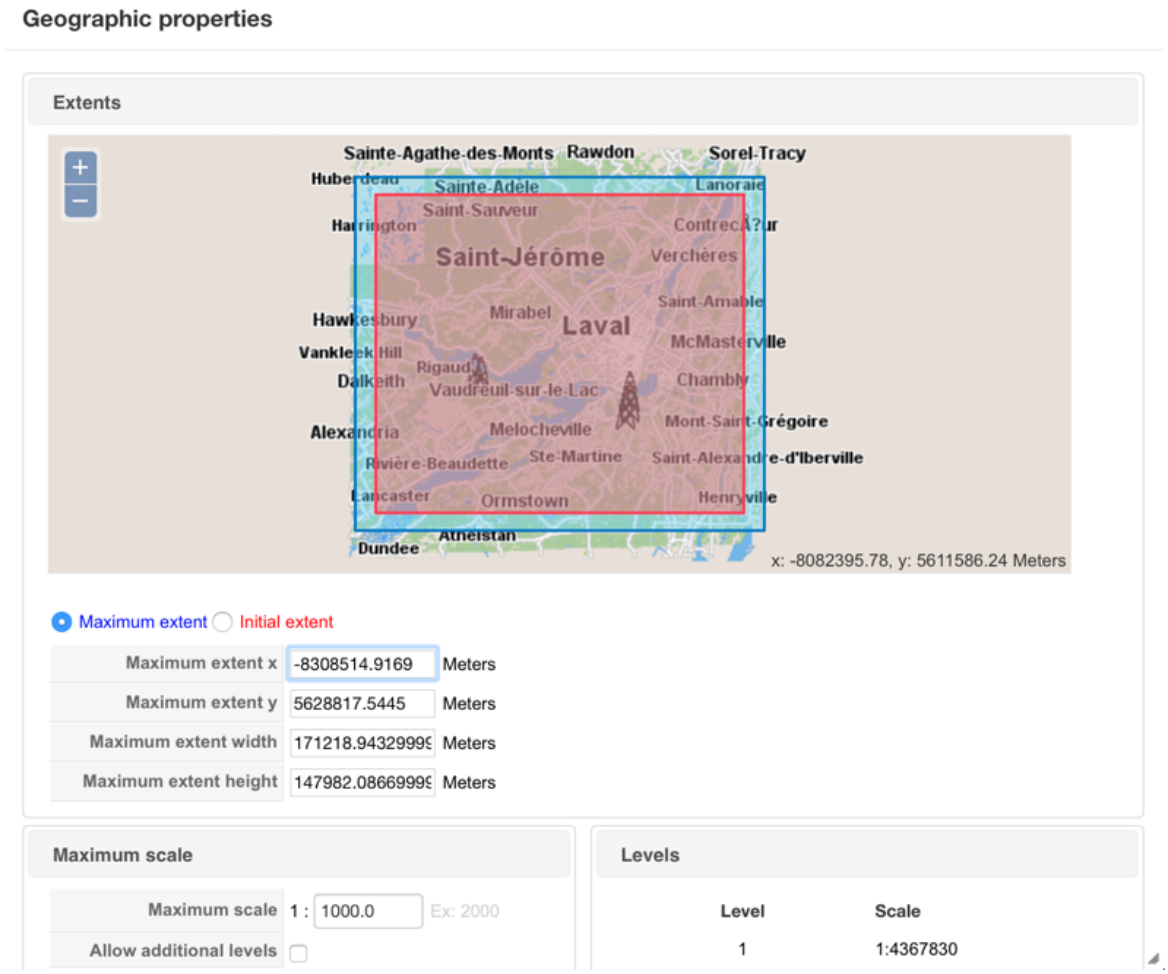
Map options	
Logos	**Option available for JMap Web only.** Press ***Edit*** to add a logo on the map. You could, for example, add the logo of your organization. Select the image to use and define its location and display parameters. The image files (GIF, PNG, JPEG) must be located in the folder *JMAP_HOME/applications/deployed/jmap/logos* .

Application template options	
Geolocation tool	Select this option to activate the geolocation tool in the application. If this option is not selected, the geolocation button will be absent from the user interface.
Data editing tool	Select this option to activate the data editing tools for element geometries and their attributes. Even if these tools are activated, the user must have the necessary permissions to modify the data of a layer.
Selection tools	1Select this option to activate the selection tools in the application. If this option is not selected, the selection button will be absent from the user interface.
Google tools (Addresses, Directions, Street View)	Select this option to activate the address search, directions and Street View from Google. **Important**: You must make sure you use this option in accordance with Google's license agreement.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Geographic properties

The geographic properties of a JMap Web or JMap Mobile application allow you to redefine certain project properties for this application. This type of application can generate a significant workload on JMap Server and a large storage space if you use a ***GeoWebCache*** server. By redefining the global extent of the map and maximum scale, you can improve these aspects.



The geographic property window displays the data of the project and is used to define the maximum and initial extents used by the application.

Geographic properties	
Maximum extent	Allows you to redefine the settings of the maximum extent of the data to be displayed. By default, the extent of the project data is used but another extent can be specified. Limiting the maximum extent of the map can greatly reduce the size of cached data for this type of application.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	In the map at the top of the window, the maximum extent is represented by a **blue** rectangle. You can select this rectangle on the map and move it or re-size it. The initial extent must always be contained in the maximum extent. The initial extent will be automatically adjusted accordingly. The values of the maximum extent are displayed below the map (coordinate X, Y of lower left point, width, height, the coordinate system of the project).You can also enter the values directly in the respective fields.
Initial extent	Allows you to redefine the settings of the initial extent of the map. By default, the initial extent of the project is used but another extent can be specified. This is the extent that will be displayed when the application is started. In the map at the top of the window, the initial extent is represented by a **red** rectangle. You can select this rectangle on the map and move it or re-size it. The initial extent must always be contained in the maximum extent. The initial extent will be automatically adjusted accordingly.
Maximum scale	This setting allows you to redefine the maximum scale of the map to limit the user's ability to enlarge the map. By default, the maximum scale defined in the project configuration is used but another scale can be specified. Specifying a smaller maximum scale allows you to considerably reduce the size of cached data for this type of application.
Allow additional levels	This option allows JMap Web or JMap Mobile, for certain situations, to display the map at larger scales (closer zoom) than those normally used. The largest scale normally used is approximately 1:1000. If the maximum scale defined previously is larger than 1:1000 (e.g. 1:500), you must select this option to allow JMap to zoom closer. Most base maps (Google, Bing, OSM) cannot display well at scales larger than 1:1000.
Levels/Scale	Displays the list of zoom levels and scales that will be used by the application, based on the ***maximum scale*** and ***maximum extent*** parameter values.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Web Services

JMap map imaging service

This type of service is mainly used by developers who wish to obtain map images produced by JMap.

Application options	
Image format	Select the image format that will be created by JMap Server and displayed in the application. JPEG generally offers the best quality/size ratio when the map contains air photos.
Image params	This option allows you to specify additional parameters to be used when creating images. Currently, this option is only used with the JPEG format to specify the ***quality*** setting, which controls the quality/size ratio of the image. The default value (when the field is left blank) is 0.5. Entering a lower value will result in images of lower quality but will allow smaller sizes. Example: **quality=0.6**
Controlled access	This option determines if access to this application must be controlled. If this option is activated, an authentication window will be displayed at application startup. Note that this option must be consistent with the permissions defined at project configuration. If anonymous access is not authorized for this project, a connection window should always be displayed. Otherwise, access will systematically be denied

WMS Service

Web Map Service (WMS) is a standard presented by the Open Geospatial Consortium that determines how client applications must perform requests in order to obtain maps from a server that is compatible with WMS.

JMap Server can act as a WMS server. If you implement a WMS web service, other applications can query JMap Server via the WMS protocol for the selected project. Once the service has been deployed, you can click on ***Launch*** to display a page containing 2 hyperlinks: the first one is the *getCapabilities* request you must provide to the systems that wish to query JMap's WMS service. The second one is an example of a *getMap* request that allows you to obtain a map image.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

WFS Service

Web Feature Service (WFS) is a standard presented by the Open Geospatial Consortium that indicates how client applications must perform requests in order to obtain vector data and its attributes from a server that is compatible with WFS.

JMap Server can act as a WFS server. If you implement a WFS web service, other applications can query JMap Server via the WFS protocol for the selected project. Once the service has been deployed, you can click on ***Launch*** to display a page containing a hyperlink towards the *getCapabilities* request you must provide to the systems that wish to query JMap's WFS service.

Managing Deployed Applications

Once you have deployed applications, you can perform certain management tasks on them.

Editing an existing application

Editing an existing application allows you to go through all configuration sections again and change any options as needed. Click on the application's name and select ***Edit***.

Updating applications

Updating a deployed application means deploying it again, overwriting the existing one. This is equivalent to editing an existing application and keeping all the same options. Updating applications is useful when you install a new version of JMap to make sure your deployed application uses all the latest library versions. You **do not** need to update deployed applications when the data or the project changes.

Loading and unloading applications

If you want to temporarily make a deployed application unavailable, you simply need to unload it by selecting it in the list and pressing ***Unload***. When an application is unloaded, users can no longer start it using its URL. If you want to make it available again, simply press ***Load*** to reload it.

Deleting applications

Deleting an existing deployed application deletes all files related to this application. There is no way to undelete an application (you need to redeploy it). Note that when deleting an application, none of your data or configurations (projects, layers, data sources, databases, etc.) are deleted nor affected in any way.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Using a GeoWebCache Server

JMap Web and JMap Mobile applications use an approach based on the production of images and maps generated by JMap Server. The images can be produced as a series of tiles that are adjacent to one another, for each scale level. Lower scale levels contain a small number of tiles, while higher scale levels typically contain a large amount of tiles.

These images are created on request when users navigate on the map in web or mobile applications. Producing these images demands a lot of work from JMap Server and therefore can cause significant delays in these applications. To improve performance, it is recommended to use a tile cache system. This system caches each tile once it is produced and can also ask JMap Server to produce all images of each layer in advance. This operation can require several hours of work during which JMap Server will be very busy. In addition, the sum total of the cached tiles can require a large storage space. This will greatly accelerate navigation in web and mobile applications, since all images will have been produced and made available.

JMap Server is compatible with the open source product ***GeoWebCache*** (http://geowebcache.org). However, to improve integration with JMap Admin, K2 Geospatial provides its own slightly adapted version of *GeoWebCache*. Visit K2 Geospatial's website (http://k2geospatial.com) to download the *GeoWebCache* installer for JMap Server. In addition to providing a tile cache for JMap applications, this version of *GeoWebCache* can also prepare maps for offline usage in mobile applications. This will allow users to continue working without a network connection using maps that have been loaded in local mode on their devices.

Configuring GeoWebCache in JMap

To use *GeoWebCache* in conjunction with JMap Server, JMap Admin must be configured to provide JMap with the settings to connect to *GeoWebCache*. Refer to the JMap Server Settings section for more information on configuring these settings.

Providing more than one URL towards *GeoWebCache* enables web and mobile applications to launch more image queries simultaneously, which improves performance when loading the map. These URLs must use domain names or IP addresses that point to the same *GeoWebCache* instance.

The username and password configured are used to establish communication with *GeoWebCache*. These settings must match the configuration in *GeoWebCache.* Read below for more information on configuring *GeoWebCache*.

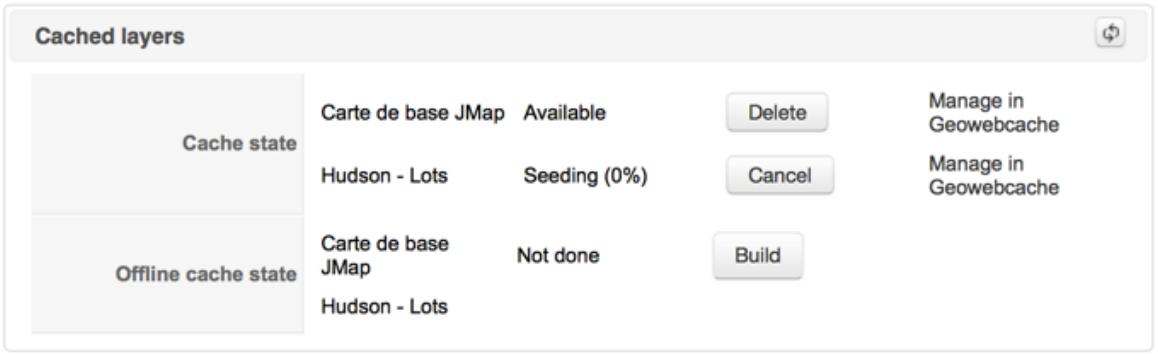
Configuring GeoWebCache

GeoWebCache is not included with JMap and must be installed separately. For more information on installing and configuring *GeoWebCache*, read the following article.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Using GeoWebCache for mobile and web applications

If *GeoWebCache* is correctly installed and configured, you can use it with web and mobile applications. Usage of *GeoWebCache* for these types of applications is configured when these are deployed. In the information section of a web or mobile application that has already been deployed, there is a subsection titled ***Cached layers***. This subsection displays the list of layers for which the ***Cached*** or ***Offline*** options were activated upon deployment (refer to the Web and Mobile Applications section).



Interface for managing cache for JMap Web and JMap Mobile applications

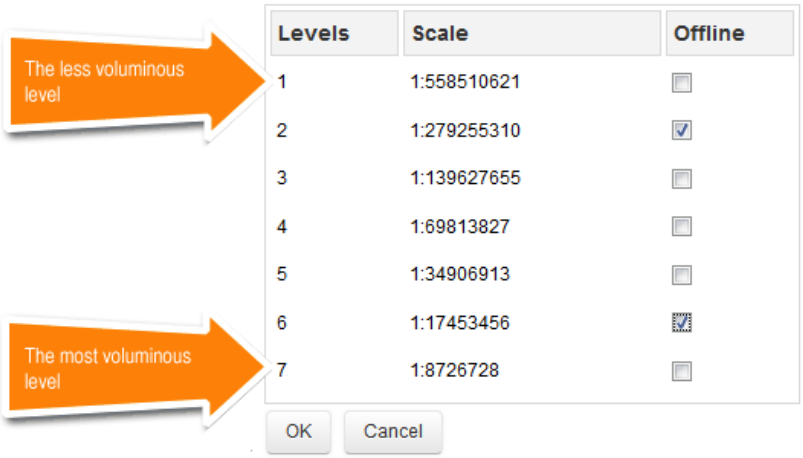
Cache state

For each layer, click on ***Seed*** to launch the production of the tile cache. This process can be cancelled by clicking on ***Cancel***. To delete the cache for a layer, click on ***Delete***. Cache production can take a very long time. If you wish to manage the cache directly in Geowebcache interface, click ***Manage in Geowebcache***.

Offline cache state

Offline cache allows mobile application users to navigate on the map without a network connection. To enable this, part of the tiles for certain layers are stored directly on their mobile devices. To make a layer available offline, you must activate the ***Offline*** option when deploying the application. In addition, you must select the scale levels that will be available offline. It is important to limit the number of offline levels to avoid overloading mobile devices. Avoid selecting the highest scale level as it is also the largest (refer to the Web and Mobile Applications section).

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Selecting scale levels offline when deploying the mobile application

You must select ***Build*** to ask *GeoWebCache* to prepare the cache for each layer to work in offline mode. This option is only available if the status of a layer's cache is set to ***Available*** . If the offline cache is already ready, you can delete it by clicking on ***Delete*** .

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Security

Managing Users

In JMap Admin, the user manager configuration can be accessed by clicking on ***Users / Groups*** in the *JMap Server* section. Select the *User manager* tab.

The user manager allows you to define how JMap will manage user accounts and groups. There are two ways to manage this information with JMap:

- Using the JMap user account database: you create and delete the user accounts directly from JMap Admin;
- By connecting to an existing database of user accounts such as a *Windows Active Directory* system, an LDAP compatible system or a relational database.

Several systems can also be combined to be used simultaneously (e.g. the JMap database and *Windows Active Directory*). These systems are then used as a single system.

When JMap Server connects to an existing database, user account management is simplified because no account or group needs to be created and managed in JMap.

The following sections describe each available option.

JMap DB user manager

This type of user account management records users and groups directly into JMap Server's ***System*** database or in an external database containing the required tables and fields. The JMap administrator must create and manage all user accounts and groups.

Click on the ***User manager*** tab from the ***Users / Groups*** section. Select ***JMap DB user manager*** to indicate that user accounts will be managed within a relational database. To store information in JMap Server's *System* database, select the ***JMap Server database*** option.

You can also use any relational database that contains at least the required tables and fields by selecting the ***External database*** option. When you do this, an interface displays, allowing you to define the configuration parameters. Using this configuration interface, select the database you wish to use. Afterwards, select the tables and fields containing the various information pertaining to users and groups. If needed, you can select Read-only mode to prevent account information from being modified by JMap Admin.

Once this configuration has been defined, you can create, modify and delete user accounts directly from JMap Admin.

Active Directory user manager

You can connect to *Windows Active Directory* (in read-only mode) by selecting the option ***Active Directory user manager*** under *User manager*. When you select this option, a new interface is displayed, allowing you to specify the configuration parameters.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Active Directory	
Server address	Address of the domain controller Windows server configured with Active Directory.
DN	Unique identifier (Distinguished Name) pointing at the root of the directory. Composed of a list of DC (Domain Component) entries. Example: dc=ABC,dc=COM
Domain	Name of the Windows domain (e.g. ABC.COM).
User / SPN	User name that JMap Server will use to connect to the Active Directory. It is recommended to create a user especially for JMap. Its password should never expire. If you wish to use single sign-on, you will have to create an SPN (Service Principal Name) associated with this user. See Single Sign-On for more details.
Password	Password of the user JMap Server will use to connect to the Active Directory.
Admin. password	A user named *administrator* must always exist in JMap. If no *administrator* user exists in the Active Directory, JMap will simulate one. In such a case, provide the password associated with this simulated user. If the user *administrator* does exist in the Active Directory and a password is entered, this password will simply be ignored.
Enable single sign-on	Enables the single sign-on option. See Single Sign-On for more details.
Default / Custom LDAP configuration	Active Directory is based on LDAP. This option allows the use of LDAP parameters that are most commonly used for Active Directory. However, if those parameters don't match the ones in use, it is possible to specify custom values.
Max page size	Active Directory limits the transaction size to a maximum number of records at a time (page size). The value of this parameter must not be greater than the maximum size authorized by Active Directory (1000 is the default value in Active Directory). If the size is too small, this can reduce performance. A size greater than the authorized limit will cause missing data in the user list.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap LDAP user manager

You can connect to any LDAP compliant directory (in read-only mode). Unix, Linux and Windows systems offer many LDAP compliant directories.

To use this option, select ***JMap LDAP user manager*** under *User manager*. When you do so, a new interface is displayed, allowing you to specify the configuration parameters.

JMap LDAP user manager	
Server URL	LDAP server address.
DN	Unique identifier (Distinguished Name) used to define the root of the directory. Includes a list of Domain Component entries. For example: dc=ABC,dc=COM
User	User name that will be used by JMap Server to connect to the LDAP directory. It is recommended to have a user created specifically for JMap purposes. This user's password should never expire.
Password	The user password that JMap Server will use to connect to the LDAP directory.
Admin password	A user named *administrator* must always exist in JMap. If there is no *administrator* user in the LDAP directory, JMap will simulate one. In this case, you must provide the password associated with this user. If the *administrator* user exists in the LDAP directory and a password is entered, it will be ignored.
Authentication prefix	Some LDAP servers require a prefix to be concatenated with the user name in order to proceed with authentication. Example: Prefix: a_domain\ User: a_user Result: a_domain\a_user
Authentication suffix	Some LDAP servers require a suffix to be concatenated with the user name to proceed with authentication. Example: Suffix=@a_domain User=a_user Result: a_user@a_domain

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap LDAP user manager	
User class	Name of the LDAP object class used to identify a user in the LDAP directory.
Group class	Name of the LDAP object class used to identify a group in the LDAP directory.
User filter	Search filter used to extract users from the LDAP directory. This filter must be formatted according to the standard LDAP syntax.
Group filter	Search filter used to extract groups from the LDAP directory. This filter must be formatted according to the standard LDAP syntax.
User attribute	The attribute of an LDAP user that defines this user's identity.
Group attribute	The attribute of an LDAP group that defines this group's identity.
Member attribute	The attribute of an LDAP group that defines which users are members of this group.
Full name attribute	The attribute of an LDAP user that defines this user's full name.
Email attribute	The attribute of an LDAP user that defines this user's email address.
Max page size	In LDAP directories, the size of transactions is limited to a maximum number of recordings at once (the size of the page). The value of this parameter must not exceed the maximum size permitted by the directory (1000 is the default value in LDAP directories). If the size is too small, this could affect performance. If the size is larger than the authorized limit, data will be missing in the user list.

For more information on the LDAP protocol, refer to http://en.wikipedia.org/wiki/Lightweight_Directory_Access_Protocol.

Composite user manager

This type of user management allows you to combine several managers together. You can add as many user managers as necessary. All user managers will function as a single user manager. Refer to the previous sections for information on user manager configuration.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Synchronizing user permissions

When you connect to an existing user account database (Active Directory, LDAP or external relational database), it may be useful to synchronize JMap Server with the database for 2 reasons:

- When users or groups are deleted from the database and those deleted users or groups had been given permissions in JMap (e.g. to open a project or view certain layers), the permissions are not deleted from JMap Server permission lists. This can happen because JMap Server is not aware the users or groups have been deleted from the database. When synchronizing, JMap Server removes all existing permissions for deleted users and groups. However, even if you don't synchronize, there is no security problem because deleted users will fail at login.
- When the contents of user groups are modified (members added or removed), so that JMap Server can reload the lists of users that belong to the groups. JMap Server keeps the group member lists in memory for performance reasons.

You can automate the synchronization by selecting the option ***Synchronize automatically every...*** and specifying a time period.

Managing User Accounts and Groups

User accounts in JMap are used for security and collaboration purposes. For security, user accounts are used for limiting access to JMap resources to authorized persons only. For collaboration needs, user accounts are useful to identify users when sending emails with embedded map images or when creating and sharing map contexts or personal layers.

JMap also supports the concept of user groups. Instead of giving permissions to users directly, you can give permissions to groups and all users that are members of the groups will inherit the permissions. Using groups can ease the user management process. Groups can also be used as destination lists for sending emails and map contexts.

Two users and one special group always exist in JMap: ***administrator*** , ***anonymous*** and ***everyone*** .

Special users and groups	
Administrator	The ***administrator*** user allows you to access JMap Admin following a new installation (this user has administration rights in JMap). This user's password field is left blank, therefore, it is highly recommended to add a password as soon as possible. Read below for more information. The ***administrator*** user always exists in JMap and cannot be deleted.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Anonymous	The ***anonymous*** user allows users who are not authenticated to access certain resources. It can be used to configure access to a project without authentication, for instance. The ***anonymous*** user always exists in JMap and cannot be deleted. In addition, this user's password (blank) cannot be modified.
Everyone	The ***everyone*** group is used to give all users access to a resource, provided they are authenticated. The ***everyone*** user is not displayed in the list of JMap groups. It is only visible in interfaces that allow you to define permissions, where applicable.

Creating users and groups

You can create a new user or group by pressing ***Create*** from the ***Users / Groups*** section. This will bring you to the new user or group configuration section. Note that you can only create users and groups if you are using the JMap account database or an external database that is not in read-only mode.

Users	
User name	Enter a unique user name (login name) for the new user. You will not be able to save it if the name already exists.
Password	Enter a password for the new user. The password can be empty but this is not recommended.
Confirm password	Enter the password a second time to confirm.
Full name	Enter the full name (first name and last name) for the new user. This is optional.
Email	Enter the email address of the new user. It is used when sending maps to users. This is optional.
Hidden	Select this option if you want the new user to be hidden from user directories.

Groups	
Group name	Enter a unique group name for the new group. You will not be able to save it if the name already exists.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Modifying users and groups

You can modify an existing user or group by clicking on it in the list and pressing ***Edit***. Note that once a user is created, its user name cannot be modified. To add users to a group, press ***Add...*** and a list of available users will be displayed. Select the users to add to the group and press ***Add***. To remove users from a group, select the users to remove and press ***Remove*** .

Deleting users and groups

You can delete a user or group by selecting it in the list and pressing ***Delete*** .

Managing Permissions

Permissions in JMap are divided into 2 families: permissions for the users of applications (Pro, Web and Mobile) and permissions for the administrators (JMap Admin).

User permissions

User permissions determine what the users can do inside JMap Pro, JMap Web and JMap Mobile applications.

The following table presents the different groups of permissions available for the users.

User permissions	
Permissions on projects	See section Project Permissions for more information.
Permissions on layers	See section Layer Permissions for more information.
Permissions on personal layers	**Create personal layers** This permission gives a user the right to create personal layers in JMap Pro applications. By default, JMap users are not allowed to create personal layers. You can configure this permission in sub section ***Permissions*** of section JMap Server.
Permissions on forms	See section Database Forms for more information..

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Administrator permissions

Administrator permissions determine what administrators are authorized to do in JMap Admin. Some permissions are global (permissions to do some tasks) while other permissions apply to specific resources.

Most of the global permissions are configured in sub section ***Permissions*** of section JMap Server.

The following table describes the global administration permissions.

Global administration permissions	
Access JMap Admin	This permission is required for an administrator to access JMap Admin. After the installation of JMap, only the user *administrator* has this permission. Note that the password is initially left empty for this user. **It is strongly recommended to enter a password for user *administrator*** . See section Managing Users for more information on modifying passwords. Also make sure to leave at least one user with this permission and with a known password. Otherwise, it will be impossible to access JMap Admin.
Create databases	This permission is required for an administrator to create new databases in JMap Admin.
Create remote connections	This permission is required for an administrator to create new connections to remote JMap Server instances in JMap Admin.
Create deployments	This permission is required for an administrator to create new application deployments in JMap Admin.
Create metadata templates	This permission is required for an administrator to create new metadata templates in JMap Admin.
Create style templates	This permission is required for an administrator to create new style templates in JMap Admin.
Create projects	This permission is required for an administrator to create new projects in JMap Admin.
Create data sources	This permission is required for an administrator to create new spatial data sources in JMap Admin.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Administration permissions that are specific to resources determine what an administrator can do with each resource. The following table describes those permissions.

Resource specific administration permissions	
Access ...	Allows for viewing the detailed information of a resource and for using the resource, but not modifying it. Example: For using a spatial data source to create a layer, the administrator must minimally have the permission *Access* on the data source.
Administrate ...	Allows for modifying the resource and for managing the user permissions for the resource. Does not allow for deleting the resource, nor for managing its administration permissions. Example: To add a layer in a project, the administrator must have the *Administrate* permission for the project.
Use SQL console	**Applies only to databases.** Allows for using the SQL console on the database. The SQL console is used to show the database structure and to execute SQL queries on the database.
Remote access	Allows for accessing the resource from another instance of JMap Server. This permission is generally granted to a generic account used to open communication sessions between different instances of JMap Server. For more information, see sections Sharing Layers and Sharing Spatial Data Sources.

Owners of a resource

Most resources managed in JMap Admin have one or more owners. Owners of a resource are the only ones that are allowed to:

- manage administration permissions for the resource;
- manage the list of owners for the resource;
- delete the resource.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Super administrators

Super administrators are special accounts that can do everything in JMap Admin. They are the only ones who are allowed to:

- manage the list of super administrators;
- manage global administration permissions;
- manage users and groups;
- modify the working parameters of JMap Server;
- display the log files;
- import and export configurations.

You can manage the list of super administrators from sub section ***Permissions*** in section JMap Server. Select the ***Super administrators*** tab.

The following table presents administration tasks with examples, and indicates which profile or permission is required for each case.

Tasks	Super Administrator	Administrator
Access JMap Admin	YES	If permission *Access JMap Admin*
Manage the list of Super administrators	YES	NO
Manage global administration permissions • Give an administrator the permission to create projects • Remove an administrator the permission to create spatial data sources • Give an administrator the permission to create metadata templates for data sources	YES	NO
Perform management tasks for JMap Server • Modify JMap Server working parameters (ports, memory, etc.) • Manage users and groups • Import and export JMap Server configurations • View and manage log files	YES	NO
Create a resource • Create a project • Create a database	YES	If permission *Create ...*

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

• Create an application deployment		
Use a resource • Use a database to create a spatial data source • Use a spatial data source to create a layer • Use a connection to JMap Server to create a layer by reference	YES	If permission *Access* ...
View detailed information about a resource • Click on a database and view all its parameters • Click on a project to view all its parameters	YES	If permission *Access* ...
Modify a resource • Change the name of a project • Add a layer in a project • Modify the connection parameters for a database • Modify the projection of a spatial data source	YES	If permission *Administrate* ...
Delete a resource • Delete a project • Delete an application deployment • Delete a style template	YES	If owner of the resource
Manage user permissions of a resource • Give a user the permission to open a project • Give a user the permission to edit the elements of a layer of a project • Remove a user the permission to copy the data of a layer	YES	If permission *Administrate* ...
Manage the administrator permissions of a resource • Give an administrator the permission to use a spatial data source • Give an administrator the permission to modify a project • Remove an administrator the permission to modify a database	YES	If owner of the resource
Manage the list of owners of a resource	YES	If owner of the resource

Permission Reports

Permission reports are used to visualize on a single report all the permissions that a user or a group has. It is a convenient way to get the information without checking every ressource.

The reports are accessible from the sub section ***Users / Groups*** of section JMap Server. To display a report, click on the icon in the *Permissions* column for a user or a group.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Single Sign-On

Single sign-on provides a secure way for users to access JMap applications without authentication. The Windows session authentication is used to automatically launch the JMap session. Single sign-on is only available for Windows environments using Active Directory. A special configuration is required on the Windows server and on each computer where single sign-on is wanted. Note that the ***Single sign-on*** option must also be activated when deploying a JMap Pro application.

For more details on single sign-on configuration, refer to this article.

Managing Sessions

Each user that is connected to JMap Server using a JMap application has an open session on the server. The session remains open as long as the JMap application is not closed. Sessions contain information about the identity of the user. Depending on your license agreement, you may be limited to a certain number of simultaneous sessions.

To access the session management section, click on ***Sessions*** in the ***JMap Server*** section.

Five different types of sessions are possible. The following table describes each type of session.

Type of JMap session	
JMap Pro	This type of session is used when a user connects to JMap Server using a JMap Pro application. The number of concurrent sessions of this type is prescribed by your JMap license.
JMap Mobile	This type of session is used when a user connects to JMap Server using a JMap Mobile application. These applications are developed specifically for mobile devices such as smartphones and tablets. The number of concurrent sessions of this type is prescribed by your JMap license.
JMap Web	This type of session is used when a user connects to JMap Server using a JMap Web application. These are light applications that run on a web browser, either on a PC/Mac or on mobile devices. The number of concurrent sessions of this type is prescribed by your JMap license.
JMap Admin	This type of session is opened when a user connects to JMap Admin to administrate JMap Server. This type

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	of session is not controlled, therefore the number of concurrent JMap Admin sessions is unlimited.
Server	This type of session is used when a JMap Server connects to another JMap Server. The session opens on the server that accepted the connection. This type of session is used for JMap to JMap data sharing. Your license may not authorize JMap Server sessions.

Active sessions

You can view the list of open sessions. By selecting the ***Active sessions*** tab, the list of current sessions will be displayed along with useful information on each session. You can close open sessions by selecting them and clicking on ***Close sessions*** .

Reserved sessions

Reserved sessions are special sessions for users that have priority over the other users. These users can always open a JMap Pro session, even if the maximum number of sessions is reached, according to your license. These reserved sessions are recorded separately from the rest of the sessions.

If your JMap user license permits it, you can assign a certain number of reserved sessions to the users of your choice. Press ***Add...*** to select a user and assign him/her a reserved session. Once the maximum number of reserved sessions has been assigned, you cannot assign any to other users. You can remove a reserved session from a user by selecting that person's name and clicking on ***Remove*** .

Statistics

Session statistics provide basic information on user activity over time. You can determine the total number of sessions over a given period and the highest number of concurrent sessions reached over a period of time. Statistics are displayed in a bar graph. Note that if your license is limited to a certain number of concurrent sessions, this limit will be identified on the graphs. Click on ***Update*** to generate the graph.

Session statistics	
Display	Select the information to display, either the **Total number of sessions** or the **Highest number of concurrent sessions**.
Users	Select one or more users for which the information will be displayed.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Time unit	Select the time unit to be used to display information. Possible units are *Hour*, *Day*, *Week* or *Month*.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap Server Management

JMap Server Status

The server status section of JMap Admin provides a lot of useful information for monitoring the server instance. Additionally, this section provides detailed information on your license agreement. Each part is explained below.

General	
Version	Complete information on the JMap Server version. Provide this information when requesting support.
IP address	IP address of the host running JMap Server
Port	TCP/IP port JMap Server is listening on for client connections.
Sessions	
Total active sessions	Number of currently active user sessions.
Active JMap Pro sessions	Number of current user sessions for JMap pro applications. The maximum number of sessions authorized by the license is indicated.
Active reserved JMap Pro sessions	Number of current reserved JMap Pro sessions. The maximum number of reserved sessions authorized by the license is indicated.
Active JMap Web sessions	Number of current user sessions for JMap Web applications. The maximum number of sessions authorized by the license for this type of application is indicated.
Active JMap Mobile sessions	Number of current user sessions for JMap Mobile applications. The maximum number of sessions authorized by the license for this type of application is indicated.
Active JMap Server sessions	Number of current JMap Server sessions. The maximum number permitted for this type of session is indicated.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Administrators	User names of administrators currently connected to JMap Admin. The computer host name or IP address from which the administrators are connected are also indicated.
Resources	
Java VM	Version of the Java virtual machine used by JMap Server.
Process Id	Number of JMap Server's system process.
Available processors	Number of processors used by the JMap Server process.
Memory usage	Portion of the allocated memory actually used by JMap Server.
Memory allocated	Total amount of memory allocated for JMap Server by the operating system. If the memory usage reaches this limit, more memory (if available) will be allocated by the operating system. The maximum memory that can be used by JMap Server is defined in the startup parameters during installation.
Thread pool usage	Number of simultaneous request processors (threads) currently in use (compared to number of initialized threads).
Thread pool usage peak	Maximum usage value reached since server startup (helps determine optimal initial pool size).
Cache	
Memory cache usage	Proportion of the memory data cache used by JMap Server compared to the defined limit and relative percentage.
Memory cache efficiency	Percentage of times requested data is found in the memory cache over compared to the total number of data requests.
Disk cache usage	Proportion of the disk data cache used by JMap Server compared to the defined limit and relative percentage.
Disk cache efficiency	Percentage of times requested data is found in the disk cache over compared to the total number of data requests.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

License information	
Model	Licensing model in use. It can be Session-restricted or User-restricted.
Licensed to	Organization licensed to use JMap Server.
Serial number	Unique serial number of JMap Server.
Maximum users	Maximum number of users that can be created in JMap, according to license.
Maximum concurrent desktop sessions	Maximum number of concurrent sessions that can be opened by desktop applications, according to license.
Maximum reserved sessions	Maximum number of reserved sessions, according to license.
Maximum concurrent web sessions	Maximum number of concurrent sessions that can be opened by web applications, according to license.
Maximum concurrent mobile sessions	Maximum number of concurrent sessions that can be opened by mobile applications, according to license.
Maximum projects	Maximum number of projects that can be created in JMap, according to license.
Multiple sessions	Authorization to have multiple concurrent sessions for the same user.
Expiration	Expiration date of the license. Beyond this date, JMap Server will refuse to start. Can be undefined (no expiration).
Licensed products	Lists of JMap modules that are authorized by license.

Exporting and Importing

Exporting and importing JMap configuration

Your JMap Server configuration (spatial data sources, databases, projects, layers, etc.) is stored on a disk in binary format. This configuration is only accessible by JMap Server and is only compatible with your current version (main version, e.g. 6.X). Using the exportation tool, a text version of this configuration can be produced. This exported configuration can then be imported back into JMap Server, with the same settings or different ones, and even in a newer

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

version. Here are a few examples where exporting and importing your configuration can be useful:

- You installed a new version of JMap with major changes and you want to reuse your existing configuration. You can export the configuration from your older JMap version and then import it in the newer version.
- You manage many instances of JMap Server and you need to move a project from one instance to another. You can do a partial export to move only the project you need and then import it in the other instance.
- You need to replicate your development environment to the production environment. You can do a full export from your development server and then import it in the production server.

To access export and import tools, select ***Import / Export*** in the ***JMap Server*** section.

Exporting

When exporting a configuration, you must choose whether you want to export the complete configuration or some specific resources (partial exportation). If you choose to export specific resources, you must select if you want to export databases, spatial data sources, projects or style templates. There is a dependency relationship between these different resources: projects depend on spatial data sources and style templates while spatial data sources may depend on databases. Consequently, if you export a project, spatial data sources, style templates and possibly databases will also be exported.

The exportation process creates up to 4 files: the *.properties* file is the main exportation file and contains the configuration information. All files are necessary for the importation. You can determine the destination directory and file name.

Importing

When importing a configuration, you have the choice to import a complete configuration (complete importation) or only a portion of it (partial importation). You can only do a complete importation if the exportation files contain a complete exportation. **When doing a complete importation, any existing configuration in JMap Server is deleted and replaced by the imported configuration**. When a full importation is completed, you will automatically be sent back to the JMap Admin login page.

When doing a partial importation, there may be situations where the imported resources already exist (identical names). In these cases, you have to tell JMap Admin which action to take: replace the existing resource or create a new one with a different name. Imported data sources are not ready to use and must be updated after the importation.

When importing from version 3.1 (or older) to versions 4.0 or 5.0, the zoom level values must be converted to scale values. There is no way for JMap to calculate a scale that corresponds exactly to a zoom level because the scale depends on the display size. JMap will convert zoom levels into scale values that are valid most of the time. The resulting values may need to be adjusted.

Exporting and importing JMap user data

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

JMap user data includes all data created or modified by users. This includes user preferences, contexts, personal layers, data from editable JMap layers, etc. If you change JMap Server instances and you wish to keep all existing user data, you must export it from the previous server and import it into the new server.

Exporting

When you export user data, you must decide whether to export all data, only the editable layers stored in JMap (including personal layers) or only the workspaces (including contexts, user preferences, etc.).

Importing

When you import user data, there may be situations where imported resources already existed (identical names). In these cases, you must indicate which action JMap Admin must take: replace the existing resource or create a new one under a different name.

JMap Server Settings

These parameters have an impact on the behaviour and performances of a JMap Server system. Press ***Save*** to save all modifications. Click on ***Reload parameters*** to read parameters from configuration files if they have changed. The configuration files are located in JMAP_HOME/conf.

Ports	
Server port	TCP/IP port that JMap Server listens to for requests coming from client applications (direct connections). JMap Server needs to be restarted for the changes to take effect.
Web server port	TCP/IP port that JMap Server embedded web server listens to for HTTP requests. It is used for JMap Admin, for executing various pages (reports, etc.) and for JMapProxy forwarding (proxy connections).
Caching	
Memory size	Size of memory cache. Holds previously requested data to minimize database queries. It helps improve JMap Server performances. Cache statistics can be viewed in JMap Server status section.
Disk size	Size of disk cache. Holds previously requested data to minimize database queries. It helps improve JMap Server performances. Cache statistics can be viewed in JMap Server status section. Unlimited size is recommended.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Ports	
Imaging size	Size of memory cache dedicated to imaging operations. This cache is used by JMap Server when processing image files (raster data sources that read image files). It dramatically helps improve JMap Server performances when working with high volume images.
HTTPS	
Redirect	Automatically redirect JMap Admin users to a secure connection (https). This option is only available if there is a security certificate. The security certificate is created during JMap's installation.
HTTP Proxy	
Host	Host name or address of HTTP proxy server. This is used if JMap Server is behind a firewall and must go through a HTTP proxy to access systems outside of the local network.
Port	TCP/IP port used to connect to the HTTP proxy server.
Username	Username used to connect to the HTTP proxy server.
Password	Password used to connect to the HTTP proxy server.
SMTP (Mail server)	
Host	Host name or address of SMTP server. JMap Server requires an SMTP server to send emails.
Port	TCP/IP port used to connect to SMTP server.
Username	Username used to connect to the SMTP server (if needed).
Password	Password used to connect to the SMTP server (if needed).
Encryption	Select an encryption method if required by the SMTP server.
Test SMTP	Press this button to send an email in order to test the SMTP server's settings.
GeoWebCache	

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Ports	
URL (1-4)	Enter one or more URLs to connect to the GeoWebCache server. Only one URL is necessary, but entering several URLs that point to the same server will optimize the use of this type of server. Configuring settings for GeoWebCache is optional but offers better performance for JMap Web and JMap Mobile applications. Refer to the Using a GeoWebCache Server section for more information.
Username	Name used to connect to the GeoWebCache server.
Password	Password used to connect to the GeoWebCache server.
Loaded parameters	
Database drivers	List of loaded database drivers. New drivers can be added by creating new configuration files in directory JMAP_HOME/conf/db on the server.
Custom spatial data sources	Spatial data sources related to specific applications.
Projections	List of loaded projections. New projections can be added by adding entries in file JMAP_HOME/conf/projections.properties on the server.
Element factories	Map element generation modules related to specific applications.
User managers	List of loaded user manager modules. User managers are used to manage users and groups as well as providing the authentication service used in JMap Server.

Messages

As the administrator, you can send messages to users from JMap Admin. The messages will be displayed in the user interface (JMap Pro applications only). Users who already have an active session will see the messages immediately. Other users will see the message the next time they log on. Messages can be used to inform users of service interruptions, for example. Messages will be displayed each time a user starts a new session, during the validity period of the message.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Sending messages

To create a new message to all users, press ***Create*** from the messages section.

New message to all users	
Subject	A short text describing the subject of the message.
Message	The message itself. Formatting is done using HTML tags. For example, line breaks are done using tags. The message can contain hyperlinks.
Valid from	The date and time from which the message will start to be displayed.
Valid until	The end date and time from which the message will no longer be displayed. After this date and time, the message will disappear from the list.

Deleting messages

To delete a message before it expires, select it in the table and press ***Delete*** .

Log Files

Log files contain a trace of JMap Server activity. Depending on the selected logging level, a different quantity of events is written in the log files. By default, a new log file is created every day but this parameter can be adjusted. By default, log files are located in directory JMAP_HOME/logs. You may need to periodically check the volume of the log files and archive or delete old ones.

Log files can be viewed online and analyzed to determine the number of occurrences of different types of events. A special analysis tool can be used to analyze logins, to know which users connected to JMap Server, how many times, and when.

Log files parameters	
Log level	The maximum level of the messages added to the log files. For example, if WARNING is selected, only messages with a level of WARNING, ERROR or FATAL will be written in the log files.The following log levels are available (listed in decreasing order) : **All**: Every event is written. Use only to solve a problem.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

	Debug: Debug level events are written. Use only to solve a problem. All lower level events are also written. **Info**: Information level events are written. This includes user logins. All lower level events are also written. **Warning**: Warning (non serious) level events are written. All lower level events are also written. **Error**: Error (serious) level events are written. All lower level events are also written. **Fatal**: Only fatal error (very serious) events are written. **Off**: Nothing is written.
Log file directory	Directory where to create the log files. Default is under JMAP_HOME/logs. Make sure there is sufficient disk space to hold log files.
File age limit	The file age limit determines how often new log files are created. The current log file is always called jmap_log. When a new file is created, the current log is renamed to include the date (e.g. jmap_log_2006_05_23.log).
Send messages to console	Determines if events will also be written in JMap Server screen console. This is useful in tests or development but should be turned off in production. Moreover, when JMap Server has no output console (started as a background process or as a service on Windows), this option is useless and consumes computer resources for nothing.

Viewing log files

Log files (and error files) can be viewed directly in JMap Admin. Select only one file from the list and press ***View Log*** . The content of the file is displayed. Note that error files are also listed along with log files. The error files contain only error messages that can sometimes complement the log files to help solve a problem.

Analyzing log files

Log files can be analyzed in order to provide a summary of the activity of JMap Server. For instance, they can inform you of the number server shutdowns, authentication failures, etc. You can analyze many log files at the same time by selecting them in the list.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Analyzing logins

A special analyzing tool can be used to provide information about user logins. This informs you about which users have used JMap, how many times they logged in and when each user last used it.

JMap Server System Data

JMap Server configurations, parameters and system data are stored in different locations. The following sections explain how the information is organized.

JMap Server's System database

JMap Server's System database is a relational database that stores important data for JMap Server. User account and group data is stored in this database if you are using JMap Server's built-in user manager. This is not the case if you are using another user manager (e.g.: LDAP/Active Directory). Also, when spatial data sources read their data from files (SHP, MIF, DWG, etc.), the geometry and descriptive data read from the files are inserted in tables of the System database. There is one data table per such data source, as well as spatial index tables that speed up data extraction. Personal layers created by the users as well as JMap Spatial tables are also stored in the System database.

The relational database management system (RDBMS) used by default for storing JMap Server's System database is Apache Derby. It is embedded in JMap Server and requires no maintenance. This system is suitable for publishing small to medium spatial data volumes or for test environments. For more robust and powerful systems, you should use another relational database management system. See the list of compatible systems below. By default, Derby's database files are located under the directory *JMAP_HOME/db/database* . Never delete or alter any file located in this directory.

Moving the JMap Server System database to another system

JMap Server's System database can be moved to another RDBMS easily. You may want to do it for scalability or performance reasons or to take advantage of more advanced functionalities such as backups. There are 4 other officially supported RDBMS for storing the System database:

RDBMS	Version
MySQL	4.x, 5.x
PostgreSQL	7.2+, 8.x, 9.x
Oracle	8, 9, 10, 11

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

SQLServer	2000, 2005, 2008, 2012

Note that other RDBMS and versions may probably be supported as JMap Server uses mostly very common and simple database features.

To store the System database, you should use a database or schema that is reserved exclusively for JMap. The user that established the connection must have sufficient privileges to select, insert, create and delete tables and indexes.

To move the System database, simply edit the database called *System* in JMap Admin, select another database driver and specify the connection parameters. Note that any old System database tables that could be present will be deleted.

After the System database is moved, any spatial data source that reads vector data files will have a ***Not ready*** status. It will need to be updated before it can be used. Other types of data sources (raster, Oracle Spatial, SDE, etc.) will not be affected.

JMap Server system data files

JMap Server uses a binary file to store its configuration. This includes the definitions of databases, spatial data sources, projects, layers, style templates, etc. Basically, all configurations done using JMap Admin are stored in this file. The configuration file is named ***JMap ServerSystemData.ser*** and located in the *JMAP_HOME/db* directory, as well as a few backup versions of it. Never delete or alter any file located in this directory.

JMap Server configuration files

JMap Server uses text files to store its parameters. These parameters include the TCP/IP ports, SMTP connection parameters, the paths for storing log files, the list of data file readers, the list of projections, etc. Most of these files are *properties* files and are located in the *JMAP_HOME/conf* directory. They normally don't need to be modified manually as most of the important parameters can be modified using JMap Admin.

Backups

If the JMap Server System database was moved to another RDBMS, it must be included in the backup strategy. It contains very sensitive information like personal layers data.

To backup a JMap Server setup, you can include an entire *JMAP_HOME* directory and its subdirectories. More specifically, the directories presented in the following table are the ones that contain the most sensitive information.

Directories

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

conf	Contains all parameter files such as *JMap Server.properties* , *usermanager.properties* , etc.
db	Contains configuration files (projects, layers, etc.) as well as the JMap Server System database, unless it was moved to another RDBMS.
backups	Default directory for storing exportation files.
workspaces	User workspaces contain users' personal parameters and contexts.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Advanced Concepts

Data Caching in JMap

The following diagram shows the flow of vector data from the spatial data source to the JMap Pro application. As you can see, there are 2 levels of caching for the layer data: one on the server and one on the JMap Pro application. Caching is only used for vector data.

Caching on the JMap Pro application

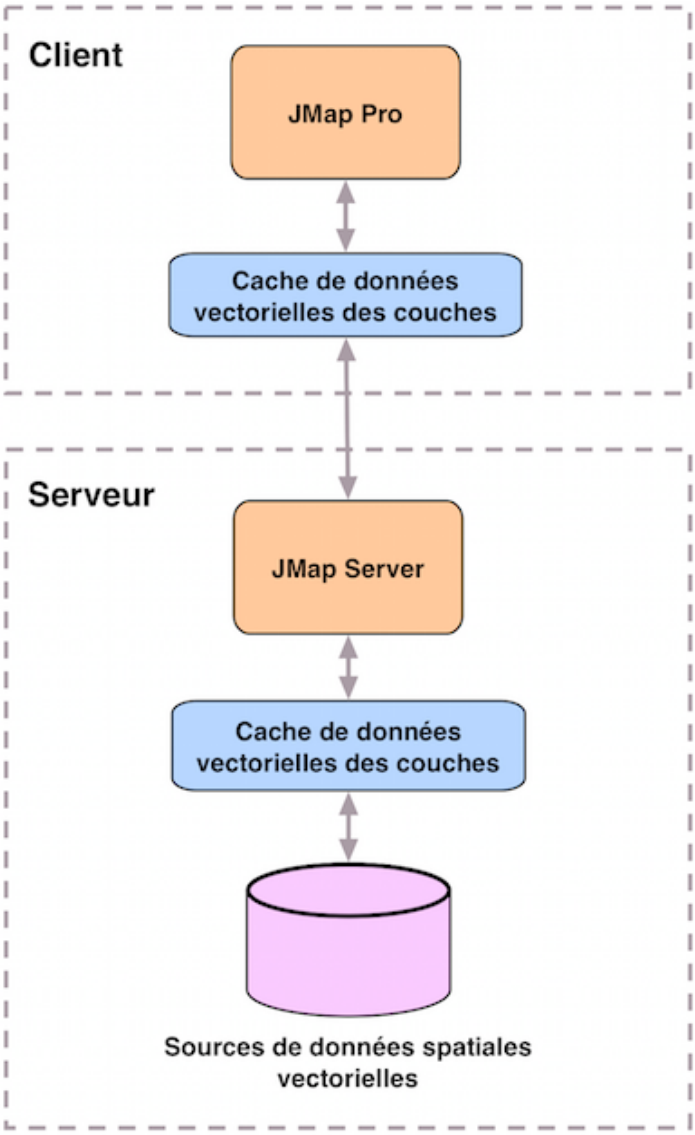
Caching on the JMap Pro application is used to improve performances and to reduce JMap Server workload by using locally stored data instead of requesting it from JMap Server. It is much faster to use local data than to have it transferred on the network. The cached data is stored on the user's hard disk in a directory called *.jmap* located in the user's home directory. Its maximum size is limited to 256 Mb. The cached data is automatically deleted when newer data exists on the server.

Caching on the server

Server caching is used to improve performances by using locally stored data (on the server) instead of requesting it from the spatial data source each time it is needed. Using local data is much faster then extracting it from a data source, especially when the data source is a remote server (Oracle Spatial/Locator, ESRI SDE, PostGIS, WFS, etc.).

The cache on the server is composed of a part using memory and one using the hard disk. They work together. Memory is used first because it is faster, but its size is generally limited. The hard disk is used as a second line but its size is generally much larger. The default cache size values are 64 Mb for memory and unlimited for hard disk. The cached data on the hard disk is stored by default in JMAP_HOME/cache. The cache sizes and location can be modified in JMap Server Settings.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.



Geographic Projections

When displaying maps of the world on a flat surface, a projection is necessary to go from a spherical coordinate system (the Earth) to a rectangular or Cartesian system (the paper map or the computer screen). Several projections are available in JMap Admin. Some projections are adequate for relatively small regions while some are appropriate for displaying very large areas (e.g. continents). For more information, see the definition on Wikipedia.

When you create a spatial data source in JMap Admin, you must inform JMap of the projection in use by the data (if any). If you do so, you will later be able to change the projection used to display your data in JMap (in the project configuration). This is very useful when you need to integrate data sets that use different projections and coordinate systems. If your data is using longitude and latitude values (degrees), it is not projected. In this case, select Longitude/Latitude as the projection choice. If your data is not using a world coordinate

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

system (sometimes called non-Earth), which is typical with CAD files, then select Unknown. You will not be able to change the display projection later on.

Supported projections in JMap are listed in file *JMAP_HOME/conf/projections.properties* . New projection classes can be developed using JMap SDK. If new projection parameters need to be added, this should be done in a file called ***customprojections.properties*** to avoid loosing your changes at the next JMap upgrade.

Resource Pooling

On most systems, the usage pattern of some resources (database connections, network connections, CPU threads) may have a direct impact on performance. In JMap Server, these resources are used very efficiently through a principle called pooling. Pooling is described as follows:

1. A certain number of resource instances are created, initialized at startup and placed in a pool (ex: 3 database connections);
2. When an instance of a resource is needed by the system, the resource is borrowed from the pool and becomes locked (made unavailable) for others;
3. Work is done using the resource (e.g. executing SQL queries);
4. The resource is returned to the pool and is unlocked (made available) for others.

This mechanism is efficient because the resources are shared between different parts of the system, thus reducing their number. Also, initialization only occurs at startup, improving the system's performance (establishing a database connection is time consuming).

In JMap Server, if a pool becomes out of resources (all locked), new resources are initialized automatically (the pool grows) but performance may be impacted. If the demand decreases, the pool will regain its initial size after a certain period of time. This means that choosing an appropriate initial size for each pool is important. You can also specify a maximum size for a pool. When a pool reaches its maximum size, further requests are queued until a pooled resource becomes available again. To help you, some statistics are displayed in JMap Admin about pool usage: current size and peak size.

For database connection pools, an inactivity timeout is needed to automate the closing and reopening of inactive connections, which avoids having the connections terminated by database management systems after a given period of inactivity.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

To Contact Us

By phone

You can contact us during business hours (8:30 AM - 4:30 PM, Monday through Friday) at +1 514.285.1211.

On the web

You can visit our web site for more information about our products or for technical support at www.k2geospatial.com.

By email

Technical support: support@k2geospatial.com

Sales: sales@k2geospatial.com

Our street address is

K2 Geospatial
740 Notre-Dame Street West, suite 1260
Montréal, Quebec (Canada) H3C 3X6

Copyright © 2001-2017 K2 Geospatial. All rights reserved.

Copyright © 2001-2017 K2 Geospatial. All rights reserved.