



MXD2map Documentation

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REQUIREMENTS

The current version of the converter only runs on Windows. This is because the ArcObjects JDK API is not running properly on Linux though. In theory it should also run on Linux.

To run the converter you need at least the following components:

- Sun Java6 SDK to build, JRE to run
- ArcGIS Desktop10.x or ArcEngine10.x with a valid licence enabled
- UMN MapServer with Java MapScript-bindings ($\geq 6.0.1$ or recent development-version)
- Optional: Apache2 Webserver for displaying the resulting Mapfiles
- Optional: MapServer compiled with ArcSDE-plugin
- Optional: GDAL/OGR compiled with ArcSDE-support
- Optional: GDAL/OGR compiled with FileGeodatabase-support
- Optional: Other GDAL/OGR-related tools
- Optional: Sphinx for building the docs

INSTALLATION

3.1 Compile the converter-sources

To compile the sources you need to have a properly configured ant-environment available. ArcGIS SDK provides an ant-installation which suffices:

```
ant jar
```

or:

```
ant jar-norevision
```

3.2 Create run-environment

The current version of MXD2map needs a few steps to run properly. The following steps assume the runtime folder to be `c:/mxd2map/`. This path can be changed.

1. Copy `mxd2map.jar` to `c:/mxd2map/`.
2. Copy folder “conf” from repository to `c:/mxd2map/`
3. Create folder `c:/mxd2map/lib/`
4. Get log4j from <http://logging.apache.org/log4j/1.2/download.html>
5. Get jars <http://jargs.sourceforge.net/> (Version 1.0)
6. Build the libraries and copy the resulting jar-files to `c:/mxd2map/lib/`
7. Copy `mapscript.jar` and `mapscript.dll` to `c:/mxd2map/lib/`
8. Create a folder `c:/mxd2map/logs/`
9. Create or copy a `converter.properties` file to `c:/mxd2map/`

3.3 Setup environment-variables

For running the converter it is necessary to set up some environment variables and adjust the path accordingly.

The following example shows the minimum env-vars needed:

```
@echo off
if "%1" == "setenv" goto setenv

%comspec% /k SDKShell.bat setenv %1
goto exit

:setenv
@echo Setting environment for using the GDAL and MapServer tools.

if "%2"=="hideoci" goto hideoci

set ocipath=0
set _path="%PATH:;=" "%
for %%p in (%_path%) do if not "%%~p"==" " if exist %%~p\oci.dll set ocipath=1

if "%ocipath%"=="0" goto hideoci
@echo WARNING: If you encounter problems with missing oci libraries then type:
@echo   SDKShell hideoci
goto setenv2

:hideoci
@echo Hiding the OCI plugin library.
if not exist %CD%\bin\gdal\plugins-optional mkdir %CD%\bin\gdal\plugins-optional
if exist %CD%\bin\gdal\plugins\ogr_OCI.dll move %CD%\bin\gdal\plugins\ogr_OCI.dll %CD%\bin\gdal\plugins-optional\ogr_OCI.dll
if exist %CD%\bin\gdal\plugins\gdal_GEO.dll move %CD%\bin\gdal\plugins\gdal_GEO.dll %CD%\bin\gdal\plugins-optional\gdal_GEO.dll

:setenv2
SET PATH=C:\Program Files\ArcGIS\DeveloperKit10.0\java\jre\bin;C:\Program Files\ArcGIS\DeveloperKit10.0\bin;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_data;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_plugins;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_python;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_proj;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_curl;C:\Program Files\ArcGIS\DeveloperKit10.0\bin\gdal\bin\gdal_curl\cacert.pem
SET GDAL_DATA=%CD%\bin\gdal-data
SET GDAL_DRIVER_PATH=%CD%\bin\gdal\plugins
SET PYTHONPATH=%CD%\bin\gdal\python\osgeo
SET PROJ_LIB=%CD%\bin\proj\SHARE
SET CURL_CA_BUNDLE=C:\ms4w\Apache\conf\ca-bundle\cacert.pem

:exit
```

The above batch-script `SDKShell.bat` needs to be sources before working with `MXD2map`.

3.4 Install Apache Webserver

If you will be able to display the resulting mapfiles directly you need to install a webserver like Apache2 and the UMN MapServer CGI-file `mapserv.exe`.

Install Apache webserver by executing the .msi-file and follow the install-dialogs:

```
httpd-2.2.19-win32-x86-openssl-0.9.8r.msi
```

Make sure that you install apache as a service so it will be available directly after system bootup.

3.5 Install UMN MapServer

The current documentation uses the Windows binary-builds from <http://www.gisinternals.com/sdk/>

1. Unzip the ZIP-file at `c:/ms_6.1-dev`
2. Configure Apache Webserver to find the cgi-bin-folder:


```
ScriptAlias /cgi-bin/ "C:/ms_6.1-dev/bin/"

<Location "/cgi-bin">
    Options None
    Order allow,deny
    Allow from all
</Location>
```
3. Copy `mapserv.exe` from `c:/ms_6.1-dev/bin/apps/ms` to `c:/ms_6.1-dev/bin/`
4. Add environment-variables to apache in order to have WMS-server available:

```
SetEnv PROJ_LIB "c:/ms_6.1-dev/bin/proj/SHARE"
SetEnv PATH "c:/ms_6.1-dev/bin"
SetEnv PATH "c:/ms_6.1-dev/bin/gdal/python/osgeo"

# set GDAL_DATA environment variable to location of supporting gdal files
SetEnv GDAL_DATA "c:/ms_6.1-dev/bin/gdaldata"

# set GDAL_DRIVER_PATH environment variable for gdal plugins
SetEnv GDAL_DRIVER_PATH "c:/ms_6.1-dev/bin/gdal/plugins"
```

3.6 Configure Logging

Logging is supported on different levels. MXD2map logs with Javas Log4J. A sample configuration could look like this:

```
#### Log just errors and warnings to a file.
log4j.rootLogger=DEBUG, MXD, Console

log4j.appender.MXD=org.apache.log4j.RollingFileAppender
log4j.appender.MXD.File=./logs/console-client.log
log4j.appender.MXD.MaxFileSize=5000KB
```

```
log4j.appender.MXD.MaxBackupIndex=1
log4j.appender.MXD.layout=org.apache.log4j.PatternLayout
log4j.appender.MXD.layout.ConversionPattern=%d [%t] %-5p %c - %m%n

#log4j.rootLogger=WARN, Console
log4j.appender.Console=org.apache.log4j.ConsoleAppender
log4j.appender.Console.Threshold=INFO
log4j.appender.Console.layout=org.apache.log4j.PatternLayout
log4j.appender.Console.layout.ConversionPattern=%d [%t] %-5p %c - %m%n
```

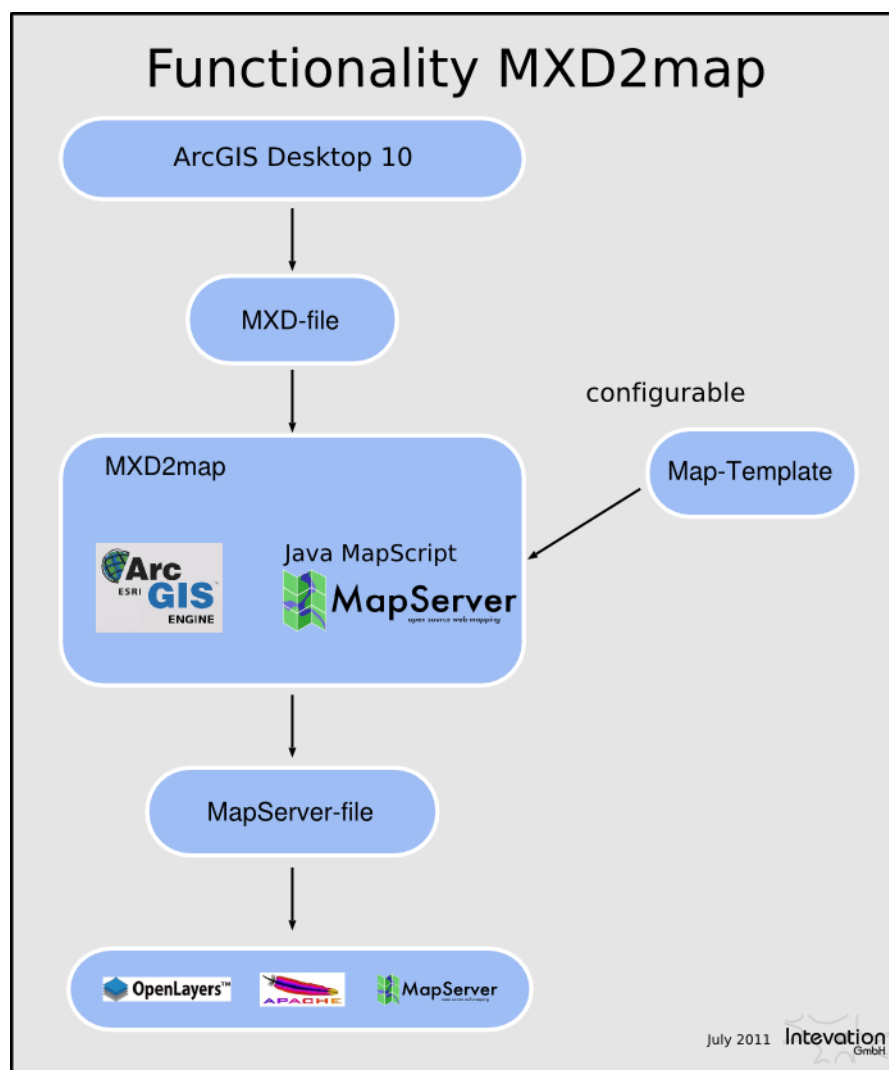
3.6.1 Apache Webserver and UMN MapServer

They both support logging. MapServers output ends up in Apaches logfiles if not configured differently within a providing template. The loglevel can be adjusted at template-level. For further information consult the UMN MapServer manual regarding logging at <http://mapserver.org/optimization/debugging.html#steps-to-enable-mapserver-debugging>.

FUNCTIONALITY

The MXD2map converter works as a commandline tool to transform maps from the proprietary ArcGIS file format “MXD” to a MapServer configuration file.

To transform an ArcGIS mxd file to a MapServer configuration file the mxd file must have a valid and available data source and must not fit the *Restrictions* described in the appropriate section.



4.1 How to use

The converter is started via the commandline running the command:

```
$java -jar mxd2map.jar
```

The converter can be configured in two ways:

1. The `converter.properties` file (see `converter.properties.sample`)
2. via commandline arguments

The `converter.properties.sample` file:

```
# Java properties file for the MXD Converter Tool.
mxd = \\full\\path\\to\\mxd-file
map = \\full\\path\\to\\map-file
map-template = \\full\\path\\to\\mapfile-template
```

Make sure you mask backslashes with an additional backslash.

Both take a parameter for the path to the mxd file, the outputfile and a mapfile template for initial mapfile config. Commandline parameters have a higher priority than the properties file.

The available parameters on the commandline are:

```
-m or --mxd           The mxd file to convert.
-a or --map           The path to the output file. Should end with ".map".
-t or --template      The template to use for an initial mapfile
                      configuration.
```

To have the full functionality for ArcGIS map conversion it is necessary to have the ESRI fonts available. ArcGIS products install these fonts to the default windows font folder `c:\\windows\\fonts`. To make them available for the converter there has to be a MapServer font set (see <http://mapserver.org/mapfile/fontset.html>).

The MXD2map converter comes with an initial fontset containing all relevant ESRI fonts and the free font FreeSans. The font set file named `fonts.txt` can be edited and further fonts can be added. To use a font set, the file needs to be referenced in the MapServer template otherwise the converter can not create character symbols and will show up errors in the conversion process.

The converter uses a separate symbol file to provide symbol sets to the template to have initial symbols available. If no symbol file is referenced a new one is created by the converter if necessary. The resulting symbol set is written to the same directory as the output mapfile named `[mapfile-name]-symbols.sym`.

4.2 Features

MXD2map is optimized to work best with MapServer 6.x. Therefore the new MapServer features (symbolhandling, styling etc) are built in.

MXD2map currently supports the following features:

- Datasources:
 - ArcSDE vector database connections (requires MapServer built against ArcSDE, Client-dlls needed)
 - ESRI-Shapefiles
- Symbols:
 - Simple marker symbols
 - Character marker symbols
 - Arrow marker symbols
 - Picture marker symbols (also transparency is supported if set in MXD)
 - Symbols based on TTF-characters of special cartographic fonts
 - Any combination of character marker symbols
 - Linesymbols with pattern and cartographic attributes
 - Polygons filled with solid color and outline
 - Polygons filled with a hatch and hatched outline
- Layer types:
 - Featurelayer (vectors) as POINT, LINESTRING and POLYGON
 - Classifications with unique values
 - Classifications with class breaks
 - Group-members are concatenated to group.layername. This ensures having discrete layernames
 - ArcGIS-layergroups are represented as WMS Named layers, which are WMS-layers without a title (so not requestable through GetMap)
 - all definition-queries for filtering the data on Layer- and classification-level
- Further map attributes:
 - Projections and units based on the EPSG-table (if set in MXD)
 - Min/max scale denominations at layer and label-level
 - Global Map extent
 - Layer extent and SRS
 - Simple labeling
 - Filter and expressions
 - ArcSDE Jointables
 - Mapfile-Templating for OGC-related stuff

- Simple Labeling-syntax (a subset of ArcGISs VBScript-labels)
- Other features
 - Umlauts are translated into its equivalents within LAYER-names, CLASS-names and also mapfile-names. Though it is good standard not to use them since they mostly cause problems when using them within OWS-related services.
 - Creation of distinct layer-names by concatenating group- and layernames to WMS-titles. This comes handy mostly in ArcGIS layergroups.

RESTRICTIONS

Currently there are some restrictions in the usage of the converter. One of the main restrictions is the fact that the converter currently only runs on Windows. This is due to the fact that the needed ArcEngine did never reliably work on Linux. This was tested with ArcEngine 10.0.

Supported datasources:

- ArcSDE-passwords cannot be read since they are encrypted. The converter exports the string <PASSWORD> which needs to be replaced later on in the resulting mapfile.
- Since MapServer cannot use a FileGeodatabase datasources (yet) the MXD2map does not support this datasource and will not transform the MXD-file at all. This may change in the near future.
- Raster data is not supported by the converter yet, though ArcSDE Raster-support will be available in the near future.

Symbol support:

- Line symbols with pattern cannot be combined with marker symbols. The converter reads all symbols and writes the corresponding styles to the resulting mapfile but the marker symbols are rendered without any gap. The resulting mapimage may not look as intended.

Hint: Workarround: For small marker symbols it is recommended to use a line symbol in combination with pattern (in ArcGIS called template) to create the symbology. The reason why marker symbols cannot be used in combination with a template is the difficulty to interpret the read attributes like marks and gaps and write the appropriate symbols with the appropriate gap to the mapfile.

- The converter sets the width to 1 for line symbols that have a width smaller than 1.
-

Tip: To avoid lines and line colors (specially outlines) to be handled by the converter, use integer numbers for line width only.

- In ArcGIS maps default symbols can be defined as fallback within classifications. Since MapServer does not support such fallback symbols or styles within classifications the converter does not read these default symbols.

- In ArcGIS predefined symbols like bars or pie charts can be used to display values. The converter does not support these symbols yet.

Layer support:

- Expressions for label are parsed by an internal parser in ArcGIS. The interpretation of this expressions is very limited though. Therefore label expressions may not contain any special functions or must fit the mapserver expression design pattern.

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