

OpenJUMP Printer Extension User Guide

Version 1.62

By

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Introduction

This extension adds printing capabilities to OpenJUMP. It is targeted at users who would like to print a copy of their map displays directly from the OpenJUMP Workbench.

The capabilities include:

- To print a map at a nominated scale on one or more sheets of paper.
- To save the printer image as an image file in JPG, PNG, SVG or PDF formats.
- A preview window that shows the current map display with superimposed printer page boundaries.
- A printer setup option to set printed page properties.
- A full page option to scale the map to be printed in a single page.
- Options to add furniture items to the printed map, including a title, scale, north symbol, map legend, layer legend, border and a multi-line text note.
- The capability to re-position the map drawing on the printed page(s).
- Zoom and pan facilities.
- Internationalization capabilities.
- From version 1.53:
 - Most furniture items can be scaled. There is a size field in the appropriate dialog which accepts a number between 0.1 and 10.0. This scale factor is applied to the furniture item when displayed and printed.
 - Each project can have multiple printer configuration files that can be user created and selected.

This plugin requires JRE 1.5 or later.

Installation

The java archive file JumpPrinter.jar should be copied into the lib\ext folder of the OpenJUMP installation folder. The extension will then be loaded next time OpenJUMP is started.

A <Printing> option should appear in the <File> menu. This will be enabled once a Project containing at least one layer has been created, or loaded.

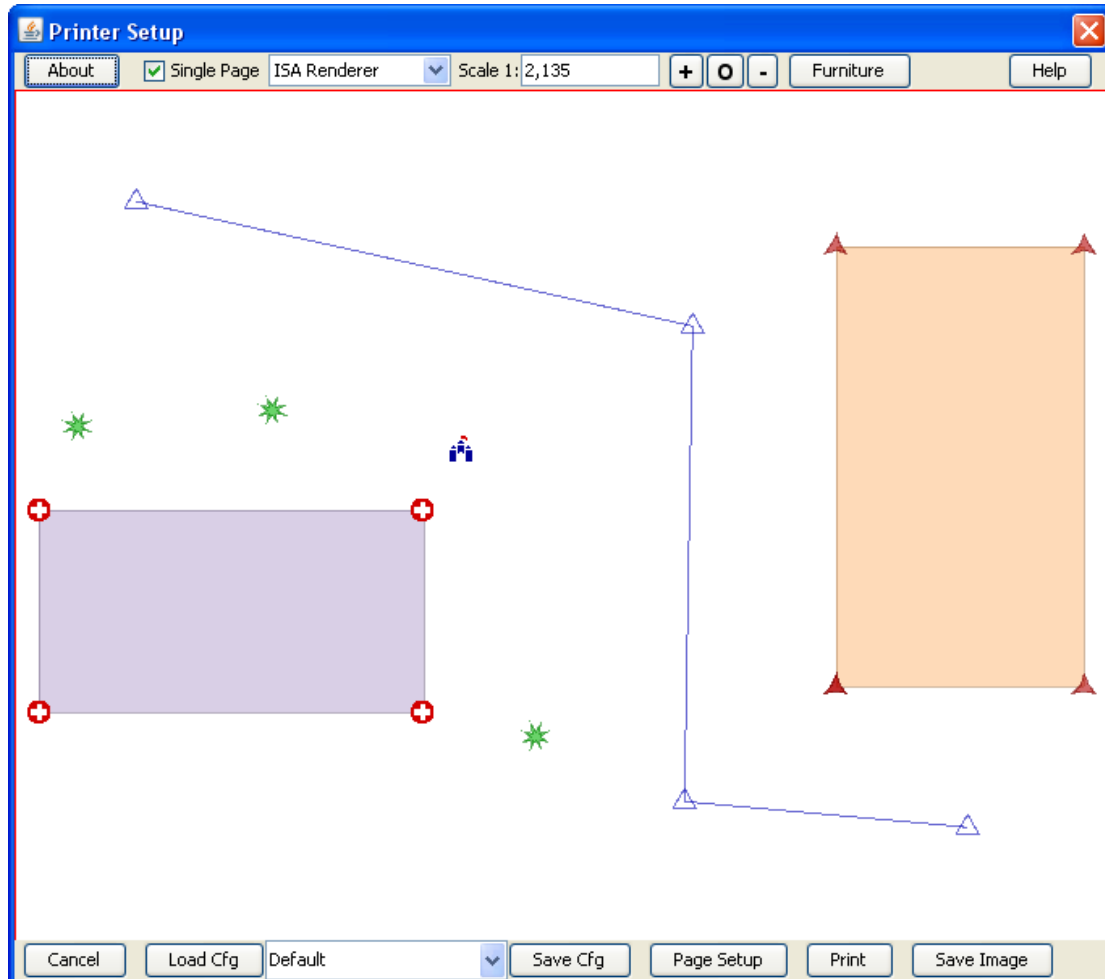
The following associated libraries must also be installed:

1. iText: from <http://sourceforge.net/projects/itext/>
2. Batik: from <http://xmlgraphics.apache.org/batik/>

Operating Instructions

To prepare a drawing for printing:

1. Selected the required layers, then zoom and pan to show the required map region to be printed.
2. Select the <Printing> option in the <File> menu.



3. The Printer Setup window will appear showing the map region. This window can be resized to show a greater area for printing.
4. The current page boundaries are shown as red lines.
5. The <Page Setup> button will show a standard Java PageFormat dialog where paper size, orientation and margins can be set. On <OK> the page boundaries will be adjusted to match.
6. The <Single Page> checkbox will force the scaling to fit the map drawing onto a single sheet of paper at the currently set paper orientation. If a border is displayed the scale of the map will be adjusted to fit the border onto the single sheet of paper. If items of furniture exist outside the single page and the border placed to enclose them. They will remain there until moved by the user.
7. The <Print Quality> combo sets the optional print quality (see below).

8. The <Scale> field is used to define a required drawing scale. To change the scale, enter the required value, then the <Enter> key. The page boundaries will be then adjusted.
9. The zoom buttons are used to change the size of the visible paper area:
 - a. + means zoom in (by about 20% for each button click)
 - b. **○** means zoom to 100%, i.e. the same map size as in the main view panel.
 - c. - means zoom out (by about 20% for each button click)
10. The visible paper area can also be panned using a <Shift Left Click Drag> of the mouse. Using the Zoom 100% button (<○>) returns the view to the top left of the print preview.
11. The <Furniture> button shows the Furniture dialog that is used to define various types of “furniture” on the map, including
 - a. A title - as a single line of text with text formatting and font selection.
 - b. A scale – as a scale bar, with options to set the scale range and interval.
 - c. A border – to be drawn around the map, with thickness option and option to have border adjust to contain maps and furniture or be fixed.
 - d. A North symbol – from a choice of three, with an orientation option.
 - e. A note – as a multi-line block of text with text formatting, justification and font selection.
 - f. A legend – showing symbols for visible layers, with user selection.
12. A given printer configuration can be saved using the <Save Cfg> button, as an XML file with a name like “*projectname_PrinterProperties_name.xml*” in the same folder as the project file. Initially there is a default properties file with a name like “*projectname_PrinterProperties.xml*”. To create a named configuration file, type the name into the combobox on the left of the <Save Cfg> button, then type <Enter>. The name will then appear in the combobox list. Then click the <Save Cfg> button to save it.
13. A previously saved configuration file can be loaded using the <Load Cfg> button. First select the required configuration from the combobox, then click the <LoadCfg> button. In this case, a PageFormat dialog will display to confirm the page format properties (may be avoided in Java 1.6), then the new printer configuration will be applied (including furniture).
14. To delete a previously saved configuration file, select it in the combobox, then delete it with <Backspace> or <Delete>, then hit <Enter>. The name will be removed from the list in the combobox and the named configuration file deleted when the delete is confirmed.
15. Once the preview is ready the <Print> button will send the drawing to a nominated printer.
16. The <Save Image> button will save the print image as an image file, in either JPEG, PNG , SVG or PDF formats.

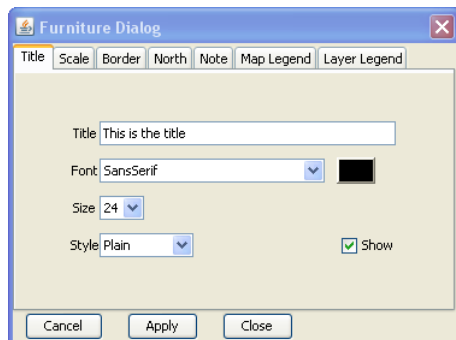
For images (JPEG, PNG and SVG) the size of the image will be the same number of pixels as would have been required to print it on paper at the set scale. For example, an A4 page is about 450 x700 pixels in portrait orientation. To produce a higher resolution image, then adjust the paper scale to a smaller value.

For PDFs, the image will be constructed on a single page of a size sufficient to contain the complete image on paper at the correct scale. When printing, this image may be scaled (Adobe Acrobat Reader allows this) to fit on an available paper size, or printed without scaling when the available paper is larger than the PDF image.

Note that to create SVG images the Batik libraries must be available and to produce PDF images the iText libraries are required.

Furniture

The Furniture dialog appears like this:



with a tab for each type of furniture. Each furniture item can be displayed or not displayed with the <Show> checkbox. Other fields provide various options for each of the displayed item. The font sizes specified in the Furniture Dialog tabs refer to the printed sizes, i.e. how they appear on paper. The colored button shows the current color for the item, clicking this button will offer a Color Chooser dialog to change the color.

When a furniture item is displayed, either by using the <Apply> button, or the <Close> button, the item appears in the Printer Setup widow, with a blue coloured bounding box.

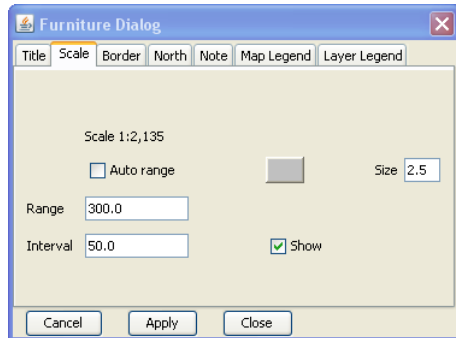
The size of each furniture item is set to appear “reasonable” on the printed page. Each furniture item can be sized to suit individual needs, depending on the type of item:

- When the size of the furniture item is largely determined by its font size then this is user selectable.
- In other cases a size ratio is available to be set. The default value is 1.0, and this can be set in the range 0.1 to 10.0

The **Title** type item is shown above. The font name, style and size can be selected, as well as its color.

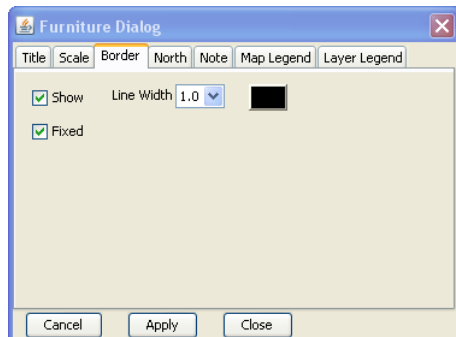
The other furniture options are as follows:

The **Scale** item is used to display a scale on the drawing. The auto range option estimates a reasonable range for the scale, and a set of intervals. The range is the length of the scale in world units, and the interval the length of the scale divisions in world units. This may not be optimal in all cases, so a specific range and interval can be set by un-checking the Auto scale checkbox.

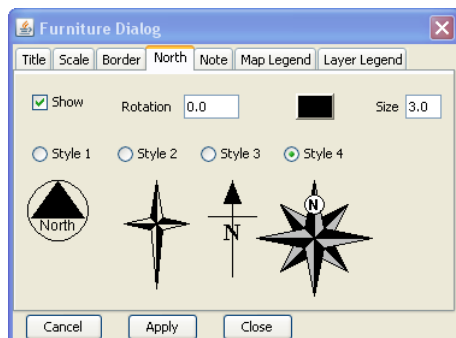


The Size field specified a scale ratio to be applied to the height of the scale panel and the font used. Should only be used when in manual range mode so that the length of the scale panel can also be specified.

The border type item allows the width of the border line, and its color to be set as follows. A non-fixed border will automatically adjust to enclose the map part of the drawing. A fixed border is sized by the user by dragging the re-size handles (top-left and bottom-right).



The North item provides an option to include a North symbol, a choice of four is available. The rotation value sets its rotation (in degrees) from the Y-axis, +ve being clockwise.



The Size field specifies a scale ratio to be applied to the size of the North symbol.

The note item places one or more blocks of text on the drawing. The font name, style and size can be selected as well as its color. The text blocks can also be shaded with a color background by activating the “Shade” option and choosing the color.

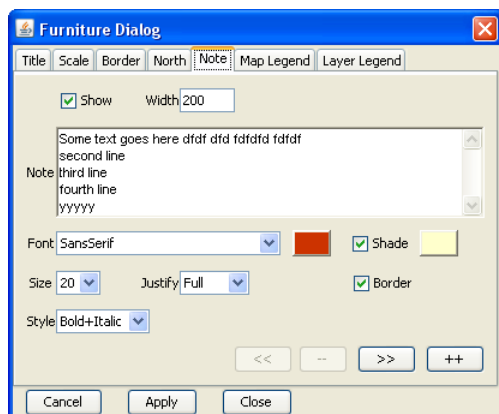
The justification can be left, center, right or full. The note can contain several lines of text. When entering text, the lines auto-wrap, and a <new line> is defined by using the <enter> key.

The justification options work like this:

1. Left: displays each line, aligned on the left.
2. Centre: displays each line, aligned centrally.
3. Right: displays each line, aligned on the right.
4. Full: splits each line over one or more lines with the word spacing adjusted so that both left and right ends of the text align within the specified width (specified in the *Width* field).

When borders or shading is enabled, the width of the border/shaded area is taken from the *Width* field. For *Full* justification the border/shading and the text fit exactly. For Left, Centre or Right justifications, the border/shading is set to the specified *Width*. If the actual text width is greater than *Width*, then the text will flow outside the border/shaded area – but it is a simple matter to adjust the *Width* to suit. This option provides the capability to have fixed-width borders/shaded areas for a number of notes.

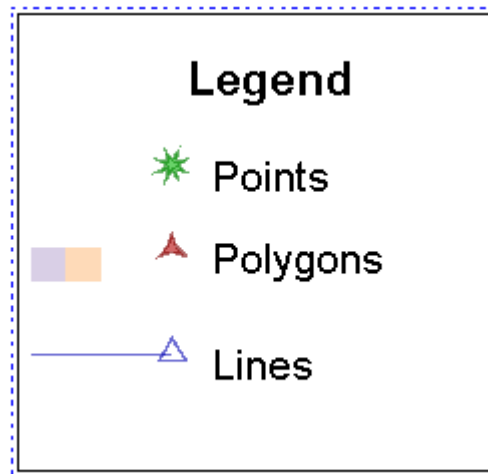
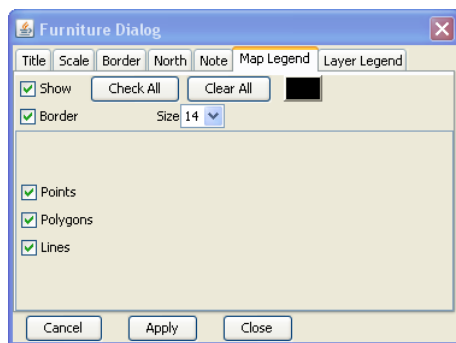
The Width field is a measure in screen pixels.



To add new notes use the ++ button; to view the previous note use the << button; to view the next note use the >> button; to delete a note use the – button. Any number of notes can be added, each with their own properties.

Two types of legend are now available to be added to the printed map. The standard **map legend** allows the user to include legend items for each visible layer in the map. The layer legend can be used to show a legend for selected layers that use a theming style to show shading according to a selected attribute value range.

A **map legend** can be added with the Legend item option. Each of the currently visible layers are displayed (by name), those checked will appear in the legend. An optional border can also be displayed and the color selected.



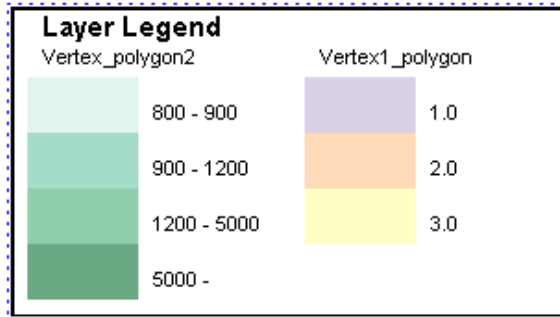
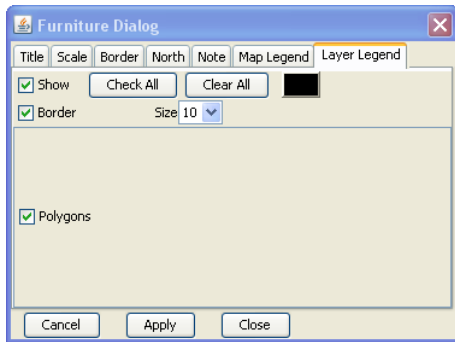
Some features of the Map Legend type furniture items are:

- Only visible layers are shown; visibility must be set on the main map window.
- The user can choose to not include some layers in the legend.
- The legend names match the layer names. Layer names should not include commas (they will be removed for the legend if present).
- If a layer has lines and fill enabled, then a patch of color and a line are shown.
- If a layer only has a line shown, then only the line is displayed in the legend, also if the layer only has fill shown then only the color patch is displayed.
- Line styles match
- Fill patterns match
- Where a layer uses theming, up to four blocks of color matching the first four theme levels are displayed (no line).
- When vertices are enabled on polygons, lines or points, they will also be displayed in the legend. Note that if the Cadplan VertexSymbols plugin is installed, then those symbols will be displayed.

Note that if new layers are added (or made visible) after saving a printer configuration, then they will not be shown checked in the legend when the configuration is loaded.

The Size field specifies the font size to be used in the Legend.

A **layer legend** can be added for each layer that has color theming enabled. The layer legend dialog behaves in much the same way as the map legend panel. Only visible layers that have theming enabled are displayed.

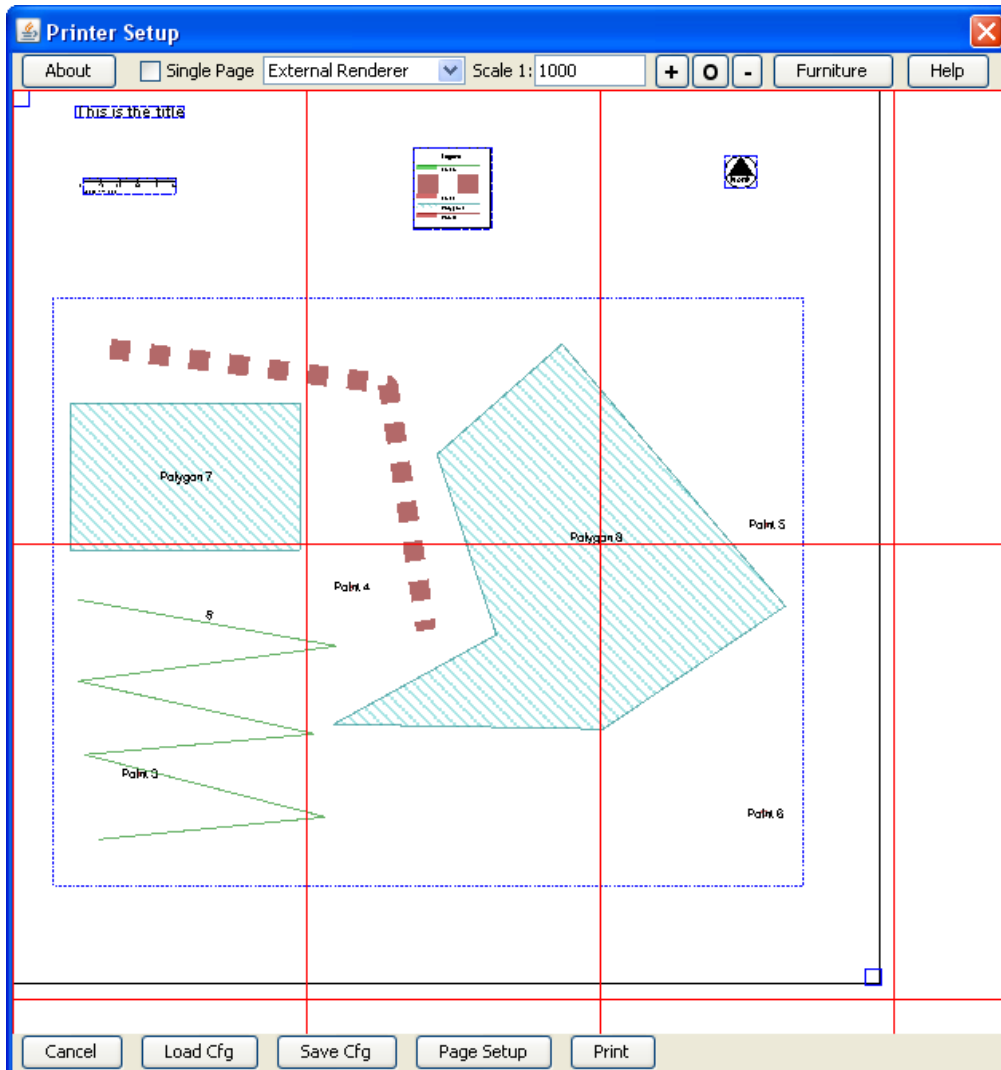


The layer legend is composed on one or more columns, each corresponding to a selected layer. The values displayed are those set in the Label column of the OJ Change Styles dialog. It may generally be useful to set these labels to appropriate values (especially if computed attribute values are used) to limit the number of decimal places to be displayed.

The Size field specified the font size to be used in the layer Legend.

Previewing the Drawing

The following image shows a sample drawing with all furniture items made visible.



Each item can be moved around by clicking (inside its respective bounding box) and dragging. The Furniture dialog can be left open while manipulating the furniture items. The color of each furniture item is set to black (default) but can be changed by the user selecting the Color button in the appropriate Furniture Dialog tab pane.

If a border is displayed (auto adjust mode, i.e. not fixed), then the border will adjust to contain the map and items of furniture as they are moved. In fixed mode, the border can be dragged to a fixed position using either/both of the small drag boxes at the bottom-right or top left of the border.

The map drawing initially is located in the top-left of the preview window. This part of the drawing is also shown with a blue bounding box. Clicking with the mouse (left button) inside this box (and not inside a furniture item), then dragging the mouse allows the map drawing to be moved around on top of the sheet(s) of paper. The map drawing can thus be positioned to suit the user's needs. The Printer Setup window can also be re-sized as required by dragging its edges.

Print Quality Options

There are three modes for printing. The first of these (the Quality and Accurate options) did not produce the best quality results. The new ISA Renderer has been developed with the assistance of Larry Becker and appears to produce good results, much the same as the External Renderer (this option may not appear in future releases), except for some line decorations:

1. *ISA Renderer*: This option has been introduced from Vers 1.49. It uses the internal renderer and appears to correctly scale lines and pattern and produces a good quality print.
2. *Core Renderer*: this is the old Quality Option, but it does not always produce a good result, especially when maps are scaled over several sheets of paper, or onto large paper sizes.
3. *External Renderer*: The graphics (lines and text and patterns) are scaled to their natural size regardless of the size of the printed page. The resolution is only limited by the printer resolution. This renderer produces better results for some line decorations that are poorly rendered by the core renderer.

Internationalization

Internationalization properties are defined in the relevant properties file included in the language folder or the jar file. English and German files are included (defined by “en” and “de” labels in the file name). Others may be added in the future.

If your locale settings are not built-in then English will be used as the fall back.

Known Issues

Scaling of maps

For this version there are two scaling options as indicated above. It may be that it is possible to offer the highest resolution for lines and text while maintaining the correct absolute size.

For the “quality” option for printing the scaling is done by transforming the screen graphics to match the required printed scale. This means that the printed image will have line thicknesses and font sizes also scaled to match the required printed scale. This approach is not ideal, but it does produce high resolution text and lines. To minimize the effects of scaling, the idea is to have the screen size of the map as close as possible, or as large as possible for printing on large paper sizes, to the required printed size.

For the “accurate” for printing the scaling is done by creating a new graphics context that has been re-sized to match the required paper scale. In this case text and lines appear to be interpolated into the new panel dimensions, thus their edges can be ragged and require anti-aliasing. The text and line sizes are however correctly sized. Raster images (at least those produced using the Pirol raster image plugin) are not scaled correctly.

The external renderer uses a renderer provided in the Printer Extension and does not use the core OpenJUMP renderer. This mode is experimental for the purpose of increasing the quality of the printed image, especially on large sheets of paper. The final resolution is only dependent on that of the printer.

External Renderer

The external renderer is provided as a work around until the OJ core renderer is able to produce printed output at the resolution of the printer. As it stands there are some variations from the core renderer capabilities.

Label sizes are reduced to 2/3 of the screen size – this appears to be better on paper, Also, the positioning of labels and the size of decorations may vary from that defined in the core renderer. The differences are partially due to simplifications in the external renderer and partially due to other assumptions being made, in particular:

- Labels on points are always located at the point, i.e. the start of the label is at the point. Label Height and Angle attributes are implemented.
- Labels on lines can be above, on or below the line and the Height attribute is implemented, but Angle attribute is not implemented.
- When a single line is clipped into multiple line segments in the view window, a label is placed on each line segment.
- Polygon labels do not have the Angle attribute enabled.
- When a polygon is clipped into multiple part polygons in the view window a label is placed in each part polygon.
- All decorations can be placed at the start or end of a line (or polygon boundary).
- Decorations are all scaled to match line widths.
- When a line is clipped into multiple line segments in the view window, decorations are placed on each visible segment.
- Pirol raster images are supported.

A number of new line decorations have been introduced in version 1.1 of OpenJUMP. These options are now supported in this extension. The extension is still compatible with OpenJUMP version 1.0.1 (the current stable release).

The external renderer can require larger amounts of memory and may take a longer time than the other two options. There are no optimizations for parts of the image off the page.

Repositioning of Furniture

If the drawing scale of a map, or a visible section of a map, changes after the positioning of furniture then the furniture may need to be re-positioned. In some cases the old positions may be off the current preview screen. To make them visible, so that they can be dragged into a new position, it may be necessary to change the drawing scale (temporally) to a smaller value so that the furniture items become visible, or to zoom out to a sufficient extent is visible. Then, drag them back towards the top-left of the window. Reset the scale, and then position the furniture items as required.

Warning Messages

A warning message “*method getBounds() not yet implemented*” is displayed when printing using the “quality” option. The source of this warning is in the `getBounds()` method of the `PolygonShape` (from within the Jump Workbench):

```
java.lang.UnsupportedOperationException: Method getBounds() not yet implemented.at  
com.vivid solutions.jump.workbench.ui.renderer.java2D.PolygonShape.getBounds(PolygonShape.java:79)
```

though it does not appear to (generally) affect the printed results. There are some effects if the map only has polygon shapes in a single layer. Providing the map has at least two layers with one layer containing lines or points, then the bounds appear to be evaluated sufficiently well to display all the drawing when printed. If not, then parts of the printed image are sometimes missing.

Restoring PageFormat

The current page format is saved in the printer configuration file, and is restored (?) on loading the configuration. There are sometimes problems with the margins not being restored correctly. For the moment, if this occurs, the margins should be manually corrected. Note that there will always be small differences between set and actual margin sizes.

Note also that if the default system printer is changed after the configuration is saved, the page format may not be correct on restore, especially if the available paper sizes are different for the new default printer.

Tasks to be done

The following are ideas for future developments:

1. Correct scaling to maintain font sizes and line thicknesses on printed page with the highest quality resolution.
2. Correct scaling of raster image layers in the “accurate” mode.
3. Other furniture items?

Feedback

Please send comments and thoughts to the OpenJUMP developer’s mailing list.

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