

# Running Apache FOP

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## 1. System Requirements

The following software must be installed:

- Java 1.3.x or later Runtime Environment.
- Apache FOP. The [FOP distribution](#) includes all libraries that you will need to run a basic FOP installation. These can be found in the [fop-root]/lib directory. These libraries include the following:
  - A JAXP-compatible XML Parser (FOP comes with [Apache Xerces-J](#)).
  - A JAXP-compatible XSLT Processor (FOP comes with [Apache Xalan-J](#)).
  - [Apache Batik](#), an SVG library.
  - [Apache Jakarta Commons Logging](#), a logger abstraction kit.
  - [Apache Jakarta Commons IO](#), a library with I/O utilities.
  - [Apache Excalibur/Avalon Framework](#), for XML configuration handling.

The following software is optional, depending on your needs:

- Graphics libraries. Support for some graphics formats requires additional packages. See [FOP: Graphics Formats](#) for details.
- PDF encryption. See [FOP: PDF Encryption](#) for details.

In addition, the following system requirements apply:

- If you will be using FOP to process SVG, you must do so in a graphical environment. See [FOP: Graphics \(Batik\)](#) for details.

## 2. Installation

### 2.1. Instructions

Basic FOP installation consists of first unzipping the .gz file that is the distribution medium, then unarchiving the resulting .tar file in a directory/folder that is convenient on your system. Please consult your operating system documentation or Zip application software documentation for instructions specific to your site.

### 2.2. Problems

Some Mac OSX users have experienced filename truncation problems using Stuffit to unzip and unarchive their distribution media. This is a legacy of older Mac operating systems, which had a

31-character pathname limit. Several Mac OSX users have recommended that Mac OSX users use the shell command `tar -xzf` instead.

## 3. Starting FOP as a Standalone Application

### 3.1. Using the fop script or batch file

The usual and recommended practice for starting FOP from the command line is to run the batch file `fop.bat` (Windows) or the shell script `fop` (Unix/Linux). These scripts require that the environment variable `JAVA_HOME` be set to a path pointing to the appropriate Java installation on your system. Macintosh OSX includes a Java environment as part of its distribution. We are told by Mac OSX users that the path to use in this case is `/Library/Java/Home`. **Caveat:** We suspect that, as Apple releases new Java environments and as FOP upgrades the minimum Java requirements, the two will inevitably not match on some systems. Please see [Java on Mac OSX FAQ](#) for information as it becomes available.

```
USAGE
Fop [options] [-fo|-xml] infile [-xsl file]
[-awt|-pdf|-mif|-rtf|-tiff|-png|-pcl|-ps|-txt|-at [mime]|-print] <outfile>
[OPTIONS]
  -d                      debug mode
  -x                      dump configuration settings
  -q                      quiet mode
  -c cfg.xml              use additional configuration file cfg.xml
  -l lang                 the language to use for user information
  -r                      relaxed/less strict validation (where available)
  -dpi xxx                target resolution in dots per inch (dpi) where xxx is a
number
  -s                      for area tree XML, down to block areas only
  -v                      to show FOP version being used

  -o [password]           PDF file will be encrypted with option owner password
  -u [password]           PDF file will be encrypted with option user password
  -noprint                PDF file will be encrypted without printing permission
  -nocopy                 PDF file will be encrypted without copy content permission
  -noedit                 PDF file will be encrypted without edit content permission
  -noannotations          PDF file will be encrypted without edit annotation
permission
  -pdfprofile prof        PDF file will be generated with the specified profile
                        (Examples for prof: PDF/A-1b or PDF/X-3:2003)

[INPUT]
  infile                  xsl:fo input file (the same as the next)
  -fo infile              xsl:fo input file
  -xml infile             xml input file, must be used together with -xsl
  -atin infile            area tree input file
```

```

-xsl stylesheet    xslt stylesheet

-param name value <value> to use for parameter <name> in xslt stylesheet
                  (repeat '-param name value' for each parameter)

[OUTPUT]
outfile           input will be rendered as PDF into outfile
-pdf outfile      input will be rendered as PDF (outfile req'd)
-pdfalb outfile   input will be rendered as PDF/A-1b compliant PDF
                  (outfile req'd, same as "-pdf outfile -pdfprofile
PDF/A-1b")
-awt              input will be displayed on screen
-rtf outfile      input will be rendered as RTF (outfile req'd)
-pcl outfile      input will be rendered as PCL (outfile req'd)
-ps outfile       input will be rendered as PostScript (outfile req'd)
-afp outfile      input will be rendered as AFP (outfile req'd)
-tiff outfile     input will be rendered as TIFF (outfile req'd)
-png outfile      input will be rendered as PNG (outfile req'd)
-txt outfile      input will be rendered as plain text (outfile req'd)
-at [mime] out    representation of area tree as XML (outfile req'd)
                  specify optional mime output to allow AT to be converted
                  to final format later
-print            input file will be rendered and sent to the printer
                  see options with "-print help"
-out mime outfile input will be rendered using the given MIME type
                  (outfile req'd) Example: "-out application/pdf D:\out.pdf"
                  (Tip: "-out list" prints the list of supported MIME types)
-mif outfile      input will be rendered as MIF (FrameMaker) (outfile req'd)
                  Experimental feature - requires additional
fop-sandbox.jar.
-svg outfile      input will be rendered as an SVG slides file (outfile
req'd)
                  Experimental feature - requires additional
fop-sandbox.jar.
-foout outfile    input will only be XSL transformed. The intermediate
                  XSL-FO file is saved and no rendering is performed.
                  (Only available if you use -xml and -xsl parameters)

[Examples]
Fop foo.fo foo.pdf
Fop -fo foo.fo -pdf foo.pdf (does the same as the previous line)
Fop -xml foo.xml -xsl foo.xsl -pdf foo.pdf
Fop -xml foo.xml -xsl foo.xsl -foout foo.fo
Fop foo.fo -mif foo.mif
Fop foo.fo -rtf foo.rtf
Fop foo.fo -print or Fop -print foo.fo
Fop foo.fo -awt

```

PDF encryption is only available if FOP was compiled with encryption support **and** if compatible encryption support is available at run time. Currently, only the JCE is supported. Check the [Details](#).

### 3.2. Writing your own script

FOP's entry point for your own scripts is the class `org.apache.fop.cli.Main`. The general pattern for the command line is: `java -classpath <CLASSPATH> org.apache.fop.cli.Main <arguments>`. The arguments consist of the options and infile and outfile specifications as shown above for the standard scripts. You may wish to review the standard scripts to make sure that you get your environment properly configured.

### 3.3. Running with java's -jar option

As an alternative to the start scripts you can run `java -jar path/to/build/fop.jar <arguments>`, relying on FOP to build the classpath for running FOP dynamically, see [below](#). If you use hyphenation, you must put `fop-hyph.jar` in the `lib` directory.

You can also run `java -jar path/to/fop.jar <arguments>`, relying on the `Class-Path` entry in the manifest file. This works if you put `fop.jar` and all jar files from the `lib` directory in a single directory. If you use hyphenation, you must also put `fop-hyph.jar` in that directory.

In both cases the arguments consist of the options and infile and outfile specifications as shown above for the standard scripts.

### 3.4. FOP's dynamical classpath construction

If FOP is started without a proper classpath, it tries to add its dependencies dynamically. FOP uses the current working directory as the base directory for its search. If the base directory is called `build`, then its parent directory becomes the base directory.

FOP expects to find `fop.jar` in the `build` subdirectory of the base directory, and adds it to the classpath. Subsequently FOP adds all jar files in the `lib` directory to the classpath. The `lib` directory is either the `lib` subdirectory of the base directory, or, if that does not exist, the base directory itself.

If the system property `fop.optional.lib` contains the name of a directory, then all jar files in that directory are also added to the classpath. See the methods `getJARList` and `checkDependencies` in `org.apache.fop.cli.Main`.

## 4. Using Xalan to Check XSL-FO Input

FOP sessions that use `-xml` and `-xsl` input instead of `-fo` input are actually controlling two distinct

conversions: Transforming XML to XSL-FO, then formatting the XSL-FO to PDF (or another FOP output format). Although FOP controls both of these processes, the first is included merely as a convenience and for performance reasons. Only the second is part of FOP's core processing. If a user has a problem running FOP, it is important to determine which of these two processes is causing the problem. If the problem is in the first process, the user's stylesheet is likely the cause. The FOP development team does not have resources to help with stylesheet issues, although we have included links to some useful [Specifications](#) and [Books/Articles](#). If the problem is in the second process, FOP may have a bug or an unimplemented feature that does require attention from the FOP development team.

**Note:**

The user is always responsible to provide correct XSL-FO code to FOP.

In the case of using `-xml` and `-xsl` input, although the user is responsible for the XSL-FO code that is FOP's input, it is not visible to the user. To make the intermediate FO file visible, the FOP distribution includes the `"-foout"` option which causes FOP to run only the first (transformation) step, and write the results to a file. (See also the Xalan command-line below)

**Note:**

When asking for help on the FOP mailing lists, *never* attach XML and XSL to illustrate the issue. Always run the XSLT step (`-foout`) and send the resulting XSL-FO file instead. Of course, be sure that the XSL-FO file is correct before sending it.

The `-foout` option works the same way as if you would call the [Xalan command-line](#):

```
java org.apache.xalan.xslt.Process -IN xmlfile -XSL file -OUT
outfile
```

Note that there are some subtle differences between the FOP and Xalan command-lines.

## 5. Memory Usage

FOP can consume quite a bit of memory, even though this has been continually improved. This is partly inherent to the formatting process and partly caused by implementation choices. All FO processors currently on the market have memory problems with certain layouts.

If you are running out of memory when using FOP, here are some ideas that may help:

- Increase memory available to the JVM. See [the -Xmx option](#) for more information.

**Warning:**

It is usually unwise to increase the memory allocated to the JVM beyond the amount of physical RAM, as this will generally cause significantly slower performance.

- Avoid forward references. Forward references are references to some later part of a document. Examples include page number citations which refer to pages which follow the citation, tables of contents at the beginning of a document, and page numbering schemes that include the total number of pages in the document ("[page N of TOTAL](#)"). Forward references cause all subsequent pages to be held in memory until the reference can be resolved, i.e. until the page with the referenced element is encountered. Forward references may be required by the task, but if you are getting a memory overflow, at least consider the possibility of eliminating them. A table of contents could be replaced by PDF bookmarks instead or moved to the end of the document (reshuffle the paper could after printing).
- Avoid large images, especially if they are scaled down. If they need to be scaled, scale them in another application upstream from FOP. For many image formats, memory consumption is driven mainly by the size of the image file itself, not its dimensions (width\*height), so increasing the compression rate may help.
- Use multiple page sequences. FOP starts rendering after the end of a page sequence is encountered. While the actual rendering is done page-by-page, some additional memory is freed after the page sequence has been rendered. This can be substantial if the page sequence contains lots of FO elements.

One of FOP's stated design goals is to be able to process input of arbitrary size. Addressing this goal is one of the prime motivations behind the [FOP Redesign](#).

## 6. Problems

If you have problems running FOP, please see the ["How to get Help" page](#).