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# DocBook Installation on Ubuntu 16.04

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## Introduction

This document is a guide to installing DocBook [<https://docbook.org/whatis>] on Ubuntu 16.04. The installation requires six components. A seventh component is optional. The optional component is `fop-hyphenate`.

The guide installs DockBook 4 and not version 5. If you want DockBook v5 then install `docbook5` and `docbook-xsl-ns` instead of `docbook` and `docbook-xsl`.

Be careful when copying and pasting from this document. If you copy and paste commands from the document to the terminal then the dash used in commands may be translated into hyphens used in typesetting. They are not the same thing in the terminal, and it usually leads to obscure failures when installing packages.

## Components

DocBook requires a DTD, XSLTPROC, and FOP. In addition, Apache's FOP requires a Java subsystem. The components are as follows:

1. DocBook DTD – DocBook entity definitions
2. DocBook XSL – DocBook stylesheets
3. XMLLINT – XML validator and formatter
4. XSLTPROC – XML processor which reads the XML source and produces Formatted Objects (FOs)
5. Java – Runtime environment for Apache FOP
6. FOP – Apache's Formatted Object Processor which transforms FOs to output file types such as HTML, PS, and PDF
7. FOP-HYPH – used by FOP to hyphenate words in a DocBook

## DockBook DTD

The DockBook DTD provides entity definitions. It is provided by the `docbook` package. To install the package issue the following.

```
$ sudo apt-get install docbook
```

## DockBook XSL

The DockBook XSL provides stylesheets. It is provided by the `docbook-xsl` and `docbook-xsl-doc-pdf` packages. To install the packages issue the following.

```
$ sudo apt-get install docbook-xsl docbook-xsl-doc-pdf
```

The stylesheets are installed in `/usr/share`.

```
$ ls /usr/share/xml/docbook/stylesheet/docbook-xsl/fo/
admon.xsl      division.xsl  info.xsl      refentry.xsl
annotations.xsl docbook.xsl  inline.xsl    sections.xsl
autoidx-kimber.xsl ebnf.xsl    keywords.xsl  spaces.xsl
autoidx-kosek.xsl footnote.xsl lists.xsl     synop.xsl
autoidx-ng.xsl  fop.xsl     math.xsl      table.xsl
...
```

## XML lint

The XML lint provides validation and formatting. It is provided by the `libxml2-utils` package. To install the package issue the following.

```
$ sudo apt-get install libxml2-utils
```

## XML processor

The XML processor translates XML source and produces Formatted Object (FO). It is provided by the `xsltproc` package. To install the package issue the following.

```
$ sudo apt-get install xsltproc
```

## Java runtime

The Java runtime environment is needed by Apache FOP. It is provided by the `openjdk-8-jdk` package. To install the package issue the following.

```
$ sudo apt-get install openjdk-8-jdk
```

After installing the JRE you can export `JAVA_HOME` from your login script:

```
# User .bashrc or .bash_profile
$ export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64

$ source ~/.bash_profile
```

```
$ echo $JAVA_HOME
/usr/lib/jvm/java-8-openjdk-amd64
```

## FO processor

The Formatted Object Processor (FOP) is provided by Apache. It is provided by the `fop` and `fop-doc` packages. To install the packages issue the following.

```
$ sudo apt-get install fop fop-doc
```

Alternatively, you can install the latest Apache FOP by downloading the binary from the Apache website. This can be useful if Ubuntu's version has trouble. To manually install FOP perform the following.

```
$ wget https://mirror.cogentco.com/pub/apache/xmlgraphics/
  fop/binaries/fop-2.2-bin.tar.gz
$ tar -xzf fop-2.2-bin.tar.gz
$ chmod +x fop-2.2/fop/fop
$ sudo mv fop-2.2 /usr/local/bin
```

Once `fop` is installed locally, add a wrapper script to execute it. In the `cat` below, both `JAVA_HOME` and `CLASSPATH` are a single line.

```
$ cat /usr/local/bin/fop
#!/usr/bin/env bash
```

```
JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
CLASSPATH=/usr/local/bin/fop-2.2:/usr/local/bin/fop-2.2/lib \
  /usr/local/bin/fop-2.2/fop/fop $*
```

After you manually install the new processor you should run `hash -r` to clear Bash's program cache.

## FO hyphenate

You can add hyphenation to the book by installing FOP XML Hyphenation Patterns. Download the compiled binary for FOP XML Hyphenation Patterns from the Objects For Formatting Objects (OFFO) website [<https://offo.sourceforge.net/>]. Install `fop-hyph.jar` in FOP's `lib/` directory.

```
$ sudo cp fop-hyph.jar /usr/local/bin/fop-2.2/fop/lib/
$ ls /usr/local/bin/fop-2.2/fop/lib/*.jar
...
/usr/local/bin/fop-2.2/fop/lib/commons-io-1.3.1.jar
/usr/local/bin/fop-2.2/fop/lib/commons-logging-1.0.4.jar
/usr/local/bin/fop-2.2/fop/lib/fontbox-2.0.4.jar
/usr/local/bin/fop-2.2/fop/lib/fop-hyph.jar
/usr/local/bin/fop-2.2/fop/lib/serializer-2.7.2.jar
...
```

## Testing

You should test the installation using command `-v`. The Posix command is the standard way to check availability of a program.

```
$ command -v xmllint
```

```
/usr/bin/xmllint
$ command -v xsltproc
/usr/bin/xsltproc
$ command -v fop
/usr/local/bin/fop
```

You should also verify the version of fop.

```
$ fop -version
FOP Version 2.2
```

If the version is unexpected then verify the shell script located in `/usr/local/bin/fop`, and ensure it is executable. If the script is correct then run `hash -r` to clear the Bash program cache.