

- Add method *QPDFPageObjectHelper::getAttribute* for retrieving an attribute from the page dictionary taking inheritance into consideration, and optionally making a copy if your intention is to modify the attribute.
- Fix long-standing limitation of *QPDFPageObjectHelper::getPageImages* so that it now properly reports images from inherited resources dictionaries, eliminating the need to call *QPDFPageDocumentHelper::pushInheritedAttributesToPage* in this case.
- Add method *QPDFObjectHandle::getUniqueResourceName* for finding an unused name in a resource dictionary.
- Add method *QPDFPageObjectHelper::getFormXObjectForPage* for generating a form XObject equivalent to a page. The resulting object can be used in the same file or copied to another file with *copyForeignObject*. This can be useful for implementing underlay, overlay, n-up, thumbnails, or any other functionality requiring replication of pages in other contexts.
- Add method *QPDFPageObjectHelper::placeFormXObject* for generating content stream text that places a given form XObject on a page, centered and fit within a specified rectangle. This method takes care of computing the proper transformation matrix and may optionally compensate for rotation or scaling of the destination page.
- Build Improvements
 - Add new configure option **--enable-avoid-windows-handle**, which causes the preprocessor symbol `AVOID_WINDOWS_HANDLE` to be defined. When defined, `qpdf` will avoid referencing the Windows **HANDLE** type, which is disallowed with certain versions of the Windows SDK.
 - For Windows builds, attempt to determine what options, if any, have to be passed to the compiler and linker to enable use of *wmain*. This causes the preprocessor symbol `WINDOWS_WMAIN` to be defined. If you do your own builds with other compilers, you can define this symbol to cause *wmain* to be used. This is needed to allow the Windows **qpdf** command to receive Unicode command-line options.

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- Command-line Enhancements
 - Shell completion: you can now use `eval $(qpdf --completion-bash)` and `eval $(qpdf --completion-zsh)` to enable shell completion for bash and zsh.
 - Page numbers (also known as page labels) are now preserved when merging and splitting files with the **--pages** and **--split-pages** options.
 - Bookmarks are partially preserved when splitting pages with the **--split-pages** option. Specifically, the outlines dictionary and some supporting metadata are copied into the split files. The result is that all bookmarks from the original file appear, those that point to pages that are preserved work, and those that point to pages that are not preserved don't do anything. This is an interim step toward proper support for bookmarks in splitting and merging operations.
 - Page collation: add new option **--collate**. When specified, the semantics of **--pages** change from concatenation to collation. See [Section 3.5, “Page Selection Options”](#), [page 10](#) for examples and discussion.
 - Generation of information in JSON format, primarily to facilitate use of `qpdf` from languages other than C++. Add new options **--json**, **--json-key**, and **--json-object** to generate a JSON representation of the PDF file. Run **qpdf --json-help** to get a description of the JSON format. For more information, see [Chapter 6, QPDF JSON](#), [page 25](#).