MuPDFCore

1.4.0

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Chapter 1

MuPDFCore: Multiplatform .NET Core bindings for MuPDF

MuPDFCore is a set of multiplatform .NET Core bindings for `MuPDF`. It can render PDF, XPS, EPUB and other formats to raster images returned either as raw bytes, or as image files in multiple formats (including PNG and PSD). It also supports multithreading.

It also includes **MuPDFCore.MuPDFRenderer**, an Avalonia control to display documents compatible with MuPDFCore in Avalonia windows (with multithreaded rendering).

The library is released under the `AGPLv3` licence.

1.1 Getting started

The MuPDFCore library targets .NET Standard 2.0, thus it can be used in projects that target .NET Standard 2.0+, .NET Core 2.0+, .NET 5.0+, .NET Framework 4.6.1 (`note`) and possibly others. MuPDFCore includes a pre-compiled native library, which currently supports the following platforms:

- Windows x86 (32 bit)
- Windows x64 (64 bit)
- Windows arm64 (ARM 64 bit)
- Linux x64 (64 bit)
- Linux arm64/aarch64 (ARM 64 bit)
- macOS Intel x86_64 (64 bit)
- macOS Apple silicon (ARM 64 bit, without support for the OCR functions)

To use the library in your project, you should install the `MuPDFCore NuGet package` and/or the `MuPDFCore.PDFRenderer NuGet package`. When you publish a program that uses MuPDFCore, the correct native library for the target architecture will automatically be copied to the build folder (but see the `note` for .NET Framework).

Note: you should make sure that end users on Windows install the `Microsoft Visual C++ Redistributable for Visual Studio 2015, 2017, 2019 and 2022` for their platform, otherwise they will get an error message stating that `MuPDFWrapper.dll` could not be loaded because a module was not found.

1.2 Usage

1.2.1 Documentation

Interactive documentation for the library can be accessed from the documentation website. A PDF reference manual is also available.

1.2.2 Examples

The Demo folder in the repository contains some examples of how the library can be used to extract pages from a PDF or XPS document, render them to a raster image, or combine them in a new document

The PDFViewerDemo folder contains a complete (though minimal) example of a PDF viewer program built around the MuPDFCore.MuPDFRenderer.PDFRenderer control.

Note that these examples intentionally avoid any error handling code: in a production setting, you should typically make sure that calls to MuPDFCore library functions are within a `try...catch` block to handle any resulting `MuPDFException`s.

1.2.3 MuPDFCore library

The first step when using MuPDFCore is to create a `MuPDFCore.MuPDFContext` object that is used internally by the MuPDF library to store various things:

```
MuPDFContext context = new MuPDFContext();
```

This object is `IDisposable`, therefore you should always call the `Dispose()` method on it once you are done with it (or, better yet, wrap it in a `using` directive). In most instances, you will only need one instance of `MuPDFContext` for your whole application.

Amongst other things, MuPDF uses this context to store a cache of "assets" (e.g. images or fonts) that have been used while rendering documents and that may be needed in future. This requires some memory: by default, the maximum size of this cache store is 256MB; however, if you want to restrict how much memory can be used, you can alter this by providing a `long` value to constructor, indicating the size in bites for the store. A value of `0` means that the store can grow up to an unlimited size. Furthermore, you can clear the cache completely by using the `MuPDFContext.ClearCache` method, or partially by using the `MuPDFContext.ShrinkCache` method.

Once you have obtained a `MuPDFContext`, you can use it to open a `MuPDFDocument`. A document can be opened from a file on disk:

```
MuPDFDocument document = new MuPDFDocument(context, "path/to/file");
```

Or from a `byte[]` array (in this case, you will have to specify the format of the document):

```
byte[] data;
...
MuPDFDocument document = new MuPDFDocument(context, data, InputFileTypes.PDF);
```

Or from a `MemoryStream` (in this case too, you will have to specify the format of the document):

```
MemoryStream stream;
...
MuPDFDocument document = new MuPDFDocument(context, ref stream, InputFileTypes.PDF);
```

The `MemoryStream` is passed with the `ref` keyword to indicate that the `MuPDFDocument` will take care of appropriately disposing it once it finishes using it.

A `MuPDFDocument` is also `IDisposable` and should be properly disposed of to avoid memory leaks.

Important note: the constructor taking a `byte[]` and the one taking a `MemoryStream` will not copy the data bytes before sending them to the native MuPDF library functions. Rather, they will *pin them in place*. This is a **bad thing** because it will mess up with the Garbage Collector's management of memory. Therefore, this is only suitable for short-lived objects. If you need to initialise a long-lived document object from memory, you should first copy the data to unmanaged memory and then use one of the constructors that take an `IntPtr` parameter, e.g.:

```
byte[] data;
...
//Allocate enough unmanaged memory
IntPtr ptr = Marshal.AllocHGlobal(data.Length);
//Copy the byte array to unmanaged memory
Marshal.Copy(data, 0, ptr, data.Length);
//Wrap the pointer in an IDisposable
IDisposable dispIntPtr = new DisposableIntPtr(ptr);
//Create the document
MuPDFDocument document = new MuPDFDocument(ctx, ptr, data.Length, InputFileTypes.PDF, ref dispIntPtr);
```

The `DisposableIntPtr` class is a wrapper around a pointer that calls `Marshal.FreeHGlobal` on it once it is disposed. Passing it as the final optional parameter of `MuPDFDocument` constructor (again by reference, to indicate that the document takes ownership of the object) makes sure that the memory is properly freed once the document is disposed.

After having obtained a document, you can do many things with it: for example, you can render a page and save the results to a file on disk, or you can collect multiple pages and combine them in a new document. Code to do this can be found in the `Program.cs` file of the Demo project.

Furthermore, you can render a page directly to memory:

```
byte[] pixelData = document.Render(0, 1, PixelFormats.RGBA);
```

This method renders page 0 (i.e. the first page of the document) at a 1x resolution (1pt in the document is equivalent to 1px in the image), preserving alpha (transparency) information, and returns the image as an array of the bytes that constitute the pixel data (four bytes per pixel). A variation of this method allows you to supply a rectangular region of the page that you would like to render, rather than the whole page.

Alternatively, if you already know where the image data should be put (e.g. because you are using some kind of graphics library that lets you manipulate the pixel data of its images), you can use the methods that take an `IntPtr` destination:

```
IntPtr destination;
...
document.Render(0, 1, PixelFormats.RGBA, destination);
```

In this case, **you have to make sure that there is enough memory to hold the resulting image**! Otherwise, an `AccessViolationException` will occur and your program will usually fail catastrophically. Since it may sometimes be hard to determine how much memory a particular image will need (especially because of subtle differences in the rounding routines, which can cause images to be 1px larger or shorter than expected), the `GetRenderedSize` method is provided, which returns the number of bytes that will be needed to render a certain page. For example:

```
//Get the number of bytes that will be necessary to hold the rendered page at the given resolution.
int sizeInBytes = document.GetRenderedSize(0, 1, PixelFormats.RGBA);
//Allocate an appropriate amount of memory.
IntPtr destination = Marshal.AllocHGlobal(sizeInBytes);
//Again, we use a DisposableIntPtr to make sure that we are freeing the memory when we are done with it.
using (DisposableIntPtr holder = new DisposableIntPtr(destination))
{
    //Make sure that all the parameters match those of the call to GetRenderedSize, or the size of the
    //resulting image may be different than expected! Even a translation of 1px could have catastrophic
    //consequences.
    document.Render(0, 1, PixelFormats.RGBA, destination);
}
```

Finally, **none of these methods are inherently thread-safe**! E.g. you cannot render multiple pages of the same document (nor multiple regions of a single page) by simply performing multiple calls to `MuPDFDocument.Render` in parallel. For multi-threaded operation, you must instead use a `MuPDFMultiThreadedPageRender`. You can obtain one from a document:

```
MuPDFMultiThreadedPageRenderer renderer = document.GetMultiThreadedRenderer(0, 2);
```

This method obtains an object that can be used to render the first page of the document using two threads. By using the `Render` method of this object, the page can be rendered. The page will be rendered to a number of separate tiles equal to the number of threads, which will then be your responsibility to appropriately "stitch up" (e.g. if you

want to display them on screen, you could just place them appropriately). The size of each tile (and the position it should occupy) can be computed by using the `Split` method of the `RoundedSize` struct.

Furthermore, multiple `MuPDFMultiThreadedPageRenderer`s can be used in parallel, which makes it possible e.g. to render every page in the document at the same time (while also using multiple threads to render each page). The following example will render all the pages in a document at the same time in RGBA format at a 1.5x zoom, using 2 threads for each page:

```
//Create a MuPDFContext with a using statement, so that it gets disposed at the right time.
using MuPDFContext context = new MuPDFContext();
//Open the document also with a using statement.
using MuPDFDocument document = new MuPDFDocument(context, "path/to/file.pdf");
//Create arrays to hold the objects for the various pages
//Renderers: one per page
MuPDFMultiThreadedPageRenderer[] renderers = new MuPDFMultiThreadedPageRenderer[document.Pages.Count];
//Page size: one per page
RoundedSize[] renderedPageSizes = new RoundedSize[document.Pages.Count];
//Boundaries of the tiles that make up each page: one array per page, with one element per thread
RoundedRectangle[][] tileBounds = new RoundedRectangle[document.Pages.Count][];
//Addresses of the memory areas where the image data of the tiles will be stored: one array per page, with
      one element per thread
IntPtr[][] destinations = new IntPtr[document.Pages.Count][];
//Cycle through the pages in the document to initialise everything
for (int i = 0; i < document.Pages.Count; i++)
{
    //Initialise the renderer for the current page, using two threads (total number of threads: number of
       pages x 2
    renderers[i] = document.GetMultiThreadedRenderer(i, 2);
    //Determine the boundaries of the page when it is rendered with a 1.5x zoom factor
    RoundedRectangle roundedBounds = document.Pages[i].Bounds.Round(1.5);
    renderedPageSizes[i] = new RoundedSize(roundedBounds.Width, roundedBounds.Height);
    //Determine the boundaries of each tile by splitting the total size of the page by the number of
       threads.
    tileBounds[i] = renderedPageSizes[i].Split(renderers[i].ThreadCount);
    destinations[i] = new IntPtr[renderers[i].ThreadCount];
    for (int j = 0; j < renderers[i].ThreadCount; j++)
    {
        //Allocate the required memory for the j-th tile of the i-th page.
        //Since we will be rendering with a 24-bit-per-pixel format, the required memory in bytes is height
       x width x 3.
        destinations[i][j] = Marshal.AllocHGlobal(tileBounds[i][j].Height * tileBounds[i][j].Width * 3);
    }
}
//Start the actual rendering operations in parallel.
Parallel.For(0, document.Pages.Count, i =>
{
    renderers[i].Render(renderedPageSizes[i], document.Pages[i].Bounds, destinations[i], PixelFormats.RGB);
});
//The code in this for-loop is not really part of MuPDFCore - it just shows an example of using VectSharp to
      "stitch" the tiles up and produce the full image.
for (int i = 0; i < document.Pages.Count; i++)
{
    //Create a new (empty) image to hold the whole page.
    VectSharp.Page renderedPage = new VectSharp.Page(renderedPageSizes[i].Width,
       renderedPageSizes[i].Height);
    //Draw each tile onto the image.
    for (int j = 0; j < renderers[i].ThreadCount; j++)
    {
        //Create a raster image object containing the pixel data. Yay, we do not need to copy/marshal
       anything!
        VectSharp.RasterImage tile = new VectSharp.RasterImage(destinations[i][j], tileBounds[i][j].Width,
       tileBounds[i][j].Height, false, false);
        //Draw the tile on the main image page.
        renderedPage.Graphics.DrawRasterImage(tileBounds[i][j].X0, tileBounds[i][j].Y0, tile);
    }
    //Save the full page as a PNG image.
    renderedPage.SaveAsPNG("page" + i.ToString() + ".png");
}
//Clean-up code.
for (int i = 0; i < document.Pages.Count; i++)
{
    //Release the allocated memory.
    for (int j = 0; j < renderers[i].ThreadCount; j++)
    {
        Marshal.FreeHGlobal(destinations[i][j]);
    }
    //Release the renderer (if you skip this, the quiescent renderer's threads will not be stopped, and your
       application will never exit!
    renderers[i].Dispose();
}
```

1.2.4 Structured text representation

The GetStructuredTextPage method of the MuPDFDocument class makes it possible to obtain a "structured text" representation of each page of the document. This consists of a MuPDFStructuredTextPage object, which is a collection of 0 or more MuPDFStructuredTextBlocks.

Each MuPDFStructuredTextBlock either represents an image or a block of text, typically a paragraph (though there is no guarantee that this is the case). MuPDFStructuredTextBlocks are themselves collections of MuPDFStructuredTextLines, and each line is a collection of MuPDFStructuredTextCharacters (in the case of a block representing an image, it will contain a single line with a single character).

MuPDFStructuredTextBlocks and MuPDFStructuredTextLines have a BoundingBox property that defines a rectangle (in page units) that bounds the contents of the block/line in the page. Similarly, MuPDF↩StructuredTextCharacters have a BoundingQuad (rather than being a Rectangle, this is a Quad, i.e. a quadrilater defined by its four vertices, which may or may not be a rectangle). These can be used e.g. to highlight regions of text in the page.

The MuPDFStructuredTextPage also has methods to determine which character contains or is closest to a specified point (useful, for example, to determine on which character the user clicked), to obtain a list of shapes that encompass a specified range of text, and to perform text searches using regular expressions.

The order of the blocks in the page (which affects the definition of a "range" of text and search operations) is the same as returned by the underlying MuPDF library, which is taken from the order the text is drawn in the source file, so may not be accurate. They can be reordered using the Array.Sort method on the StructuredText↩Blocks array contained in the MuPDFStructuredTextPage (lines within blocks and characters within lines can be likewise reordered).

1.2.5 Optical Character Recognition (OCR) using Tesseract

MuPDF 1.18+ (embedded in MuPDFCore 1.3.0+) adds support for OCR using the Tesseract library. To access this feature in MuPDFCore, you can use one of the overloads of GetStructuredTextPage that takes a TesseractLanguage argument specifying the language to use for the OCR. This will run the OCR and return a MuPDFStructuredTextPage containing the character information obtained by Tesseract, which can be used normally. Depending on the model being used, the OCR step can take a relatively long time; therefore, the MuPD↩FDocument class also implements a GetStructuredTextPageAsync method, which does the same thing in an asynchronous way.

Objects of the TesseractLanguage class contain information used to locate the trained language model file that is used by Tesseract. Normally, when using Tesseract, you would have to ensure that the trained language model files are available on the user's computer; however, this class implements some "clever" logic to download the necessary files on demand.

In general, MuPDF provides Tesseract with a "language name" (e.g. "eng"). Tesseract then looks for a file called eng.traineddata either in the folder specified by the TESSDATA_PREFIX environment variable, or, if the variable is not defined, in a subfolder of the current working directory called tessdata. MuPDFCore manipulates the value of TESSDATA_PREFIX (at the process level) and the language name in order to specify the language file.

The TesseractLanguage class has multiple constructors:

- TesseractLanguage(string prefix, string language): this constructor is used to directly specify the value of TESSDATA_PREFIX and the language name. The library does not process these in any way. If prefix is null, the value of TESSDATA_PREFIX is not changed, and Tesseract uses the system value.

- `TesseractLanguage(string fileName)`: with this constructor, you can directly specify the path to a trained language model file. You can obtain such a file from the tessdata_fast repository or from the tessdata_best repository. If the file does not have a `.traineddata` extension, it will be copied in a temporary location.

- `TesseractLanguage(Fast language, bool useAnyCached = false)` \ `TesseractLanguage(FastScript language, bool useAnyCached = false)` \ `TesseractLanguage(Best language, bool useAnyCached = false)` \ `TesseractLanguage(BestScript language, bool useAnyCached = false)`

  With these constructors, you can specify a language from the list of available languages defined in the `TesseractLanguage.Fast`, `TesseractLanguage.FastScript`, `TesseractLanguage.Best`, and `TesseractLanguage.BestScript` enums.

  MuPDFCore will then look for the trained model file corresponding to the selected language, relative to the *path of the executable*, in a folder called `tessdata/fast` and then in a folder called `fast` (or `best`, depending on the overload; for the overloads taking a script name, it looks in `tessdata/fast/script` or `fast/script` instead).

  If the language file is not found in either of these folders, it then looks for it in a subfolder called `tessdata/fast` in `Environment.SpecialFolder.LocalApplicationData`. If the optional argument `useAnyCached` is `true`, it also looks for the language file in the same folder as the executable, and then in the `best` (or `fast`) subfolders. In this case, for example, if the language file for `TesseractLanguage.Fast.Eng` is not available, but the file for `TesseractLanguage.Best.Eng` is available, the latter will be used.

  Finally, if the language file could not be found in any of the possible paths, MuPDFCore will download it from the appropriate repository and place it in the appropriate subfolder of the `tessdata` folder in `Environment.SpecialFolder.LocalApplicationData`. The file will then be reused as necessary.

  The `TESSDATA_PREFIX` and language name will then be set accordingly to where the file was located.

  This means that if you use one of these constructors you do not have to worry about the language files being installed in the right place; as long as the user has an Internet connection, the library will download the language files as necessary.

Note: the Tesseract OCR is not supported on macOS on Apple silicon, because I could not find a way to compile the native MuPDF library with Tesseract on this platform (can you help?). If you try to use any OCR method in an app published with target `osx-arm64`, you will get an exception (you can catch this and fail gracefully). If you need to use the OCR functions on macOS, you should publish with target `osx-x64` and rely on Rosetta 2 to run your program on Apple silicon Macs.

1.2.6 MuPDFCore.MuPDFRenderer control

To use the `PDFRenderer` control in an Avalonia application, first of all you need to add it to you Avalonia `Window`, e.g. in the XAML:

```
<Window xmlns="https://github.com/avaloniaui"
        ...
        xmlns:mupdf="clr-namespace:MuPDFCore.MuPDFRenderer;assembly=MuPDFCore.MuPDFRenderer"
        Opened="WindowOpened"
        ... >
    <mupdf:PDFRenderer Name="MuPDFRenderer" />
</Window>
```

You then need to initialise it from the backing code, e.g. in a `WindowOpened` event:

```
private void WindowOpened(object sender, EventArgs e)
{
    this.FindControl<PDFRenderer>("MuPDFRenderer").Initialize("path/to/file.pdf");
}
```

This way, the renderer will start showing the first page of the specified document, using a number of rendering threads that is decided based on the number of processors in the computer. There are many other ways to initialise a PDFRenderer, so make sure to look at the documentation to see the other possibilities!

1.3 Building from source

Building the MuPDFCore library from source requires the following steps:

1. Building the `libmupdf` native library
2. Building the `MuPDFWrapper` native library
3. Creating the `MuPDFCore` library NuGet package

Steps 1 and 2 need to be performed on all of Windows, macOS and Linux, and on the various possible architectures (x86, x64 and arm64 for Windows, x64/Intel and arm64/Apple for macOS, and x64 and arm64 for Linux - no cross-compiling)! Otherwise, some native assets will be missing and it will not be possible to build the NuGet package.

1.3.1 1. Building libmupdf

You can download the open-source (GNU AGPL) MuPDF source code from here. You will need to uncompress the source file and compile the library on Windows, macOS and Linux. You need the following files:

- From Windows (x86, x64, arm64):
  - libmupdf.lib
- From macOS (Intel - x64, Apple silicon - arm64):
  - libmupdf.a
  - libmupdf-third.a
- From Linux (x64, arm64):
  - libmupdf.a
  - libmupdf-third.a

Note that the files from macOS and Linux are different, despite sharing the same name.

For convenience, these compiled files for MuPDF 1.19.0 are included in the native/MuPDFWrapper/lib folder of this repository.

1.3.1.1 Tips for compiling MuPDF 1.19.0:

- On all platforms:
  - You do not need to follow the instructions in `thirdparty/tesseract.txt`, as in this version the *leptonica* and *tesseract* libraries are already included in the source archive.
  - Delete or comment line 1082 in `source/fitz/ocr-device.c` (the one reading `fz_save_pixmap_as_png(ctx, ocr->pixmap, "ass.png");`). This line creates a file called `ass.png` when running the OCR process. This may be useful for debugging, but may have the unintended consequence of overwriting a file with same name, or cause a runtime error if the user does not have write permissions.

  - Delete or comment line 316 in `source/fitz/output.c` (the `fz_throw` invocation within the `buffer_seek` method - this should leave the `buffer_seek` method empty). This line throws an exception when a seek operation on a buffer is attempted. The problem is that this makes it impossible to render a document as a PSD image in memory, because the `fz_write_pixmap_as_psd` method performs a few seek operations. By removing this line, we turn buffer seeks into no-ops; this doesn't seem to have catastrophic side-effects and the PSD documents produced in this way appear to be fine.

- On Windows (x64):
  - Open the `platform/win32/mupdf.sln` solution in Visual Studio and select the `Release↩ Tesseract` configuration and `x64` architecture. Right-click on each project, to open its properties, then go to `C/C++ > Code Generation` and set the `Runtime Library` to `Multi-threaded DLL (/MD)` (ignore any project for which this option is not available). Save everything (`CTRL+SHI↩ FT+S`) and close Visual Studio.
  - Now, open the `x64 Native Tools Command Prompt for VS`, move to the folder with the solution file, and build it using `msbuild mupdf.sln`
  - Then, build again using `msbuild mupdf.sln /p:Configuration=Release`. Ignore the compilation errors.
  - Finally, build again using `msbuild mupdf.sln /p:Configuration=ReleaseTesseract`.
  - This may still show some errors, but should produce the `libmupdf.lib` file that is required in the `x64/ReleaseTesseract` folder (the file should be ~383MB in size).

- On Windows (x86):
  - Open the `platform/win32/mupdf.sln` solution in Visual Studio and select the `Release↩ Tesseract` configuration and `Win32` architecture. Right-click on each project, to open its properties, then go to `C/C++ > Code Generation` and set the `Runtime Library` to `Multi-threaded DLL (/MD)` (ignore any project for which this option is not available). Save everything (`CTRL+SHI↩ FT+S`) and close Visual Studio.
  - Now, open the `x86 Native Tools Command Prompt for VS`, move to the folder with the solution file, and build it using `msbuild mupdf.sln /p:Platform=Win32`
  - Then, build again using `msbuild mupdf.sln /p:Configuration=Release /p↩ :Platform=Win32`. Ignore the compilation errors.
  - Finally, build again using `msbuild mupdf.sln /p:Configuration=ReleaseTesseract /p:Platform=Win32`.
  - This may still show some errors, but should produce the `libmupdf.lib` file that is required in the `ReleaseTesseract` folder (the file should be ~362MB in size).

- On Windows (arm64)

  This is going to be a bit more complicated, because it appears that MuPDF is not meant to be built on ARM. These instructions will assume that you are building MuPDF on an ARM machine.

  First of all, make sure that you have installed Visual Studio 2022 and have selected the C++ ARM64 build tools component of the "Desktop development with C++" workload.

  Note: When you install Visual Studio on an ARM machine, it will complain that this is not supported and will be slow. Ignore that warning.

  - Download and extract the MuPDF source code and follow the instructions for all platforms above.
  - Add `|| defined(_M_ARM64)` at the end of line 16 in `scripts/tesseract/endianness.h`.
  - Now we need to edit a few files in the `thirdparty/tesseract/src/arch` folder.
    * Comment or delete lines 149-177 (inclusive) in `simddetect.cpp`. You should now have an empty block between `# elif defined(_WIN32)` and `#else`. Also comment or delete lines 198-220 (inclusive) and 237-260 (inclusive).
    * Comment or delete lines 20-22 (inclusive) in `dotproductsse.cpp`. Replace the whole body of the `DotProductSSE` method (lines 30-76) with `return DotProductNative(u, v, n);`.

    * Comment or delete lines 20-21 (inclusive) in `dotproductavx.cpp`. Replace the whole body of the `DotProductAVX` method (lines 29-54) with `return DotProductNative(u, v, n);`.
    * Comment or delete lines 20-21 (inclusive) in `dotproductfma.cpp`. Replace the whole body of the `DotProductFMA` method (lines 29-52) with `return DotProductNative(u, v, n);`.
    * Delete the contents of `thirdparty/tesseract/src/arch/intsimdmatrixavx2.cpp` and `thirdparty/tesseract/src/arch/intsimdmatrixsse.cpp` (do not delete the files, just their contents).
    * Comment or delete lines 120-121 (inclusive) in `intsimdmatrix.h`
  - Open the `platform/win32/mupdf.sln` solution in Visual Studio. You should get a prompt to retarget your projects. Accept the default settings (latest Windows SDK and v143 of the tools).
  - In Visual Studio, click on the "Configuration Manager" item from the "Build" menu. In the new window, click on the drop down menu for the "Active solution platform" and select `<New...>`. In this new dialog, select the `ARM64` platform and choose to copy the settings from `x64`. Leave the `Create new project platforms` option enabled and click on `OK` (this may take some time).
  - Close the Configuration Manager and select the `ReleaseTesseract` configuration and `ARM64` architecture. Right-click on each project, to open its properties, then go to `C/C++ > Code Generation` and set the `Runtime Library` to `Multi-threaded DLL (/MD)` (ignore any project for which this option is not available).
  - Open the properties for the `libpkcs7` project, go to `C/C++ > Preprocessor` and remove `HAVE_LIBCRYPTO` from the `Preprocessor Definitions`. Then go to `Librarian > General` and remove `libcrypto.lib` from the `Additional Dependencies`.
  - Save everything (`CTRL+SHIFT+S`) and close Visual Studio.
  - Create a new folder `platform/win32/Release`. Now, the problem is that the `bin2coff` script included with MuPDF cannot create `obj` files for ARM64 (only for x86 and x64). Since I could not find a version that can do this, I translated the source code of bin2coff to C# and added this option myself. You can download an ARM64 `bin2coff.exe` from here; place it in the `Release` folder that you have just created.
  - Open the `Developer Command Prompt for VS`, move to the folder with the solution file (`platform/win32`), and build it using `msbuild mupdf.sln /p:Configuration=ReleaseTesseract`.
  - After a while, this should produce `libmupdf.lib` in the `ARM64/ReleaseTesseract` folder (the file should be ~388MB in size).

- On Linux (x64):
  - Edit the `Makefile`, adding the `-fPIC` compiler option at the end of line 24 (which specifies the `CFLAGS`).
  - Make sure that you are using a recent enough version of GCC (version 7.3.1 seems to be enough).
  - Compile by running `USE_TESSERACT=yes make HAVE_X11=no HAVE_GLUT=no` (this builds just the command-line libraries and tools, and enables OCR through the included Tesseract library).

- On Linux (arm64):
  - Edit the `Makefile`, adding the `-fPIC` compiler option at the end of line 24 (which specifies the `CFLAGS`).
  - Delete or comment line 218 in `thirdparty/tesseract/src/arch/simddetect.cpp`.
  - Make sure that you are using a recent enough version of GCC (version 7.3.1 seems to be enough).
  - Compile by running `USE_TESSERACT=yes make HAVE_X11=no HAVE_GLUT=no` (this builds just the command-line libraries and tools, and enables OCR through the included Tesseract library).

- On macOS (Intel - x64):
  - Edit the `Makefile`, adding the `-fPIC` compiler option at the end of line 24 (which specifies the `CFLAGS`). Also add the `-std=c++11` option at the end of line 58 (which specifies the CXX_CMD).

  - Compile by running `USE_TESSERACT=yes make` (this enables OCR through the included Tesseract library).

- On macOS (Apple silicon - arm64)
  - Edit the `Makefile`, adding the `-fPIC` compiler options at the end of line 24 (which specifies the `CFLAGS`). Also add the `-std=c++11` option at the end of line 58 (which specifies the CXX_CMD).
  - Compile by running `make` (this disables OCR, unfortunately - if you find a way to compile MuPDF with OCR support on Apple silicon, let me know).

1.3.2 2. Building MuPDFWrapper

Once you have the required static library files, you should download the MuPDFCore source code: `MuPDFCore-1.4.0.tar.gz` (or clone the repository) and place the library files in the appropriate subdirectories in the `native/MuPDFWrapper/lib/` folder.

To compile `MuPDFWrapper` you will need `CMake` (version 3.8 or higher) and (on Windows) `Ninja`.

On Windows, the easiest way to get all the required tools is probably to install `Visual Studio`. By selecting the "Desktop development with C++" workload you should get everything you need.

On macOS, you will need to install at least the Command-Line Tools for Xcode (if necessary, you should be prompted to do this while you perform the following steps) and CMake.

Once you have everything at the ready, you will have to build MuPDFWrapper on the seven platforms.

1.3.2.1 Windows (x86 and x64)

1.

Assuming you have installed Visual Studio, you should open the "x64 Native Tools Command Prompt for VS" or the "x86 Native Tools Command Prompt for VS" (you should be able to find these in the Start menu). Take care to open the version corresponding to the architecture you are building for, otherwise you will not be able to compile the library. A normal command prompt will not work, either.

Note 1: you **must** build the library on two separate systems, one running a 32-bit version of Windows and the other running a 64-bit version. If you try to build the x86 library on an x64 system, the system will probably build a 64-bit library and place it in the 32-bit output folder, which will just make things very confusing.

Note 2 for Windows x86: for some reason, Visual Studio might install the 64-bit version of CMake and Ninja, even though you are on a 32-bit machine. If this happens, you will have to manually install the 32-bit CMake and compile a 32-bit version of Ninja (which also requires Python to be installed). You will notice if this is an issue because the 64-bit programs will refuse to run.

1. `CD` to the directory where you have downloaded the MuPDFCore source code.
2. `CD` into the `native` directory.
3. Type `build`. This will start the `build.cmd` batch script that will delete any previous build and compile the library.

After this finishes, you should find a file named `MuPDFWrapper.dll` in the `native/out/build/win-x64/MuPDFWrapper/` directory or in the `native/out/build/win-x86/MuPDFWrapper/` directory. Leave it there.

1.3.2.2 Windows (arm64)

1. Locate the batch file that sets up the developer command prompt environment. You can do this by finding the "Developer Command Prompt for VS" link in the start menu, then clicking on `Open file location`, opening the properties of the link and looking at the `Target`. This could be e.g. `C:\Program Files\Microsoft Visual Studio\2022\Preview\Common7\Tools\VsDevCmd.bat`.
2. Open a normal command prompt and invoke the batch script with the `-arch=arm64 -host_arch=x86` arguments (add quotes if there are spaces in the path to the batch script), e.g.: ``` "C:\Program Files\Microsoft Visual Studio\2022\Preview\Common7\Tools\VsDevCmd.bat" -arch=arm64 -host_arch=x86 ``3.CDto the directory where you have downloaded the MuPDFCore source code. 4.CDinto thenativedirectory.
3. Typebuild. This will start thebuild.cmd` batch script that will delete any previous build and compile the library.

After this finishes, you should find a file named `MuPDFWrapper.dll` in the `native/out/build/win-arm64/MuPDFWrapper/` directory. Leave it there.

1.3.2.3 macOS and Linux

1. Assuming you have everything ready, open a terminal in the folder where you have downloaded the MuPDFCore source code.
2. `cd` into the `native` directory.
3. Type `chmod +x build.sh`.
4. Type `./build.sh`. This will delete any previous build and compile the library.

After this finishes, you should find a file named `libMuPDFWrapper.dylib` in the `native/out/build/mac-x64/MuPDFWrapper/` directory (on macOS running on an Intel x64 processor) or in the `native/out/build/mac-arm64/MuPDFWrapper/` directory (on macOS running on an Apple silicon arm64 processor), and a file named `libMuPDFWrapper.so` in the `native/out/build/linux-x64/MuPDFWrapper/` directory (on Linux). Leave it there.

1.3.3 3. Creating the MuPDFCore NuGet package

Once you have the `MuPDFWrapper.dll`, `libMuPDFWrapper.dylib` and `libMuPDFWrapper.so` files, make sure they are in the correct folders (`native/out/build/xxx-yyy/MuPDFWrapper/`), **all on the same machine**.

To create the MuPDFCore NuGet package, you will need the `.NET Core 2.0 SDK or higher` for your platform. Once you have installed it and have everything ready, open a terminal in the folder where you have downloaded the MuPDFCore source code and type:

```
cd MuPDFCore
dotnet pack -c Release
```

This will create a NuGet package in `MuPDFCore/bin/Release`. You can install this package on your projects by adding a local NuGet source.

1.3.4 4. Running tests

To verify that everything is working correctly, you should build the MuPDFCore test suite and run it on all platforms. To build the test suite, you will need the `.NET 6 SDK or higher`. You will also need to have enabled the `Windows Subsystem for Linux`.

To build the test suite:

1. Make sure that you have changed the version of the MuPDFCore NuGet package so that it is higher than the latest version of MuPDFCore in the NuGet repository (you should use a pre-release suffix, e.g. `1.4.0-a1` to avoid future headaches with new versions of MuPDFCore). This is set in line 9 of the `MuPDFCore/MuPDFCore.csproj` file.
2. Add the `MuPDFCore/bin/Release` folder to your local NuGet repositories (you can do this e.g. in Visual Studio).
3. If you have not done so already, create the MuPDFCore NuGet package following step 3 above.
4. Update line 50 of the `Tests/Tests.csproj` project file so that it refers to the version of the MuPDFCore package you have just created.

These steps ensure that you are testing the right version of MuPDFCore (i.e. your freshly built copy) and not something else that may have been cached.

Now, open a windows command line in the folder where you have downloaded the MuPDFCore source code, type `BuildTests` and press `Enter`. This will create a number of files in the `Release\MuPDFCoreTests` folder, where each file is an archive containing the tests for a certain platform and architecture:

- `MuPDFCoreTests-linux-x64.tar.gz` contains the tests for Linux environments on x64 processors.
- `MuPDFCoreTests-linux-arm64.tar.gz` contains the tests for Linux environments on arm64 processors.
- `MuPDFCoreTests-mac-x64.tar.gz` contains the tests for macOS environments on Intel processors.
- `MuPDFCoreTests-mac-arm64.tar.gz` contains the tests for macOS environments on Apple silicon processors.
- `MuPDFCoreTests-win-x64.tar.gz` contains the tests for Windows environments on x64 processors.
- `MuPDFCoreTests-win-x86.tar.gz` contains the tests for Windows environments on x86 processors.

To run the tests, copy each archive to a machine running the corresponding operating system, and extract it. Then:

1.3.4.1 Windows

- Open a command prompt and `CD` into the folder where you have extracted the contents of the test archive.
- Enter the command `MuPDFCoreTestHost` (this will run the test program).

1.3.4.2 macOS and Linux

- Open a terminal and `cd` into the folder where you have extracted the contents of the test archive.
- Enter the command `chmod +x MuPDFCoreTestHost` (this will add the executable flag to the test program).
- Enter the command `./MuPDFCoreTestHost` (this will run the test program).
- On macOS, depending on your security settings, you may get a message saying `zsh: killed` when you try to run the program. To address this, you need to sign the executable, e.g. by running `codesign --timestamp --sign <certificate> MuPDFCoreTestHost`, where `<certificate>` is the name of a code signing certificate in your keychain (e.g. `Developer ID Application: John Smith`). After this, you can try again to run the test program with `./MuPDFCoreTestHost`.

The test suite will start; it will print the name of each test, followed by a green `Succeeded` or a red `Failed` depending on the test result. If everything went correctly, all tests should succeed (except for the 5 OCR tests on Apple silicon Macs).

When all the tests have been run, the program will print a summary showing how many tests have succeeded (if any) and how many have failed (if any). If any tests have failed, a list of these will be printed, and then they will be run again one at a time, waiting for a key press before running each test (this makes it easier to follow what is going on). If you wish to kill the test process early, you can do so with `CTRL+C`.

1.4 Note about MuPDFCore and .NET Framework

If you wish to use MuPDFCore in a .NET Framework project, you will need to manually copy the native MuPDF↩ Wrapper library for the platform you are using to the executable directory (this is done automatically if you target .NET/.NET core).

One way to obtain the appropriate library files is:

1. Manually download the NuGet package for `MuPDFCore` (click on the "Download package" link on the right).
2. Rename the `.nupkg` file so that it has a `.zip` extension.
3. Extract the zip file.
4. Within the extracted folder, the library files are in the `runtimes/xxx/native/` folder, where `xxx` is `linux-x64`, `linux-arm64`, `osx-x64`, `osx-arm64`, `win-x64`, `win-x86` or `win-arm64`, depending on the platform you are using.

Make sure you copy the appropriate file to the same folder as the executable!

Chapter 2

Namespace Index

2.1 Packages

Here are the packages with brief descriptions (if available):

Chapter 3

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 5

Namespace Documentation

5.1 Avalonia Namespace Reference

5.2 Avalonia.Animation Namespace Reference

Classes

- class RectTransition

  Transition class that handles AvaloniaProperty with Rect types.

5.3 MuPDFCore Namespace Reference

Classes

- class DisposableIntPtr

  An IDisposable wrapper around an IntPtr that frees the allocated memory when it is disposed.
- class MuPDFContext

  A wrapper around a MuPDF context object, which contains the exception stack and the resource cache store.
- class MuPDFDocument

  A wrapper over a MuPDF document object, which contains possibly multiple pages.
- class MuPDFException

  The exception that is thrown when a MuPDF operation fails.
- class MuPDFImageStructuredTextBlock

  Represents a block containing a single image. The block contains a single line with a single character.
- class MuPDFMultiThreadedPageRenderer

  A class that holds the necessary resources to render a page of a MuPDF document using multiple threads.
- class MuPDFPage

  A wrapper over a MuPDF page object, which contains information about the page's boundaries.
- class MuPDFPageCollection

  A lazy collection of MuPDFPages. Each page is loaded from the document as it is requested for the first time.
- struct MuPDFStructuredTextAddress

  Represents the address of a particular character in a MuPDFStructuredTextPage, in terms of block index, line index and character index.

- class MuPDFStructuredTextAddressSpan

  Represents a range of characters in a MuPDFStructuredTextPage.
- class MuPDFStructuredTextBlock

  Represents a structured text block containing text or an image.
- class MuPDFStructuredTextCharacter

  Represents a single text character.
- class MuPDFStructuredTextLine

  Represents a single line of text (i.e. characters that share a common baseline).
- class MuPDFStructuredTextPage

  Represents a structured representation of the text contained in a page.
- class MuPDFTextStructuredTextBlock

  Represents a block containing multiple lines of text (typically a paragraph).
- struct PointF

  Represents a point.
- struct Quad

  Represents a quadrilater (not necessarily a rectangle).
- struct Rectangle

  Represents a rectangle.
- class RenderProgress

  Holds a summary of the progress of the current rendering operation.
- struct RoundedRectangle

  Represents a rectangle using only integer numbers.
- struct RoundedSize

  Represents the size of a rectangle using only integer numbers.
- struct Size

  Represents the size of a rectangle.
- class TesseractLanguage

  Represents a language used by Tesseract OCR.

Enumerations

- enum ExitCodes {
  ExitCodes.ERR_CANNOT_CREATE_CONTEXT = 129, ExitCodes.ERR_CANNOT_REGISTER_HANDLERS = 130, ExitCodes.ERR_CANNOT_OPEN_FILE = 131, ExitCodes.ERR_CANNOT_COUNT_PAGES = 132, ExitCodes.ERR_CANNOT_RENDER = 134, ExitCodes.ERR_CANNOT_OPEN_STREAM = 135, ExitCodes.ERR_CANNOT_L = 136, ExitCodes.ERR_CANNOT_COMPUTE_BOUNDS = 137, ExitCodes.ERR_CANNOT_INIT_MUTEX = 138, ExitCodes.ERR_CANNOT_CLONE_CONTEXT = 139, ExitCodes.ERR_CANNOT_SAVE = 140, ExitCodes.ERR_CANNOT_CREATE_BUFFER = 141, ExitCodes.ERR_CANNOT_CREATE_WRITER = 142, ExitCodes.ERR_CANNOT_CLOSE_DOCUMENT = 143, ExitCodes.ERR_CANNOT_CREATE_PAGE = 144, ExitCodes.ERR_CANNOT_POPULATE_PAGE = 145,
  ExitCodes.EXIT_SUCCESS = 0 }

  Exit codes returned by native methods describing various errors that can occur.
- enum InputFileTypes {
  InputFileTypes.PDF = 0, InputFileTypes.XPS = 1, InputFileTypes.CBZ = 2, InputFileTypes.PNG = 3, InputFileTypes.JPEG = 4, InputFileTypes.BMP = 5, InputFileTypes.GIF = 6, InputFileTypes.TIFF = 7, InputFileTypes.PNM = 8, InputFileTypes.PAM = 9, InputFileTypes.EPUB = 10, InputFileTypes.FB2 = 11 }

  File types supported in input by the library.
- enum RasterOutputFileTypes { RasterOutputFileTypes.PNM = 0, RasterOutputFileTypes.PAM = 1, RasterOutputFileTypes.PNG = 2, RasterOutputFileTypes.PSD = 3 }

  Raster image file types supported in output by the library.

- enum DocumentOutputFileTypes { DocumentOutputFileTypes.PDF = 0, DocumentOutputFileTypes.SVG = 1, DocumentOutputFileTypes.CBZ = 2 }

  Document file types supported in output by the library.
- enum PixelFormats { PixelFormats.RGB = 0, PixelFormats.RGBA = 1, PixelFormats.BGR = 2, PixelFormats.BGRA = 3 }

  Pixel formats supported by the library.

5.3.1 Enumeration Type Documentation

5.3.1.1 DocumentOutputFileTypes

`enum MuPDFCore.DocumentOutputFileTypes [strong]`

Document file types supported in output by the library.

Enumerator

PDF	Portable Document Format.
SVG	Scalable Vector Graphics.
CBZ	Comic book archive format.

Definition at line 210 of file MuPDF.cs.

5.3.1.2 ExitCodes

`enum MuPDFCore.ExitCodes [strong]`

Exit codes returned by native methods describing various errors that can occur.

Enumerator

ERR_CANNOT_CREATE_CONTEXT	An error occurred while creating the context object.
ERR_CANNOT_REGISTER_HANDLERS	An error occurred while registering the default document handlers with the context.
ERR_CANNOT_OPEN_FILE	An error occurred while opening a file.
ERR_CANNOT_COUNT_PAGES	An error occurred while determining the total number of pages in the document.
ERR_CANNOT_RENDER	An error occurred while rendering the page.
ERR_CANNOT_OPEN_STREAM	An error occurred while opening the stream.
ERR_CANNOT_LOAD_PAGE	An error occurred while loading the page.
ERR_CANNOT_COMPUTE_BOUNDS	An error occurred while computing the page bounds.
ERR_CANNOT_INIT_MUTEX	An error occurred while initialising the mutexes for the lock mechanism.
ERR_CANNOT_CLONE_CONTEXT	An error occurred while cloning the context.
ERR_CANNOT_SAVE	An error occurred while saving the page to a raster image file.

Enumerator

ERR_CANNOT_CREATE_BUFFER	An error occurred while creating the output buffer.
ERR_CANNOT_CREATE_WRITER	An error occurred while creating the document writer.
ERR_CANNOT_CLOSE_DOCUMENT	An error occurred while finalising the document file.
ERR_CANNOT_CREATE_PAGE	An error occurred while creating an empty structured text page.
ERR_CANNOT_POPULATE_PAGE	An error occurred while populating the structured text page
EXIT_SUCCESS	No error occurred. All is well.

Definition at line 27 of file MuPDF.cs.

5.3.1.3 InputFileTypes

`enum MuPDFCore.InputFileTypes [strong]`

File types supported in input by the library.

Enumerator

PDF	Portable Document Format.
XPS	XML Paper Specification document.
CBZ	Comic book archive file (ZIP archive containing page scans).
PNG	Portable Network Graphics format.
JPEG	Joint Photographic Experts Group image.
BMP	Bitmap image.
GIF	Graphics Interchange Format.
TIFF	Tagged Image File Format.
PNM	Portable aNyMap graphics format.
PAM	Portable Arbitrary Map graphics format.
EPUB	Electronic PUBlication document.
FB2	FictionBook document.

Definition at line 118 of file MuPDF.cs.

5.3.1.4 PixelFormats

`enum MuPDFCore.PixelFormats [strong]`

Pixel formats supported by the library.

Enumerator

RGB	24bpp RGB format.
RGBA	32bpp RGBA format.
BGR	24bpp BGR format.
BGRA	32bpp BGRA format.

Definition at line 231 of file MuPDF.cs.

5.3.1.5 RasterOutputFileTypes

`enum MuPDFCore.RasterOutputFileTypes [strong]`

Raster image file types supported in output by the library.

Enumerator

PNM	Portable aNyMap graphics format.
PAM	Portable Arbitrary Map graphics format.
PNG	Portable Network Graphics format.
PSD	PhotoShop Document format.

Definition at line 184 of file MuPDF.cs.

5.4 MuPDFCore.MuPDFRenderer Namespace Reference

Classes

- class PDFRenderer

  A control to render PDF documents (and other formats), potentially using multiple threads.

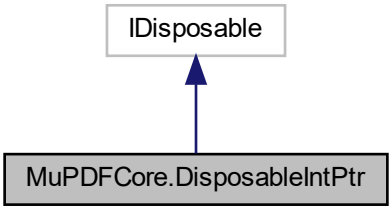
Chapter 6

Class Documentation

6.1 MuPDFCore.DisposableIntPtr Class Reference

An IDisposable wrapper around an IntPtr that frees the allocated memory when it is disposed.

Inheritance diagram for MuPDFCore.DisposableIntPtr:



Public Member Functions

- DisposableIntPtr (IntPtr pointer)
  Create a new DisposableIntPtr.
- void **Dispose** ()

6.1.1 Detailed Description

An IDisposable wrapper around an IntPtr that frees the allocated memory when it is disposed.

Definition at line 308 of file MuPDF.cs.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 DisposableIntPtr()

```
MuPDFCore.DisposableIntPtr.DisposableIntPtr (
            IntPtr pointer )
```

Create a new DisposableIntPtr.

Parameters

pointer	The pointer that should be freed upon disposing of this object.

Definition at line 319 of file MuPDF.cs.

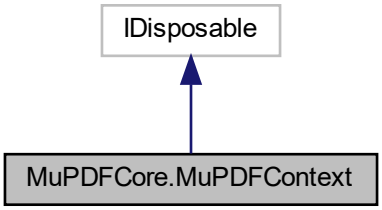
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDF.cs

6.2 MuPDFCore.MuPDFContext Class Reference

A wrapper around a MuPDF context object, which contains the exception stack and the resource cache store.

Inheritance diagram for MuPDFCore.MuPDFContext:



Public Member Functions

- MuPDFContext (uint storeSize=256<< 20)

  Create a new MuPDFContext instance with the specified cache store size.
- void ClearStore ()

  Evict all items from the resource cache store (freeing the memory where they were held).
- void ShrinkStore (double fraction)

  Evict items from the resource cache store (freeing the memory where they were held) until the the size of the store drops to the specified fraction of the current size.
- void **Dispose** ()

Properties

- long StoreSize [get]

  The current size in bytes of the resource cache store. Read-only.
- long StoreMaxSize [get]

  The maximum size in bytes of the resource cache store. Read-only.

6.2.1 Detailed Description

A wrapper around a MuPDF context object, which contains the exception stack and the resource cache store.

Definition at line 25 of file MuPDFContext.cs.

6.2.2 Constructor & Destructor Documentation

6.2.2.1 MuPDFContext()

```
MuPDFCore.MuPDFContext.MuPDFContext (
            uint storeSize = 256 << 20 )
```

Create a new MuPDFContext instance with the specified cache store size.

Parameters

storeSize	The maximum size in bytes of the resource cache store. The default value is 256 MiB.

Definition at line 58 of file MuPDFContext.cs.

6.2.3 Member Function Documentation

6.2.3.1 ClearStore()

```
void MuPDFCore.MuPDFContext.ClearStore ( )
```

Evict all items from the resource cache store (freeing the memory where they were held).

Definition at line 87 of file MuPDFContext.cs.

6.2.3.2 ShrinkStore()

```
void MuPDFCore.MuPDFContext.ShrinkStore (
            double fraction )
```

Evict items from the resource cache store (freeing the memory where they were held) until the the size of the store drops to the specified fraction of the current size.

Parameters

fraction	The fraction of the current size that constitutes the target size of the store. If this is <= 0, the cache is cleared. If this is >= 1, nothing happens.

Definition at line 96 of file MuPDFContext.cs.

6.2.4 Property Documentation

6.2.4.1 StoreMaxSize

```
long MuPDFCore.MuPDFContext.StoreMaxSize  [get]
```

The maximum size in bytes of the resource cache store. Read-only.

Definition at line 46 of file MuPDFContext.cs.

6.2.4.2 StoreSize

```
long MuPDFCore.MuPDFContext.StoreSize  [get]
```

The current size in bytes of the resource cache store. Read-only.

Definition at line 35 of file MuPDFContext.cs.

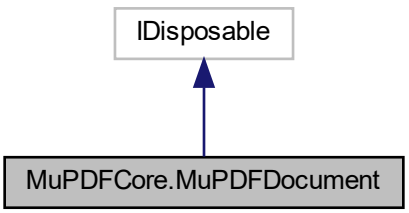
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFContext.cs

6.3 MuPDFCore.MuPDFDocument Class Reference

A wrapper over a MuPDF document object, which contains possibly multiple pages.

Inheritance diagram for MuPDFCore.MuPDFDocument:



Public Member Functions

- MuPDFDocument (MuPDFContext context, IntPtr dataAddress, long dataLength, InputFileTypes fileType)

  Create a new MuPDFDocument from data bytes accessible through the specified pointer.
- MuPDFDocument (MuPDFContext context, IntPtr dataAddress, long dataLength, InputFileTypes fileType, ref IDisposable dataHolder)

  Create a new MuPDFDocument from data bytes accessible through the specified pointer.
- MuPDFDocument (MuPDFContext context, byte[ ] data, InputFileTypes fileType)

  Create a new MuPDFDocument from an array of bytes.
- MuPDFDocument (MuPDFContext context, ref MemoryStream data, InputFileTypes fileType)

  Create a new MuPDFDocument from a MemoryStream.
- MuPDFDocument (MuPDFContext context, string fileName)

  Create a new MuPDFDocument from a file.
- void ClearCache ()

  Discard all the display lists that have been loaded from the document, possibly freeing some memory in the case of a huge document.
- byte[ ] Render (int pageNumber, Rectangle region, double zoom, PixelFormats pixelFormat, bool include↩ Annotations=true)

  Render (part of) a page to an array of bytes.
- byte[ ] Render (int pageNumber, double zoom, PixelFormats pixelFormat, bool includeAnnotations=true)

  Render a page to an array of bytes.
- void Render (int pageNumber, Rectangle region, double zoom, PixelFormats pixelFormat, IntPtr destination, bool includeAnnotations=true)

  Render (part of) a page to the specified destination.
- void Render (int pageNumber, double zoom, PixelFormats pixelFormat, IntPtr destination, bool include↩ Annotations=true)

  Render a page to the specified destination.
- MuPDFMultiThreadedPageRenderer GetMultiThreadedRenderer (int pageNumber, int threadCount, bool includeAnnotations=true)

  Create a new MuPDFMultiThreadedPageRenderer that renders the specified page with the specified number of threads.
- int GetRenderedSize (int pageNumber, double zoom, PixelFormats pixelFormat)

  Determine how many bytes will be necessary to render the specified page at the specified zoom level, using the the specified pixel format.
- void SaveImage (int pageNumber, Rectangle region, double zoom, PixelFormats pixelFormat, string file↩ Name, RasterOutputFileTypes fileType, bool includeAnnotations=true)

  Save (part of) a page to an image file in the specified format.
- void SaveImage (int pageNumber, double zoom, PixelFormats pixelFormat, string fileName, RasterOutputFileTypes fileType, bool includeAnnotations=true)

  Save a page to an image file in the specified format.
- void WriteImage (int pageNumber, Rectangle region, double zoom, PixelFormats pixelFormat, Stream outputStream, RasterOutputFileTypes fileType, bool includeAnnotations=true)

  Write (part of) a page to an image stream in the specified format.
- void WriteImage (int pageNumber, double zoom, PixelFormats pixelFormat, Stream outputStream, RasterOutputFileTypes fileType, bool includeAnnotations=true)

  Write a page to an image stream in the specified format.
- MuPDFStructuredTextPage GetStructuredTextPage (int pageNumber, bool includeAnnotations=true)

  Creates a new MuPDFStructuredTextPage from the specified page. This contains information about the text layout that can be used for highlighting and searching. The reading order is taken from the order the text is drawn in the source file, so may not be accurate.
- MuPDFStructuredTextPage GetStructuredTextPage (int pageNumber, TesseractLanguage ocrLanguage, bool includeAnnotations=true)

Creates a new MuPDFStructuredTextPage from the specified page, using optical character recognition (OCR) to determine what text is written on the image. This contains information about the text layout that can be used for highlighting and searching.

- async Task< MuPDFStructuredTextPage > GetStructuredTextPageAsync (int pageNumber, TesseractLanguage ocrLanguage, bool includeAnnotations=true)

  Creates a new MuPDFStructuredTextPage from the specified page, using optical character recognition (OCR) to determine what text is written on the image. This contains information about the text layout that can be used for highlighting and searching. The OCR step is run asynchronously, e.g. to avoid blocking the UI thread.
- string ExtractText (string separator=null, bool includeAnnotations=true)

  Extracts all the text from the document and returns it as a string. The reading order is taken from the order the text is drawn in the source file, so may not be accurate.
- string ExtractText (TesseractLanguage ocrLanguage, string separator=null, bool includeAnnotations=true)

  Extracts all the text from the document and returns it as a string, using optical character recognition (OCR) to determine what text is written on the image.
- async Task< string > ExtractTextAsync (TesseractLanguage ocrLanguage, string separator=null, bool includeAnnotations=true)

  Extracts all the text from the document and returns it as a string, using optical character recognition (OCR) to determine what text is written on the image. The OCR step is run asynchronously, e.g. to avoid blocking the UI thread.
- void **Dispose** ()

Static Public Member Functions

- static int GetRenderedSize (Rectangle region, double zoom, PixelFormats pixelFormat)

  Determine how many bytes will be necessary to render the specified region in page units at the specified zoom level, using the the specified pixel format.
- static void CreateDocument (MuPDFContext context, string fileName, DocumentOutputFileTypes fileType, bool includeAnnotations=true, params(MuPDFPage page, Rectangle region, float zoom)[ ] pages)

  Create a new document containing the specified (parts of) pages from other documents.
- static void CreateDocument (MuPDFContext context, string fileName, DocumentOutputFileTypes fileType, bool includeAnnotations=true, params MuPDFPage[ ] pages)

  Create a new document containing the specified pages from other documents.

Properties

- MuPDFPageCollection Pages `[get]`

  The pages contained in the document.
- bool ClipToPageBounds = true `[get, set]`

  Defines whether the images resulting from rendering operations should be clipped to the page boundaries.

6.3.1 Detailed Description

A wrapper over a MuPDF document object, which contains possibly multiple pages.

Definition at line 29 of file MuPDFDocument.cs.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 MuPDFDocument() [1/5]

```
MuPDFCore.MuPDFDocument.MuPDFDocument (
            MuPDFContext context,
            IntPtr dataAddress,
            long dataLength,
            InputFileTypes fileType )
```

Create a new MuPDFDocument from data bytes accessible through the specified pointer.

Parameters

context	The context that will own this document.
dataAddress	A pointer to the data bytes that make up the document.
dataLength	The number of bytes to read from the specified address.
fileType	The type of the document to read.

Definition at line 117 of file MuPDFDocument.cs.

6.3.2.2 MuPDFDocument() [2/5]

```
MuPDFCore.MuPDFDocument.MuPDFDocument (
            MuPDFContext context,
            IntPtr dataAddress,
            long dataLength,
            InputFileTypes fileType,
            ref IDisposable dataHolder )
```

Create a new MuPDFDocument from data bytes accessible through the specified pointer.

Parameters

context	The context that will own this document.
dataAddress	A pointer to the data bytes that make up the document.
dataLength	The number of bytes to read from the specified address.
fileType	The type of the document to read.
dataHolder	An IDisposable that will be disposed when the MuPDFDocument is disposed.

Definition at line 127 of file MuPDFDocument.cs.

6.3.2.3 MuPDFDocument() [3/5]

```
MuPDFCore.MuPDFDocument.MuPDFDocument (
            MuPDFContext context,
            byte[] data,
            InputFileTypes fileType )
```

Create a new MuPDFDocument from an array of bytes.

Parameters

context	The context that will own this document.
data	An array containing the data bytes that make up the document. This must not be altered until after the MuPDFDocument has been disposed! The address of the array will be pinned, which may cause degradation in the Garbage Collector's performance, and is thus only advised for short-lived documents. To avoid this issue, marshal the bytes to unmanaged memory and use one of the IntPtr constructors.
fileType	The type of the document to read.

Definition at line 183 of file MuPDFDocument.cs.

6.3.2.4 MuPDFDocument() [4/5]

```
MuPDFCore.MuPDFDocument.MuPDFDocument (
            MuPDFContext context,
            ref MemoryStream data,
            InputFileTypes fileType )
```

Create a new MuPDFDocument from a MemoryStream.

Parameters

context	The context that will own this document.
data	The MemoryStream containing the data that makes up the document. This will be disposed when the MuPDFDocument has been disposed and must not be disposed externally! The address of the MemoryStream's buffer will be pinned, which may cause degradation in the Garbage Collector's performance, and is thus only advised for short-lived documents. To avoid this issue, marshal the bytes to unmanaged memory and use one of the IntPtr constructors.
fileType	The type of the document to read.

Definition at line 241 of file MuPDFDocument.cs.

6.3.2.5 MuPDFDocument() [5/5]

```
MuPDFCore.MuPDFDocument.MuPDFDocument (
            MuPDFContext context,
            string fileName )
```

Create a new MuPDFDocument from a file.

Parameters

context	The context that will own this document.
fileName	The path to the file to open.

Definition at line 303 of file MuPDFDocument.cs.

6.3.3 Member Function Documentation

6.3.3.1 ClearCache()

```
void MuPDFCore.MuPDFDocument.ClearCache ( )
```

Discard all the display lists that have been loaded from the document, possibly freeing some memory in the case of a huge document.

Definition at line 386 of file MuPDFDocument.cs.

6.3.3.2 CreateDocument() [1/2]

```
static void MuPDFCore.MuPDFDocument.CreateDocument (
            MuPDFContext context,
            string fileName,
            DocumentOutputFileTypes fileType,
            bool includeAnnotations = true,
            params MuPDFPage[] pages )  [static]
```

Create a new document containing the specified pages from other documents.

Parameters

context	The context that was used to open the documents.
fileName	The output file name.
fileType	The output file format.
pages	The pages to include in the document.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 829 of file MuPDFDocument.cs.

6.3.3.3 CreateDocument() [2/2]

```
static void MuPDFCore.MuPDFDocument.CreateDocument (
            MuPDFContext context,
            string fileName,
            DocumentOutputFileTypes fileType,
```

```
bool includeAnnotations = true,
params(MuPDFPage page, Rectangle region, float zoom)[] pages )  [static]
```

Create a new document containing the specified (parts of) pages from other documents.

Parameters

context	The context that was used to open the documents.
fileName	The output file name.
fileType	The output file format.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.
pages	The pages to include in the document. The "page" element specifies the page, the "region" element the area of the page that should be included in the document, and the "zoom" element how much the region should be scaled.

Definition at line 727 of file MuPDFDocument.cs.

6.3.3.4 ExtractText() [1/2]

```
string MuPDFCore.MuPDFDocument.ExtractText (
            string separator = null,
            bool includeAnnotations = true )
```

Extracts all the text from the document and returns it as a string. The reading order is taken from the order the text is drawn in the source file, so may not be accurate.

Parameters

separator	The character(s) used to separate the text lines obtained from the document. If this is `null`, Environment.NewLine is used as a default separator.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A string containing all the text in the document. Characters are converted from the UTF-8 representation used in the document to equivalent UTF-16 strings.

Definition at line 916 of file MuPDFDocument.cs.

6.3.3.5 ExtractText() [2/2]

```
string MuPDFCore.MuPDFDocument.ExtractText (
            TesseractLanguage ocrLanguage,
            string separator = null,
            bool includeAnnotations = true )
```

Extracts all the text from the document and returns it as a string, using optical character recognition (OCR) to determine what text is written on the image.

Parameters

separator	The character(s) used to separate the text lines obtained from the document. If this is `null`, Environment.NewLine is used as a default separator.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A string containing all the text in the document. Characters are converted from the UTF-8 representation used in the document to equivalent UTF-16 strings.

Definition at line 958 of file MuPDFDocument.cs.

6.3.3.6 ExtractTextAsync()

```
async Task<string> MuPDFCore.MuPDFDocument.ExtractTextAsync (
            TesseractLanguage ocrLanguage,
            string separator = null,
            bool includeAnnotations = true )
```

Extracts all the text from the document and returns it as a string, using optical character recognition (OCR) to determine what text is written on the image. The OCR step is run asynchronously, e.g. to avoid blocking the UI thread.

Parameters

separator	The character(s) used to separate the text lines obtained from the document. If this is `null`, Environment.NewLine is used as a default separator.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A string containing all the text in the document. Characters are converted from the UTF-8 representation used in the document to equivalent UTF-16 strings.

Definition at line 1000 of file MuPDFDocument.cs.

6.3.3.7 GetMultiThreadedRenderer()

```
MuPDFMultiThreadedPageRenderer MuPDFCore.MuPDFDocument.GetMultiThreadedRenderer (
            int pageNumber,
```

```
            int threadCount,
            bool includeAnnotations = true )
```

Create a new MuPDFMultiThreadedPageRenderer that renders the specified page with the specified number of threads.

Parameters

pageNumber	The number of the page to render (starting at 0).
threadCount	The number of threads to use. This must be factorisable using only powers of 2, 3, 5 or 7. Otherwise, the biggest number smaller than *threadCount* that satisfies this condition is used.

Returns

A MuPDFMultiThreadedPageRenderer that can be used to render the specified page with the specified number of threads.

Parameters

includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 515 of file MuPDFDocument.cs.

6.3.3.8 GetRenderedSize() [1/2]

```
int MuPDFCore.MuPDFDocument.GetRenderedSize (
            int pageNumber,
            double zoom,
            PixelFormats pixelFormat )
```

Determine how many bytes will be necessary to render the specified page at the specified zoom level, using the the specified pixel format.

Parameters

pageNumber	The number of the page to render (starting at 0).
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixels data.

Returns

An integer representing the number of bytes that will be necessary to store the pixel data of the rendered image.

Definition at line 532 of file MuPDFDocument.cs.

6.3.3.9 GetRenderedSize() [2/2]

```
static int MuPDFCore.MuPDFDocument.GetRenderedSize (
            Rectangle region,
            double zoom,
            PixelFormats pixelFormat )  [static]
```

Determine how many bytes will be necessary to render the specified region in page units at the specified zoom level, using the the specified pixel format.

Parameters

region	The region that will be rendered.
zoom	The scale at which the region will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixels data.

Returns

An integer representing the number of bytes that will be necessary to store the pixel data of the rendered image.

Definition at line 544 of file MuPDFDocument.cs.

6.3.3.10 GetStructuredTextPage() [1/2]

```
MuPDFStructuredTextPage MuPDFCore.MuPDFDocument.GetStructuredTextPage (
            int pageNumber,
            bool includeAnnotations = true )
```

Creates a new MuPDFStructuredTextPage from the specified page. This contains information about the text layout that can be used for highlighting and searching. The reading order is taken from the order the text is drawn in the source file, so may not be accurate.

Parameters

pageNumber	The number of the page (starting at 0)
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A MuPDFStructuredTextPage containing a structured text representation of the page.

Definition at line 848 of file MuPDFDocument.cs.

6.3.3.11 GetStructuredTextPage() [2/2]

```
MuPDFStructuredTextPage MuPDFCore.MuPDFDocument.GetStructuredTextPage (
            int pageNumber,
            TesseractLanguage ocrLanguage,
            bool includeAnnotations = true )
```

Creates a new MuPDFStructuredTextPage from the specified page, using optical character recognition (OCR) to determine what text is written on the image. This contains information about the text layout that can be used for highlighting and searching.

Parameters

pageNumber	The number of the page (starting at 0)
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A MuPDFStructuredTextPage containing a structured text representation of the page.

Definition at line 865 of file MuPDFDocument.cs.

6.3.3.12 GetStructuredTextPageAsync()

```
async Task<MuPDFStructuredTextPage> MuPDFCore.MuPDFDocument.GetStructuredTextPageAsync (
            int pageNumber,
            TesseractLanguage ocrLanguage,
            bool includeAnnotations = true )
```

Creates a new MuPDFStructuredTextPage from the specified page, using optical character recognition (OCR) to determine what text is written on the image. This contains information about the text layout that can be used for highlighting and searching. The OCR step is run asynchronously, e.g. to avoid blocking the UI thread.

Parameters

pageNumber	The number of the page (starting at 0)
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included. Otherwise, only the page contents are included.

Returns

A MuPDFStructuredTextPage containing a structured text representation of the page.

Definition at line 891 of file MuPDFDocument.cs.

6.3.3.13 Render() [1/4]

```
byte [] MuPDFCore.MuPDFDocument.Render (
            int pageNumber,
            double zoom,
            PixelFormats pixelFormat,
            bool includeAnnotations = true )
```

Render a page to an array of bytes.

Parameters

pageNumber	The number of the page to render (starting at 0).
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Returns

A byte array containing the raw values for the pixels of the rendered image.

Definition at line 433 of file MuPDFDocument.cs.

6.3.3.14 Render() [2/4]

```
void MuPDFCore.MuPDFDocument.Render (
            int pageNumber,
            double zoom,
            PixelFormats pixelFormat,
            IntPtr destination,
            bool includeAnnotations = true )
```

Render a page to the specified destination.

Parameters

pageNumber	The number of the page to render (starting at 0).
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
destination	The address of the buffer where the pixel data will be written. There must be enough space available to write the values for all the pixels, otherwise this will fail catastrophically!
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 502 of file MuPDFDocument.cs.

6.3.3.15 Render() [3/4]

```
byte [] MuPDFCore.MuPDFDocument.Render (
            int pageNumber,
            Rectangle region,
            double zoom,
            PixelFormats pixelFormat,
            bool includeAnnotations = true )
```

Render (part of) a page to an array of bytes.

Parameters

pageNumber	The number of the page to render (starting at 0).
region	The region of the page to render in page units.
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Returns

A byte array containing the raw values for the pixels of the rendered image.

Definition at line 404 of file MuPDFDocument.cs.

6.3.3.16 Render() [4/4]

```
void MuPDFCore.MuPDFDocument.Render (
            int pageNumber,
            Rectangle region,
            double zoom,
            PixelFormats pixelFormat,
            IntPtr destination,
            bool includeAnnotations = true )
```

Render (part of) a page to the specified destination.

Parameters

pageNumber	The number of the page to render (starting at 0).
region	The region of the page to render in page units.
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
destination	The address of the buffer where the pixel data will be written. There must be enough space available to write the values for all the pixels, otherwise this will fail catastrophically!
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 448 of file MuPDFDocument.cs.

6.3.3.17 SaveImage() [1/2]

```
void MuPDFCore.MuPDFDocument.SaveImage (
            int pageNumber,
            double zoom,
            PixelFormats pixelFormat,
            string fileName,
            RasterOutputFileTypes fileType,
            bool includeAnnotations = true )
```

Save a page to an image file in the specified format.

Parameters

pageNumber	The number of the page to render (starting at 0).
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
fileName	The path to the output file.
fileType	The output format of the file.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 631 of file MuPDFDocument.cs.

6.3.3.18 SaveImage() [2/2]

```
void MuPDFCore.MuPDFDocument.SaveImage (
            int pageNumber,
            Rectangle region,
            double zoom,
            PixelFormats pixelFormat,
            string fileName,
            RasterOutputFileTypes fileType,
            bool includeAnnotations = true )
```

Save (part of) a page to an image file in the specified format.

Parameters

pageNumber	The number of the page to render (starting at 0).
region	The region of the page to render in page units.
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.

Parameters

fileName	The path to the output file.
fileType	The output format of the file.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 582 of file MuPDFDocument.cs.

6.3.3.19 WriteImage() [1/2]

```
void MuPDFCore.MuPDFDocument.WriteImage (
            int pageNumber,
            double zoom,
            PixelFormats pixelFormat,
            Stream outputStream,
            RasterOutputFileTypes fileType,
            bool includeAnnotations = true )
```

Write a page to an image stream in the specified format.

Parameters

pageNumber	The number of the page to render (starting at 0).
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
outputStream	The stream to which the image data will be written.
fileType	The output format of the image.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 713 of file MuPDFDocument.cs.

6.3.3.20 WriteImage() [2/2]

```
void MuPDFCore.MuPDFDocument.WriteImage (
            int pageNumber,
            Rectangle region,
            double zoom,
            PixelFormats pixelFormat,
            Stream outputStream,
            RasterOutputFileTypes fileType,
            bool includeAnnotations = true )
```

Write (part of) a page to an image stream in the specified format.

Parameters

pageNumber	The number of the page to render (starting at 0).
region	The region of the page to render in page units.
zoom	The scale at which the page will be rendered. This will determine the size in pixel of the image.
pixelFormat	The format of the pixel data.
outputStream	The stream to which the image data will be written.
fileType	The output format of the image.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the display list that is generated. Otherwise, only the page contents are included.

Definition at line 647 of file MuPDFDocument.cs.

6.3.4 Property Documentation

6.3.4.1 ClipToPageBounds

```
bool MuPDFCore.MuPDFDocument.ClipToPageBounds = true  [get], [set]
```

Defines whether the images resulting from rendering operations should be clipped to the page boundaries.

Definition at line 108 of file MuPDFDocument.cs.

6.3.4.2 Pages

```
MuPDFPageCollection MuPDFCore.MuPDFDocument.Pages  [get]
```

The pages contained in the document.

Definition at line 103 of file MuPDFDocument.cs.

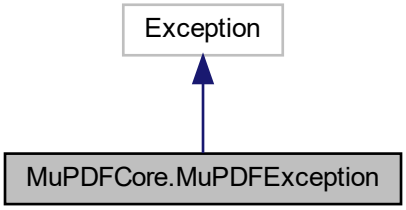
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFDocument.cs

6.4 MuPDFCore.MuPDFException Class Reference

The exception that is thrown when a MuPDF operation fails.

Inheritance diagram for MuPDFCore.MuPDFException:



Public Attributes

- readonly ExitCodes ErrorCode

  The ExitCodes returned by the native function.

6.4.1 Detailed Description

The exception that is thrown when a MuPDF operation fails.

Definition at line 353 of file MuPDF.cs.

6.4.2 Member Data Documentation

6.4.2.1 ErrorCode

```
readonly ExitCodes MuPDFCore.MuPDFException.ErrorCode
```

The ExitCodes returned by the native function.

Definition at line 358 of file MuPDF.cs.

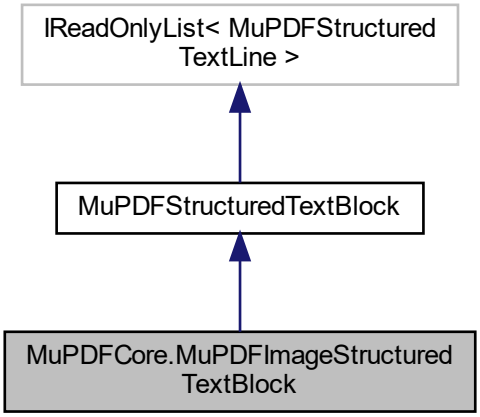
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDF.cs

6.5 MuPDFCore.MuPDFImageStructuredTextBlock Class Reference

Represents a block containing a single image. The block contains a single line with a single character.

Inheritance diagram for MuPDFCore.MuPDFImageStructuredTextBlock:



Public Member Functions

- override IEnumerator< MuPDFStructuredTextLine > GetEnumerator ()

Public Attributes

- override Types Type => Types.Image
- override int Count => 1

Properties

- override MuPDFStructuredTextLine this[int index] `[get]`

Additional Inherited Members

6.5.1 Detailed Description

Represents a block containing a single image. The block contains a single line with a single character.

Definition at line 579 of file MuPDFStructuredTextPage.cs.

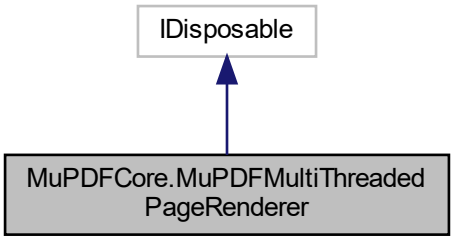
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.6 MuPDFCore.MuPDFMultiThreadedPageRenderer Class Reference

A class that holds the necessary resources to render a page of a MuPDF document using multiple threads.

Inheritance diagram for MuPDFCore.MuPDFMultiThreadedPageRenderer:



Public Member Functions

- void Render (RoundedSize targetSize, Rectangle region, IntPtr[ ] destinations, PixelFormats pixelFormat)

  Render the specified region to an image of the specified size, split in a number of tiles equal to the number of threads used by this MuPDFMultiThreadedPageRenderer, without marshaling. This method will not return until all the rendering threads have finished.
- void Abort ()

  Signal to the rendering threads that they should abort rendering as soon as possible.
- RenderProgress GetProgress ()

  Get the current rendering progress of all the threads.
- void **Dispose** ()

Properties

- int ThreadCount `[get]`

  The number of threads that are used to render the image.

6.6.1 Detailed Description

A class that holds the necessary resources to render a page of a MuPDF document using multiple threads.

Definition at line 275 of file MuPDFMultiThreadedPageRenderer.cs.

6.6.2 Member Function Documentation

6.6.2.1 Abort()

```
void MuPDFCore.MuPDFMultiThreadedPageRenderer.Abort ( )
```

Signal to the rendering threads that they should abort rendering as soon as possible.

Definition at line 495 of file MuPDFMultiThreadedPageRenderer.cs.

6.6.2.2 GetProgress()

```
RenderProgress MuPDFCore.MuPDFMultiThreadedPageRenderer.GetProgress ( )
```

Get the current rendering progress of all the threads.

Returns

A RenderProgress object containing the rendering progress of all the threads.

Definition at line 507 of file MuPDFMultiThreadedPageRenderer.cs.

6.6.2.3 Render()

```
void MuPDFCore.MuPDFMultiThreadedPageRenderer.Render (
            RoundedSize targetSize,
            Rectangle region,
            IntPtr[] destinations,
            PixelFormats pixelFormat )
```

Render the specified region to an image of the specified size, split in a number of tiles equal to the number of threads used by this MuPDFMultiThreadedPageRenderer, without marshaling. This method will not return until all the rendering threads have finished.

Parameters

targetSize	The total size of the image that should be rendered.
region	The region in page units that should be rendered.
destinations	An array containing the addresses of the buffers where the rendered tiles will be written. There must be enough space available in each buffer to write the values for all the pixels of the tile, otherwise this will fail catastrophically! As long as the *targetSize* is the same, the size in pixel of the tiles is guaranteed to also be the same.
pixelFormat	The format of the pixel data.

Definition at line 382 of file MuPDFMultiThreadedPageRenderer.cs.

6.6.3 Property Documentation

6.6.3.1 ThreadCount

```
int MuPDFCore.MuPDFMultiThreadedPageRenderer.ThreadCount  [get]
```

The number of threads that are used to render the image.

Definition at line 305 of file MuPDFMultiThreadedPageRenderer.cs.

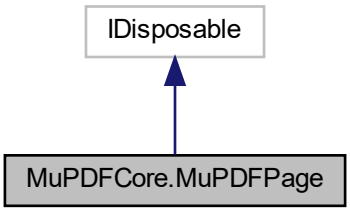
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFMultiThreadedPageRenderer.cs

6.7 MuPDFCore.MuPDFPage Class Reference

A wrapper over a MuPDF page object, which contains information about the page's boundaries.

Inheritance diagram for MuPDFCore.MuPDFPage:



Public Member Functions

- void **Dispose** ()

Properties

- Rectangle Bounds `[get]`
  The page's bounds at 72 DPI. Read-only.
- int PageNumber `[get]`
  The number of this page in the original document.

6.7.1 Detailed Description

A wrapper over a MuPDF page object, which contains information about the page's boundaries.

Definition at line 27 of file MuPDFPage.cs.

6.7.2 Property Documentation

6.7.2.1 Bounds

```
Rectangle MuPDFCore.MuPDFPage.Bounds  [get]
```

The page's bounds at 72 DPI. Read-only.

Definition at line 32 of file MuPDFPage.cs.

6.7.2.2 PageNumber

```
int MuPDFCore.MuPDFPage.PageNumber  [get]
```

The number of this page in the original document.

Definition at line 37 of file MuPDFPage.cs.

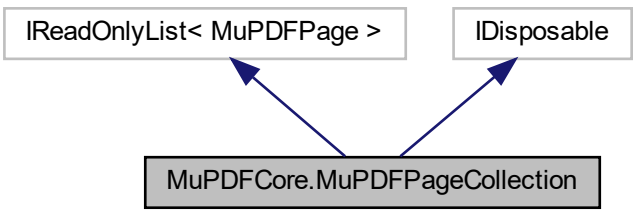
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFPage.cs

6.8 MuPDFCore.MuPDFPageCollection Class Reference

A lazy collection of MuPDFPages. Each page is loaded from the document as it is requested for the first time.

Inheritance diagram for MuPDFCore.MuPDFPageCollection:



Public Member Functions

- IEnumerator< MuPDFPage > GetEnumerator ()
  inheritdoc/>
- void **Dispose** ()

Properties

- int Length [get]
  The number of pages in the collection.
- int Count [get]
  The number of pages in the collection.
- MuPDFPage this[int index] [get]
  Get a page from the collection.

6.8.1 Detailed Description

A lazy collection of MuPDFPages. Each page is loaded from the document as it is requested for the first time.

Definition at line 123 of file MuPDFPage.cs.

6.8.2 Property Documentation

6.8.2.1 Count

```
int MuPDFCore.MuPDFPageCollection.Count [get]
```

The number of pages in the collection.

Definition at line 148 of file MuPDFPage.cs.

6.8.2.2 Length

```
int MuPDFCore.MuPDFPageCollection.Length [get]
```

The number of pages in the collection.

Definition at line 143 of file MuPDFPage.cs.

6.8.2.3 this[int index]

```
MuPDFPage MuPDFCore.MuPDFPageCollection.this[int index] [get]
```

Get a page from the collection.

Parameters

index	The number of the page (starting at 0).

Returns

The specified MuPDFPage.

Definition at line 155 of file MuPDFPage.cs.

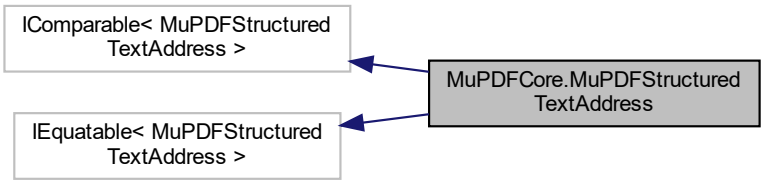
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFPage.cs

6.9 MuPDFCore.MuPDFStructuredTextAddress Struct Reference

Represents the address of a particular character in a MuPDFStructuredTextPage, in terms of block index, line index and character index.

Inheritance diagram for MuPDFCore.MuPDFStructuredTextAddress:



Public Member Functions

- MuPDFStructuredTextAddress (int blockIndex, int lineIndex, int characterIndex)

  Creates a new MuPDFStructuredTextAddress from the specified indices.
- int CompareTo (MuPDFStructuredTextAddress other)

  Compares this MuPDFStructuredTextAddress with another MuPDFStructuredTextAddress.
- override int GetHashCode ()
- MuPDFStructuredTextAddress? Increment (MuPDFStructuredTextPage page)

  Returns a MuPDFStructuredTextAddress corresponding to the next character in the specified page.
- bool Equals (MuPDFStructuredTextAddress other)

  Compares the current MuPDFStructuredTextAddress with another MuPDFStructuredTextAddress.
- override bool Equals (object other)

Static Public Member Functions

- static bool operator> (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.
- static bool operator>= (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.
- static bool operator< (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.
- static bool operator<= (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.
- static bool operator== (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.
- static bool operator!= (MuPDFStructuredTextAddress first, MuPDFStructuredTextAddress second)

  Compares two MuPDFStructuredTextAddress.

Public Attributes

- readonly int BlockIndex

  The index of the block.
- readonly int LineIndex

  The index of the line within the block.
- readonly int CharacterIndex

  The index of the character within the line.

6.9.1 Detailed Description

Represents the address of a particular character in a MuPDFStructuredTextPage, in terms of block index, line index and character index.

Definition at line 925 of file MuPDFStructuredTextPage.cs.

6.9.2 Constructor & Destructor Documentation

6.9.2.1 MuPDFStructuredTextAddress()

```
MuPDFCore.MuPDFStructuredTextAddress.MuPDFStructuredTextAddress (
            int blockIndex,
            int lineIndex,
            int characterIndex )
```

Creates a new MuPDFStructuredTextAddress from the specified indices.

Parameters

blockIndex	The index of the block.
lineIndex	The index of the line within the block.
characterIndex	The index of the character within the line.

Definition at line 948 of file MuPDFStructuredTextPage.cs.

6.9.3 Member Function Documentation

6.9.3.1 CompareTo()

```
int MuPDFCore.MuPDFStructuredTextAddress.CompareTo (
            MuPDFStructuredTextAddress other )
```

Compares this MuPDFStructuredTextAddress with another MuPDFStructuredTextAddress.

Parameters

other	The MuPDFStructuredTextAddress to compare with the current instance.

Returns

-1 if the *other* MuPDFStructuredTextAddress comes after the current instance, 1 if it comes before, or 0 if they represent the same address.

Definition at line 960 of file MuPDFStructuredTextPage.cs.

6.9.3.2 Equals()

```
bool MuPDFCore.MuPDFStructuredTextAddress.Equals (
            MuPDFStructuredTextAddress other )
```

Compares the current MuPDFStructuredTextAddress with another MuPDFStructuredTextAddress.

Parameters

other	The other MuPDFStructuredTextAddress to compare with the current instance.

Returns

`true` if the two MuPDFStructuredTextAddresses represent the same address; otherwise, `false`.

Definition at line 1203 of file MuPDFStructuredTextPage.cs.

6.9.3.3 Increment()

```
MuPDFStructuredTextAddress?  MuPDFCore.MuPDFStructuredTextAddress.Increment (
            MuPDFStructuredTextPage page )
```

Returns a MuPDFStructuredTextAddress corresponding to the next character in the specified page.

Parameters

page	The page the address refers to.

Returns

A MuPDFStructuredTextAddress corresponding to the next character in the specified page.

Definition at line 1172 of file MuPDFStructuredTextPage.cs.

6.9.3.4 operator"!=()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator!= (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the two MuPDFStructuredTextAddresses represent different addresses; otherwise, `false`.

Definition at line 1153 of file MuPDFStructuredTextPage.cs.

6.9.3.5 operator<()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator< (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the *first* MuPDFStructuredTextAddress comes before the *second* one; otherwise, `false`.

Definition at line 1062 of file MuPDFStructuredTextPage.cs.

6.9.3.6 operator<=()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator<= (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the *first* MuPDFStructuredTextAddress comes before the *second* one or if they represent the same address; otherwise, `false`.

Definition at line 1102 of file MuPDFStructuredTextPage.cs.

6.9.3.7 operator==()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator== (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the two MuPDFStructuredTextAddresses represent the same address; otherwise, `false`.

Definition at line 1142 of file MuPDFStructuredTextPage.cs.

6.9.3.8 operator>()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator> (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the *first* MuPDFStructuredTextAddress comes after the *second* one; otherwise, `false`.

Definition at line 982 of file MuPDFStructuredTextPage.cs.

6.9.3.9 operator>=()

```
static bool MuPDFCore.MuPDFStructuredTextAddress.operator>= (
            MuPDFStructuredTextAddress first,
            MuPDFStructuredTextAddress second )  [static]
```

Compares two MuPDFStructuredTextAddress.

Parameters

first	The first MuPDFStructuredTextAddress to compare.
second	The second MuPDFStructuredTextAddress to compare.

Returns

`true` if the *first* MuPDFStructuredTextAddress comes after the *second* one or if they represent the same address; otherwise, `false`.

Definition at line 1022 of file MuPDFStructuredTextPage.cs.

6.9.4 Member Data Documentation

6.9.4.1 BlockIndex

```
readonly int MuPDFCore.MuPDFStructuredTextAddress.BlockIndex
```

The index of the block.

Definition at line 930 of file MuPDFStructuredTextPage.cs.

6.9.4.2 CharacterIndex

```
readonly int MuPDFCore.MuPDFStructuredTextAddress.CharacterIndex
```

The index of the character within the line.

Definition at line 940 of file MuPDFStructuredTextPage.cs.

6.9.4.3 LineIndex

```
readonly int MuPDFCore.MuPDFStructuredTextAddress.LineIndex
```

The index of the line within the block.

Definition at line 935 of file MuPDFStructuredTextPage.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.10 MuPDFCore.MuPDFStructuredTextAddressSpan Class Reference

Represents a range of characters in a MuPDFStructuredTextPage.

Public Member Functions

- MuPDFStructuredTextAddressSpan (MuPDFStructuredTextAddress start, MuPDFStructuredTextAddress? end)

  Creates a new MuPDFStructuredTextAddressSpan corresponding to the specified character range.

Public Attributes

- readonly MuPDFStructuredTextAddress Start

  The addres of the start of the range.
- readonly? MuPDFStructuredTextAddress End

  The address of the end of the range (inclusive), or `null` to signify an empty range.

6.10.1 Detailed Description

Represents a range of characters in a MuPDFStructuredTextPage.

Definition at line 1218 of file MuPDFStructuredTextPage.cs.

6.10.2 Constructor & Destructor Documentation

6.10.2.1 MuPDFStructuredTextAddressSpan()

```
MuPDFCore.MuPDFStructuredTextAddressSpan.MuPDFStructuredTextAddressSpan (
            MuPDFStructuredTextAddress start,
            MuPDFStructuredTextAddress?  end )
```

Creates a new MuPDFStructuredTextAddressSpan corresponding to the specified character range.

Parameters

start	The addres of the start of the range.
end	The address of the end of the range (inclusive), or `null` to signify an empty range.

Definition at line 1235 of file MuPDFStructuredTextPage.cs.

6.10.3 Member Data Documentation

6.10.3.1 End

```
readonly? MuPDFStructuredTextAddress MuPDFCore.MuPDFStructuredTextAddressSpan.End
```

The address of the end of the range (inclusive), or `null` to signify an empty range.

Definition at line 1228 of file MuPDFStructuredTextPage.cs.

6.10.3.2 Start

```
readonly MuPDFStructuredTextAddress MuPDFCore.MuPDFStructuredTextAddressSpan.Start
```

The addres of the start of the range.

Definition at line 1223 of file MuPDFStructuredTextPage.cs.

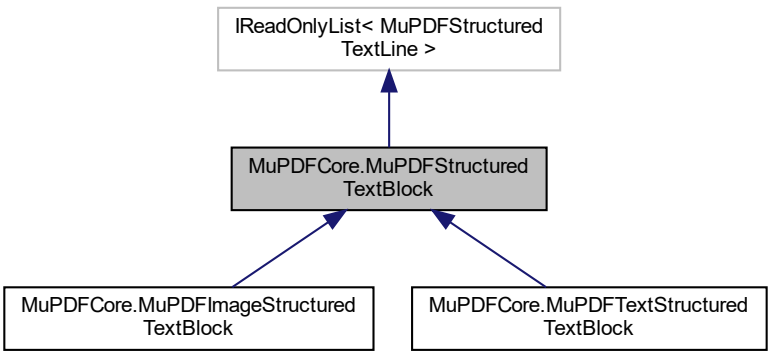
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.11 MuPDFCore.MuPDFStructuredTextBlock Class Reference

Represents a structured text block containing text or an image.

Inheritance diagram for MuPDFCore.MuPDFStructuredTextBlock:



Public Types

- enum Types { Types.Text = 0, Types.Image = 1 }

  Defines the type of the block.

Public Member Functions

- abstract IEnumerator< MuPDFStructuredTextLine > GetEnumerator ()

Properties

- abstract Types Type `[get]`

  The type of the block.
- Rectangle BoundingBox `[get]`

  The bounding box of the block.
- abstract int Count `[get]`

  The number of lines in the block.
- abstract MuPDFStructuredTextLine this[int index] `[get]`

  Gets the specified line from the block.

6.11.1 Detailed Description

Represents a structured text block containing text or an image.

Definition at line 520 of file MuPDFStructuredTextPage.cs.

6.11.2 Member Enumeration Documentation

6.11.2.1 Types

`enum MuPDFCore.MuPDFStructuredTextBlock.Types [strong]`

Defines the type of the block.

Enumerator

Text	The block contains text.
Image	The block contains an image.

Definition at line 525 of file MuPDFStructuredTextPage.cs.

6.11.3 Property Documentation

6.11.3.1 BoundingBox

```
Rectangle MuPDFCore.MuPDFStructuredTextBlock.BoundingBox  [get]
```

The bounding box of the block.

Definition at line 546 of file MuPDFStructuredTextPage.cs.

6.11.3.2 Count

```
abstract int MuPDFCore.MuPDFStructuredTextBlock.Count  [get]
```

The number of lines in the block.

Definition at line 551 of file MuPDFStructuredTextPage.cs.

6.11.3.3 this[int index]

```
abstract MuPDFStructuredTextLine MuPDFCore.MuPDFStructuredTextBlock.this[int index]  [get]
```

Gets the specified line from the block.

Parameters

index	The index of the line to extract.

Returns

The MuPDFStructuredTextLine with the specified *index* .

Definition at line 558 of file MuPDFStructuredTextPage.cs.

6.11.3.4 Type

```
abstract Types MuPDFCore.MuPDFStructuredTextBlock.Type  [get]
```

The type of the block.

Definition at line 541 of file MuPDFStructuredTextPage.cs.

The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.12 MuPDFCore.MuPDFStructuredTextCharacter Class Reference

Represents a single text character.

Public Member Functions

- override string ToString ()

  Returns a string representation of the character.

Properties

- int CodePoint `[get]`

  The unicode code point of the character.
- string Character `[get]`

  A string representation of the character. It may consist of a single char or of a surrogate pair of chars.
- int Color `[get]`

  An sRGB hex representation of the colour of the character.
- PointF Origin `[get]`

  The baseline origin of the character.
- Quad BoundingQuad `[get]`

  A quadrilater bound for the character. This may or may not be a rectangle.
- float Size `[get]`

  The size in points of the character.

6.12.1 Detailed Description

Represents a single text character.

Definition at line 870 of file MuPDFStructuredTextPage.cs.

6.12.2 Member Function Documentation

6.12.2.1 ToString()

```
override string MuPDFCore.MuPDFStructuredTextCharacter.ToString ( )
```

Returns a string representation of the character.

Returns

A string representation of the character.

Definition at line 916 of file MuPDFStructuredTextPage.cs.

6.12.3 Property Documentation

6.12.3.1 BoundingQuad

```
Quad MuPDFCore.MuPDFStructuredTextCharacter.BoundingQuad [get]
```

A quadrilater bound for the character. This may or may not be a rectangle.

Definition at line 895 of file MuPDFStructuredTextPage.cs.

6.12.3.2 Character

```
string MuPDFCore.MuPDFStructuredTextCharacter.Character [get]
```

A string representation of the character. It may consist of a single char or of a surrogate pair of chars.

Definition at line 880 of file MuPDFStructuredTextPage.cs.

6.12.3.3 CodePoint

```
int MuPDFCore.MuPDFStructuredTextCharacter.CodePoint [get]
```

The unicode code point of the character.

Definition at line 875 of file MuPDFStructuredTextPage.cs.

6.12.3.4 Color

```
int MuPDFCore.MuPDFStructuredTextCharacter.Color [get]
```

An sRGB hex representation of the colour of the character.

Definition at line 885 of file MuPDFStructuredTextPage.cs.

6.12.3.5 Origin

```
PointF MuPDFCore.MuPDFStructuredTextCharacter.Origin [get]
```

The baseline origin of the character.

Definition at line 890 of file MuPDFStructuredTextPage.cs.

6.12.3.6 Size

```
float MuPDFCore.MuPDFStructuredTextCharacter.Size  [get]
```

The size in points of the character.

Definition at line 900 of file MuPDFStructuredTextPage.cs.

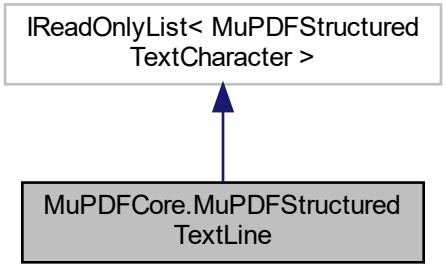
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.13 MuPDFCore.MuPDFStructuredTextLine Class Reference

Represents a single line of text (i.e. characters that share a common baseline).

Inheritance diagram for MuPDFCore.MuPDFStructuredTextLine:



Public Types

- enum WritingModes { WritingModes.Horizontal = 0, WritingModes.Vertical = 1 }
  Defines the writing mode of the text.

Public Member Functions

- override string ToString ()
  Returns a string representation of the line.
- IEnumerator< MuPDFStructuredTextCharacter > GetEnumerator ()

Public Attributes

- int Count => ((IReadOnlyCollection<MuPDFStructuredTextCharacter>)Characters).Count
  The number of characters in the line.
- MuPDFStructuredTextCharacter this[int index] => ((IReadOnlyList<MuPDFStructuredTextCharacter>)Characters)[index]
  Gets the specified character from the line.

Properties

- WritingModes WritingMode [get]

  The writing mode of the text.
- PointF Direction [get]

  The normalised direction of the text baseline.
- Rectangle BoundingBox [get]

  The bounding box of the line.
- MuPDFStructuredTextCharacter[] Characters [get]

  The characters contained in the line.
- string Text [get]

  A string representation of the characters contained in the line.

6.13.1 Detailed Description

Represents a single line of text (i.e. characters that share a common baseline).

Definition at line 716 of file MuPDFStructuredTextPage.cs.

6.13.2 Member Enumeration Documentation

6.13.2.1 WritingModes

```
enum MuPDFCore.MuPDFStructuredTextLine.WritingModes [strong]
```

Defines the writing mode of the text.

Enumerator

Horizontal	The text is written horizontally.
Vertical	The text is written vertically.

Definition at line 721 of file MuPDFStructuredTextPage.cs.

6.13.3 Member Function Documentation

6.13.3.1 ToString()

```
override string MuPDFCore.MuPDFStructuredTextLine.ToString ( )
```

Returns a string representation of the line.

Returns

A string representation of the line.

Definition at line 850 of file MuPDFStructuredTextPage.cs.

6.13.4 Member Data Documentation

6.13.4.1 Count

```
int MuPDFCore.MuPDFStructuredTextLine.Count => ((IReadOnlyCollection<MuPDFStructuredTextCharacter>)Characters
```

The number of characters in the line.

Definition at line 762 of file MuPDFStructuredTextPage.cs.

6.13.4.2 this[int index]

```
MuPDFStructuredTextCharacter MuPDFCore.MuPDFStructuredTextLine.this[int index] => ((IRead↩
OnlyList<MuPDFStructuredTextCharacter>)Characters)[index]
```

Gets the specified character from the line.

Parameters

index	The index of the character.

Returns

The MuPDFStructuredTextCharacter with the specified *index* .

Definition at line 769 of file MuPDFStructuredTextPage.cs.

6.13.5 Property Documentation

6.13.5.1 BoundingBox

```
Rectangle MuPDFCore.MuPDFStructuredTextLine.BoundingBox  [get]
```

The bounding box of the line.

Definition at line 747 of file MuPDFStructuredTextPage.cs.

6.13.5.2 Characters

```
MuPDFStructuredTextCharacter [] MuPDFCore.MuPDFStructuredTextLine.Characters  [get]
```

The characters contained in the line.

Definition at line 752 of file MuPDFStructuredTextPage.cs.

6.13.5.3 Direction

```
PointF MuPDFCore.MuPDFStructuredTextLine.Direction  [get]
```

The normalised direction of the text baseline.

Definition at line 742 of file MuPDFStructuredTextPage.cs.

6.13.5.4 Text

```
string MuPDFCore.MuPDFStructuredTextLine.Text  [get]
```

A string representation of the characters contained in the line.

Definition at line 757 of file MuPDFStructuredTextPage.cs.

6.13.5.5 WritingMode

```
WritingModes MuPDFCore.MuPDFStructuredTextLine.WritingMode  [get]
```

The writing mode of the text.

Definition at line 737 of file MuPDFStructuredTextPage.cs.

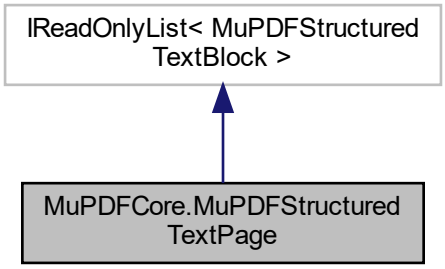
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.14 MuPDFCore.MuPDFStructuredTextPage Class Reference

Represents a structured representation of the text contained in a page.

Inheritance diagram for MuPDFCore.MuPDFStructuredTextPage:



Public Member Functions

- MuPDFStructuredTextAddress? GetHitAddress (PointF point, bool includeImages)

  Gets the address of the character that contains the specified point in page units.
- MuPDFStructuredTextAddress? GetClosestHitAddress (PointF point, bool includeImages)

  Gets the address of the character that contains the specified point in page units.
- IEnumerable< Quad > GetHighlightQuads (MuPDFStructuredTextAddressSpan range, bool includeImages)

  Gets a collection of Quads delimiting the specified character range . Where possible, these are collapsed at the line and block level. Each Quad may or may not be a rectangle.
- string GetText (MuPDFStructuredTextAddressSpan range)

  Gets the text corresponding to the specified character range . Blocks containing images are ignored.
- IEnumerable< MuPDFStructuredTextAddressSpan > Search (Regex needle)

  Searches for the specified Regex in the text of the page. A single match cannot span multiple lines.
- IEnumerator< MuPDFStructuredTextBlock > GetEnumerator ()

Public Attributes

- int Count => ((IReadOnlyCollection<MuPDFStructuredTextBlock>)StructuredTextBlocks).Count

  The number of blocks in the page.
- MuPDFStructuredTextBlock this[int index] => ((IReadOnlyList<MuPDFStructuredTextBlock>)StructuredTextBlocks)[index]

  Gets the specified block in the page.

Properties

- MuPDFStructuredTextBlock[] StructuredTextBlocks `[get]`

  The blocks contained in the page.
- MuPDFStructuredTextCharacter this[MuPDFStructuredTextAddress address] `[get]`

  Gets the specified character in the page.

6.14.1 Detailed Description

Represents a structured representation of the text contained in a page.

Definition at line 13 of file MuPDFStructuredTextPage.cs.

6.14.2 Member Function Documentation

6.14.2.1 GetClosestHitAddress()

```
MuPDFStructuredTextAddress?  MuPDFCore.MuPDFStructuredTextPage.GetClosestHitAddress (
            PointF point,
            bool includeImages )
```

Gets the address of the character that contains the specified *point* in page units.

Parameters

point	The point that must be closest to the character. This is expressed in page units (i.e. with a zoom factor of 1).
includeImages	If this is `true`, blocks containing images may be returned. Otherwise, only blocks containing text are considered.

Returns

The address of the character closest to the specified *point* This is `null` only if the page contains no characters.

Definition at line 172 of file MuPDFStructuredTextPage.cs.

6.14.2.2 GetHighlightQuads()

```
IEnumerable<Quad> MuPDFCore.MuPDFStructuredTextPage.GetHighlightQuads (
            MuPDFStructuredTextAddressSpan range,
            bool includeImages )
```

Gets a collection of Quads delimiting the specified character *range* . Where possible, these are collapsed at the line and block level. Each Quad may or may not be a rectangle.

Parameters

range	A MuPDFStructuredTextAddressSpan representing the character range
includeImages	If this is `true`, the bounding boxes for blocks containing images are also returned. Otherwise, only blocks containing text are considered.

Returns

A lazy collection of Quads delimiting the characters in the specified *includeImages* .

Definition at line 245 of file MuPDFStructuredTextPage.cs.

6.14.2.3 GetHitAddress()

```
MuPDFStructuredTextAddress?  MuPDFCore.MuPDFStructuredTextPage.GetHitAddress (
            PointF point,
            bool includeImages )
```

Gets the address of the character that contains the specified *point* in page units.

Parameters

point	The point that must be contained by the character. This is expressed in page units (i.e. with a zoom factor of 1).
includeImages	If this is `true`, blocks containing images may be returned. Otherwise, only blocks containing text are considered.

Returns

The address of the character containing the specified *point* , or `null` if no character contains the *point* .

Definition at line 138 of file MuPDFStructuredTextPage.cs.

6.14.2.4 GetText()

```
string MuPDFCore.MuPDFStructuredTextPage.GetText (
            MuPDFStructuredTextAddressSpan range )
```

Gets the text corresponding to the specified character *range* . Blocks containing images are ignored.

Parameters

range	A MuPDFStructuredTextAddressSpan representing the range of text to extract.

Returns

A string representation of the text contained in the specified *range* .

Definition at line 350 of file MuPDFStructuredTextPage.cs.

6.14.2.5 Search()

```
IEnumerable<MuPDFStructuredTextAddressSpan> MuPDFCore.MuPDFStructuredTextPage.Search (
            Regex needle )
```

Searches for the specified Regex in the text of the page. A single match cannot span multiple lines.

Parameters

needle	The Regex to search for.

Returns

A lazy collection of MuPDFStructuredTextAddressSpans representing all the occurrences of the *needle* in the text.

Definition at line 461 of file MuPDFStructuredTextPage.cs.

6.14.3 Member Data Documentation

6.14.3.1 Count

```
int MuPDFCore.MuPDFStructuredTextPage.Count => ((IReadOnlyCollection<MuPDFStructuredTextBlock>)StructuredText
```

The number of blocks in the page.

Definition at line 23 of file MuPDFStructuredTextPage.cs.

6.14.3.2 this[int index]

```
MuPDFStructuredTextBlock MuPDFCore.MuPDFStructuredTextPage.this[int index] => ((IReadOnly↩
List<MuPDFStructuredTextBlock>)StructuredTextBlocks)[index]
```

Gets the specified block in the page.

Parameters

index	The index of the block.

Returns

The block with the specified *index* .

Definition at line 30 of file MuPDFStructuredTextPage.cs.

6.14.4 Property Documentation

6.14.4.1 StructuredTextBlocks

```
MuPDFStructuredTextBlock [] MuPDFCore.MuPDFStructuredTextPage.StructuredTextBlocks [get]
```

The blocks contained in the page.

Definition at line 18 of file MuPDFStructuredTextPage.cs.

6.14.4.2 this[MuPDFStructuredTextAddress address]

```
MuPDFStructuredTextCharacter MuPDFCore.MuPDFStructuredTextPage.this[MuPDFStructuredTextAddress
address] [get]
```

Gets the specified character in the page.

Parameters

address	The address (block, line and character index) of the character.

Returns

A MuPDFStructuredTextCharacter representing the specified character.

Definition at line 37 of file MuPDFStructuredTextPage.cs.

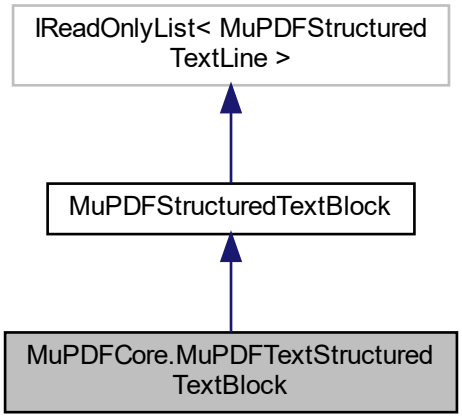
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.15 MuPDFCore.MuPDFTextStructuredTextBlock Class Reference

Represents a block containing multiple lines of text (typically a paragraph).

Inheritance diagram for MuPDFCore.MuPDFTextStructuredTextBlock:



Public Member Functions

- override IEnumerator< MuPDFStructuredTextLine > GetEnumerator ()
- override string ToString ()

  Returns the text contained in the block as a string.

Public Attributes

- override Types Type => Types.Text
- override int Count => ((IReadOnlyCollection<MuPDFStructuredTextLine>)Lines).Count
- override MuPDFStructuredTextLine this[int index] => ((IReadOnlyList<MuPDFStructuredTextLine>)Lines)[index]

Properties

- MuPDFStructuredTextLine[ ] Lines `[get]`

  The lines of text in the block.

Additional Inherited Members

6.15.1 Detailed Description

Represents a block containing multiple lines of text (typically a paragraph).

Definition at line 620 of file MuPDFStructuredTextPage.cs.

6.15.2 Member Function Documentation

6.15.2.1 ToString()

```
override string MuPDFCore.MuPDFTextStructuredTextBlock.ToString ( )
```

Returns the text contained in the block as a string.

Returns

The text contained in the block as a string. If the block contains at least one line, the return value has a line terminator at the end.

Definition at line 700 of file MuPDFStructuredTextPage.cs.

6.15.3 Property Documentation

6.15.3.1 Lines

```
MuPDFStructuredTextLine [] MuPDFCore.MuPDFTextStructuredTextBlock.Lines  [get]
```

The lines of text in the block.

Definition at line 628 of file MuPDFStructuredTextPage.cs.

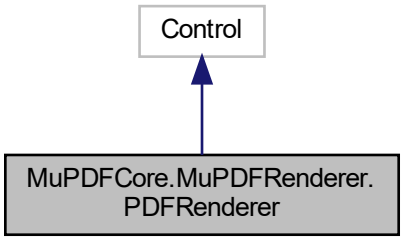
The documentation for this class was generated from the following file:

- MuPDFCore/MuPDFStructuredTextPage.cs

6.16 MuPDFCore.MuPDFRenderer.PDFRenderer Class Reference

A control to render PDF documents (and other formats), potentally using multiple threads.

Inheritance diagram for MuPDFCore.MuPDFRenderer.PDFRenderer:



Public Types

- enum PointerEventHandlers { PointerEventHandlers.Pan, PointerEventHandlers.Highlight, PointerEventHandlers.PanHighlight, PointerEventHandlers.Custom }

  Identifies the action to perform on pointer events.

Public Member Functions

- PDFRenderer ()

  Initializes a new instance of the PDFRenderer class.
- void Initialize (MuPDFDocument document, int threadCount=0, int pageNumber=0, double resolution↩ Multiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a MuPDFDocument.
- async Task InitializeAsync (MuPDFDocument document, int threadCount=0, int pageNumber=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a MuPDFDocument. The OCR step is run asynchronously, in order not to block the UI thread.
- void Initialize (string fileName, int threadCount=0, int pageNumber=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from disk.
- async Task InitializeAsync (string fileName, int threadCount=0, int pageNumber=0, double resolution↩ Multiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from disk. The OCR step is run asynchronously, in order not to block the UI thread.
- void Initialize (MemoryStream ms, InputFileTypes fileType, int threadCount=0, int pageNumber=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from a MemoryStream.
- async Task InitializeAsync (MemoryStream ms, InputFileTypes fileType, int threadCount=0, int page↩ Number=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocr↩ Language=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from a MemoryStream. The OCR step is run asynchronously, in order not to block the UI thread.
- void Initialize (byte[] dataBytes, InputFileTypes fileType, int offset=0, int length=-1, int threadCount=0, int pageNumber=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocr↩ Language=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from an array of bytes.
- async Task InitializeAsync (byte[] dataBytes, InputFileTypes fileType, int offset=0, int length=-1, int threadCount=0, int pageNumber=0, double resolutionMultiplier=1, bool includeAnnotations=true, TesseractLanguage ocrLanguage=null)

  Set up the PDFRenderer to display a page of a document that will be loaded from an array of bytes. The OCR step is run asynchronously, in order not to block the UI thread.
- void ReleaseResources ()

  Release resources held by this PDFRenderer. This is not an irreversible step: using one of the Initialize overloads after calling this method will restore functionality.
- void SetDisplayAreaNow (Rect value)

  Set the current display area to the specified value , skipping all transitions.
- void ZoomStep (double count, Point? center=null)

  Zoom around a point.
- void Contain ()

  Alter the display area so that the whole page fits on screen.
- void Cover ()

  Alter the display area so that the page covers the whole surface of the PDFRenderer (even though parts of the page may be outside it).

- RenderProgress GetProgress ()

  Get the current rendering progress.
- string GetSelectedText ()

  Get the currently selected text.
- void SelectAll ()

  Selects all the text in the document.
- int Search (Regex needle)

  Highlights all matches of the specified Regex in the text and returns the number of matches found. Matches cannot span multiple lines.
- override void Render (DrawingContext context)

  Draw the rendered document.

Static Public Attributes

- static readonly DirectProperty< PDFRenderer, int > RenderThreadCountProperty = AvaloniaProperty.↩ RegisterDirect<PDFRenderer, int>(nameof(RenderThreadCount), o => o.RenderThreadCount)

  Defines the RenderThreadCount property.
- static readonly DirectProperty< PDFRenderer, int > PageNumberProperty = AvaloniaProperty.Register↩ Direct<PDFRenderer, int>(nameof(PageNumber), o => o.PageNumber)

  Defines the PageNumber property.
- static readonly DirectProperty< PDFRenderer, bool > IsViewerInitializedProperty = AvaloniaProperty.↩ RegisterDirect<PDFRenderer, bool>(nameof(IsViewerInitialized), o => o.IsViewerInitialized)

  Defines the IsViewerInitialized property.
- static readonly DirectProperty< PDFRenderer, Rect > PageSizeProperty = AvaloniaProperty.Register↩ Direct<PDFRenderer, Rect>(nameof(PageSize), o => o.PageSize)

  Defines the PageSize property.
- static readonly StyledProperty< Rect > DisplayAreaProperty = AvaloniaProperty.Register<PDFRenderer, Rect>(nameof(DisplayArea))

  Defines the DisplayArea property.
- static readonly StyledProperty< double > ZoomIncrementProperty = AvaloniaProperty.Register<PDFRenderer, double>(nameof(ZoomIncrement), Math.Pow(2, 1.0 / 3.0), defaultBindingMode: Avalonia.Data.Binding↩ Mode.TwoWay)

  Defines the ZoomIncrement property.
- static readonly StyledProperty< IBrush > BackgroundProperty = AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(Background))

  Defines the Background property.
- static readonly StyledProperty< IBrush > PageBackgroundProperty = AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(PageBackground))

  Defines the PageBackground property.
- static readonly DirectProperty< PDFRenderer, double > ZoomProperty = AvaloniaProperty.Register↩ Direct<PDFRenderer, double>(nameof(Zoom), o => o.Zoom, (o, v) => o.Zoom = v, defaultBindingMode: Avalonia.Data.BindingMode.TwoWay)

  Defines the Zoom property.
- static readonly StyledProperty< PointerEventHandlers > PointerEventHandlerTypeProperty = Avalonia↩ Property.Register<PDFRenderer, PointerEventHandlers>(nameof(PointerEventHandlersType), PointerEventHandlers.PanHigh

  Defines the PointerEventHandlersType property.
- static readonly StyledProperty< bool > ZoomEnabledProperty = AvaloniaProperty.Register<PDFRenderer, bool>(nameof(ZoomEnabled), true)

  Defines the ZoomEnabled property.
- static readonly StyledProperty< MuPDFStructuredTextAddressSpan > SelectionProperty = Avalonia↩ Property.Register<PDFRenderer, MuPDFStructuredTextAddressSpan>(nameof(Selection), null)

  Defines the Selection property.

- static readonly StyledProperty< IBrush > SelectionBrushProperty = AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(SelectionBrush), new SolidColorBrush(Color.FromArgb(96, 86, 180, 233)))

  Defines the SelectionBrush property.
- static readonly StyledProperty< IEnumerable< MuPDFStructuredTextAddressSpan > > HighlightedRegionsProperty = AvaloniaProperty.Register<PDFRenderer, IEnumerable<MuPDFStructuredTextAddressSpan>>(nameof(HighlightedRegion null)

  Defines the HighlightedRegions property.
- static readonly StyledProperty< IBrush > HighlightBrushProperty = AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(HighlightBrush), new SolidColorBrush(Color.FromArgb(96, 230, 159, 0)))

  Defines the HighlightBrush property.

Properties

- int RenderThreadCount `[get]`

  Exposes the number of threads that the current instance is using to render the document. Read-only.
- int PageNumber `[get]`

  Exposes the number of the page that the current instance is rendering. Read-only.
- bool IsViewerInitialized `[get]`

  Whether the current instance has been initialised with a document to render or not. Read-only.
- Rect PageSize `[get]`

  Exposes the size of the page that is drawn by the current instance (in page units).
- Rect DisplayArea `[get, set]`

  The region of the page (in page units) that is currently displayed by the current instance. This always has the same aspect ratio of the bounds of this control. When this is set, the value is sanitised so that the smallest rectangle with the correct aspect ratio containing the requested value is chosen.
- double ZoomIncrement `[get, set]`

  Determines by how much the scale will be increased/decreased by the ZoomStep(double, Point?) method. Set this to a value smaller than 1 to invert the zoom in/out direction.
- IBrush Background `[get, set]`

  The background colour of the control.
- IBrush PageBackground `[get, set]`

  The background colour to use for the page drawn by the control.
- double Zoom `[get, set]`

  The current zoom level. Setting this will change the DisplayArea appropriately, zooming around the center of the DisplayArea.
- PointerEventHandlers PointerEventHandlersType `[get, set]`

  Whether the default handlers for pointer events (which are used for panning around the page) should be enabled. If this is false, you will have to implement your own way to pan around the document by changing the DisplayArea.
- bool ZoomEnabled `[get, set]`

  Whether the default handlers for pointer wheel events (which are used for zooming in/out) should be enabled. If this is false, you will have to implement your own way to zoom by changing the DisplayArea.
- MuPDFStructuredTextAddressSpan Selection `[get, set]`

  The start and end of the currently selected text.
- IBrush SelectionBrush `[get, set]`

  The colour used to highlight the Selection.
- IEnumerable< MuPDFStructuredTextAddressSpan > HighlightedRegions `[get, set]`

  A collection of highlighted regions, e.g. as a result of a text search.
- IBrush HighlightBrush `[get, set]`

  The colour used to highlight the HighlightedRegions.

6.16.1 Detailed Description

A control to render PDF documents (and other formats), potentally using multiple threads.

Definition at line 42 of file PDFRenderer.cs.

6.16.2 Member Enumeration Documentation

6.16.2.1 PointerEventHandlers

```
enum MuPDFCore.MuPDFRenderer.PDFRenderer.PointerEventHandlers  [strong]
```

Identifies the action to perform on pointer events.

Enumerator

Pan	Pointer events will be used to pan around the page.
Highlight	Pointer events will be used to highlight text.
PanHighlight	Pointer events will be used to pan around the page or to highlight text, depending on where they start.
Custom	Pointer events will be ignored. If you use this value, you will have to implement your own way to pan around the document by changing the DisplayArea or to select text.

Definition at line 246 of file PDFRenderer.Properties.cs.

6.16.3 Constructor & Destructor Documentation

6.16.3.1 PDFRenderer()

```
MuPDFCore.MuPDFRenderer.PDFRenderer.PDFRenderer ( )
```

Initializes a new instance of the PDFRenderer class.

Definition at line 203 of file PDFRenderer.cs.

6.16.4 Member Function Documentation

6.16.4.1 Contain()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Contain ( )
```

Alter the display area so that the whole page fits on screen.

Definition at line 688 of file PDFRenderer.cs.

6.16.4.2 Cover()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Cover ( )
```

Alter the display area so that the page covers the whole surface of the PDFRenderer (even though parts of the page may be outside it).

Definition at line 697 of file PDFRenderer.cs.

6.16.4.3 GetProgress()

```
RenderProgress MuPDFCore.MuPDFRenderer.PDFRenderer.GetProgress ( )
```

Get the current rendering progress.

Returns

A RenderProgress object with information about the rendering progress of each thread.

Definition at line 718 of file PDFRenderer.cs.

6.16.4.4 GetSelectedText()

```
string MuPDFCore.MuPDFRenderer.PDFRenderer.GetSelectedText ( )
```

Get the currently selected text.

Returns

The currently selected text.

Definition at line 727 of file PDFRenderer.cs.

6.16.4.5 Initialize() [1/4]

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Initialize (
            byte[] dataBytes,
            InputFileTypes fileType,
            int offset = 0,
            int length = -1,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from an array of bytes.

Parameters

dataBytes	The bytes of the document that should be opened. The array will be copied and can be safely discarded/altered after this method returns.
fileType	The format of the document.
offset	The offset in the byte array at which the document starts.
length	The length of the document in bytes. If this is < 0, the whole array is used.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 397 of file PDFRenderer.cs.

6.16.4.6 Initialize() [2/4]

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Initialize (
            MemoryStream ms,
            InputFileTypes fileType,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from a MemoryStream.

Parameters

ms	The MemoryStream containing the document that should be opened. This can be safely disposed after this method returns.
fileType	The format of the document.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 355 of file PDFRenderer.cs.

6.16.4.7 Initialize() [3/4]

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Initialize (
            MuPDFDocument document,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a MuPDFDocument.

Parameters

document	The MuPDFDocument to render.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 258 of file PDFRenderer.cs.

6.16.4.8 Initialize() [4/4]

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.Initialize (
            string fileName,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from disk.

Parameters

fileName	The path to the document that should be opened.

Parameters

threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 306 of file PDFRenderer.cs.

6.16.4.9 InitializeAsync() [1/4]

```
async Task MuPDFCore.MuPDFRenderer.PDFRenderer.InitializeAsync (
            byte[] dataBytes,
            InputFileTypes fileType,
            int offset = 0,
            int length = -1,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from an array of bytes. The OCR step is run asynchronously, in order not to block the UI thread.

Parameters

dataBytes	The bytes of the document that should be opened. The array will be copied and can be safely discarded/altered after this method returns.
fileType	The format of the document.
offset	The offset in the byte array at which the document starts.
length	The length of the document in bytes. If this is < 0, the whole array is used.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 438 of file PDFRenderer.cs.

6.16.4.10 InitializeAsync() [2/4]

```
async Task MuPDFCore.MuPDFRenderer.PDFRenderer.InitializeAsync (
            MemoryStream ms,
            InputFileTypes fileType,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from a MemoryStream. The OCR step is run asynchronously, in order not to block the UI thread.

Parameters

ms	The MemoryStream containing the document that should be opened. This can be safely disposed after this method returns.
fileType	The format of the document.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 375 of file PDFRenderer.cs.

6.16.4.11 InitializeAsync() [3/4]

```
async Task MuPDFCore.MuPDFRenderer.PDFRenderer.InitializeAsync (
            MuPDFDocument document,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a MuPDFDocument. The OCR step is run asynchronously, in order not to block the UI thread.

Parameters

document	The MuPDFDocument to render.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 282 of file PDFRenderer.cs.

6.16.4.12 InitializeAsync() [4/4]

```
async Task MuPDFCore.MuPDFRenderer.PDFRenderer.InitializeAsync (
            string fileName,
            int threadCount = 0,
            int pageNumber = 0,
            double resolutionMultiplier = 1,
            bool includeAnnotations = true,
            TesseractLanguage ocrLanguage = null )
```

Set up the PDFRenderer to display a page of a document that will be loaded from disk. The OCR step is run asynchronously, in order not to block the UI thread.

Parameters

fileName	The path to the document that should be opened.
threadCount	The number of threads to use in the rendering. If this is 0, an appropriate number of threads based on the number of processors in the computer will be used. Otherwise, this must be factorisable using only powers of 2, 3, 5 or 7. If this is not the case, the biggest number smaller than *threadCount* that satisfies this condition is used.
pageNumber	The index of the page that should be rendered. The first page has index 0.
resolutionMultiplier	This value can be used to increase or decrease the resolution at which the static renderisation of the page will be produced. If *resolutionMultiplier* is 1, the resolution will match the size (in screen units) of the PDFRenderer.
includeAnnotations	If this is `true`, annotations (e.g. signatures) are included in the rendering. Otherwise, only the page contents are included.
ocrLanguage	The language to use for optical character recognition (OCR). If this is null, no OCR is performed.

Definition at line 330 of file PDFRenderer.cs.

6.16.4.13 ReleaseResources()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.ReleaseResources ( )
```

Release resources held by this PDFRenderer. This is not an irreversible step: using one of the Initialize overloads after calling this method will restore functionality.

Definition at line 609 of file PDFRenderer.cs.

6.16.4.14 Render()

```
override void MuPDFCore.MuPDFRenderer.PDFRenderer.Render (
            DrawingContext context )
```

Draw the rendered document.

Parameters

context	The drawing context on which to draw.

Definition at line 1289 of file PDFRenderer.cs.

6.16.4.15 Search()

```
int MuPDFCore.MuPDFRenderer.PDFRenderer.Search (
            Regex needle )
```

Highlights all matches of the specified Regex in the text and returns the number of matches found. Matches cannot span multiple lines.

Parameters

needle	The Regex to search for.

Returns

The number of matches that have been found.

Definition at line 756 of file PDFRenderer.cs.

6.16.4.16 SelectAll()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.SelectAll ( )
```

Selects all the text in the document.

Definition at line 735 of file PDFRenderer.cs.

6.16.4.17 SetDisplayAreaNow()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.SetDisplayAreaNow (
            Rect value )
```

Set the current display area to the specified *value* , skipping all transitions.

Parameters

value	The new display area.

Definition at line 650 of file PDFRenderer.cs.

6.16.4.18 ZoomStep()

```
void MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomStep (
            double count,
            Point?  center = null )
```

Zoom around a point.

Parameters

count	Number of steps to zoom. Positive values indicate a zoom in, negative values a zoom out.
center	The point around which to center the zoom operation. If this is null, the center of the control is used.

Definition at line 663 of file PDFRenderer.cs.

6.16.5 Member Data Documentation

6.16.5.1 BackgroundProperty

```
readonly StyledProperty<IBrush> MuPDFCore.MuPDFRenderer.PDFRenderer.BackgroundProperty =
AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(Background))  [static]
```

Defines the Background property.

Definition at line 182 of file PDFRenderer.Properties.cs.

6.16.5.2 DisplayAreaProperty

```
readonly StyledProperty<Rect> MuPDFCore.MuPDFRenderer.PDFRenderer.DisplayAreaProperty = Avalonia↩
Property.Register<PDFRenderer, Rect>(nameof(DisplayArea))  [static]
```

Defines the DisplayArea property.

Definition at line 128 of file PDFRenderer.Properties.cs.

6.16.5.3 HighlightBrushProperty

```
readonly StyledProperty<IBrush> MuPDFCore.MuPDFRenderer.PDFRenderer.HighlightBrushProperty
= AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(HighlightBrush), new SolidColor↩
Brush(Color.FromArgb(96, 230, 159, 0)))  [static]
```

Defines the HighlightBrush property.

Definition at line 337 of file PDFRenderer.Properties.cs.

6.16.5.4 HighlightedRegionsProperty

```
readonly StyledProperty<IEnumerable<MuPDFStructuredTextAddressSpan> > MuPDFCore.MuPDFRenderer.↩
PDFRenderer.HighlightedRegionsProperty = AvaloniaProperty.Register<PDFRenderer, IEnumerable<MuPDFStructuredTe
null)  [static]
```

Defines the HighlightedRegions property.

Definition at line 324 of file PDFRenderer.Properties.cs.

6.16.5.5 IsViewerInitializedProperty

```
readonly DirectProperty<PDFRenderer, bool> MuPDFCore.MuPDFRenderer.PDFRenderer.IsViewer↩
InitializedProperty = AvaloniaProperty.RegisterDirect<PDFRenderer, bool>(nameof(IsViewerInitialized),
o => o.IsViewerInitialized)  [static]
```

Defines the IsViewerInitialized property.

Definition at line 80 of file PDFRenderer.Properties.cs.

6.16.5.6 PageBackgroundProperty

```
readonly StyledProperty<IBrush> MuPDFCore.MuPDFRenderer.PDFRenderer.PageBackgroundProperty =
AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(PageBackground))  [static]
```

Defines the PageBackground property.

Definition at line 195 of file PDFRenderer.Properties.cs.

6.16.5.7 PageNumberProperty

```
readonly DirectProperty<PDFRenderer, int> MuPDFCore.MuPDFRenderer.PDFRenderer.PageNumber↩
Property = AvaloniaProperty.RegisterDirect<PDFRenderer, int>(nameof(PageNumber), o => o.↩
PageNumber)  [static]
```

Defines the PageNumber property.

Definition at line 56 of file PDFRenderer.Properties.cs.

6.16.5.8 PageSizeProperty

```
readonly DirectProperty<PDFRenderer, Rect> MuPDFCore.MuPDFRenderer.PDFRenderer.PageSize↩
Property = AvaloniaProperty.RegisterDirect<PDFRenderer, Rect>(nameof(PageSize), o => o.Page↩
Size)  [static]
```

Defines the PageSize property.

Definition at line 104 of file PDFRenderer.Properties.cs.

6.16.5.9 PointerEventHandlerTypeProperty

```
readonly StyledProperty<PointerEventHandlers> MuPDFCore.MuPDFRenderer.PDFRenderer.Pointer↩
EventHandlerTypeProperty = AvaloniaProperty.Register<PDFRenderer, PointerEventHandlers>(nameof(PointerEventHa
PointerEventHandlers.PanHighlight)  [static]
```

Defines the PointerEventHandlersType property.

Definition at line 272 of file PDFRenderer.Properties.cs.

6.16.5.10 RenderThreadCountProperty

```
readonly DirectProperty<PDFRenderer, int> MuPDFCore.MuPDFRenderer.PDFRenderer.RenderThread↩
CountProperty = AvaloniaProperty.RegisterDirect<PDFRenderer, int>(nameof(RenderThreadCount), o
=> o.RenderThreadCount)  [static]
```

Defines the RenderThreadCount property.

Definition at line 32 of file PDFRenderer.Properties.cs.

6.16.5.11 SelectionBrushProperty

```
readonly StyledProperty<IBrush> MuPDFCore.MuPDFRenderer.PDFRenderer.SelectionBrushProperty
= AvaloniaProperty.Register<PDFRenderer, IBrush>(nameof(SelectionBrush), new SolidColor↩
Brush(Color.FromArgb(96, 86, 180, 233)))  [static]
```

Defines the SelectionBrush property.

Definition at line 311 of file PDFRenderer.Properties.cs.

6.16.5.12 SelectionProperty

```
readonly StyledProperty<MuPDFStructuredTextAddressSpan> MuPDFCore.MuPDFRenderer.PDFRenderer.↩
SelectionProperty = AvaloniaProperty.Register<PDFRenderer, MuPDFStructuredTextAddressSpan>(nameof(Selection),
null)  [static]
```

Defines the Selection property.

Definition at line 298 of file PDFRenderer.Properties.cs.

6.16.5.13 ZoomEnabledProperty

```
readonly StyledProperty<bool> MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomEnabledProperty = Avalonia↩
Property.Register<PDFRenderer, bool>(nameof(ZoomEnabled), true)  [static]
```

Defines the ZoomEnabled property.

Definition at line 285 of file PDFRenderer.Properties.cs.

6.16.5.14 ZoomIncrementProperty

```
readonly StyledProperty<double> MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomIncrementProperty =
AvaloniaProperty.Register<PDFRenderer, double>(nameof(ZoomIncrement), Math.Pow(2, 1.0 / 3.0),
defaultBindingMode:  Avalonia.Data.BindingMode.TwoWay)  [static]
```

Defines the ZoomIncrement property.

Definition at line 160 of file PDFRenderer.Properties.cs.

6.16.5.15 ZoomProperty

```
readonly DirectProperty<PDFRenderer, double> MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomProperty
= AvaloniaProperty.RegisterDirect<PDFRenderer, double>(nameof(Zoom), o => o.Zoom, (o, v) =>
o.Zoom = v, defaultBindingMode:  Avalonia.Data.BindingMode.TwoWay)  [static]
```

Defines the Zoom property.

Definition at line 208 of file PDFRenderer.Properties.cs.

6.16.6 Property Documentation

6.16.6.1 Background

```
IBrush MuPDFCore.MuPDFRenderer.PDFRenderer.Background  [get], [set]
```

The background colour of the control.

Definition at line 186 of file PDFRenderer.Properties.cs.

6.16.6.2 DisplayArea

```
Rect MuPDFCore.MuPDFRenderer.PDFRenderer.DisplayArea  [get], [set]
```

The region of the page (in page units) that is currently displayed by the current instance. This always has the same aspect ratio of the bounds of this control. When this is set, the value is sanitised so that the smallest rectangle with the correct aspect ratio containing the requested value is chosen.

Definition at line 133 of file PDFRenderer.Properties.cs.

6.16.6.3 HighlightBrush

```
IBrush MuPDFCore.MuPDFRenderer.PDFRenderer.HighlightBrush  [get], [set]
```

The colour used to highlight the HighlightedRegions.

Definition at line 341 of file PDFRenderer.Properties.cs.

6.16.6.4 HighlightedRegions

```
IEnumerable<MuPDFStructuredTextAddressSpan> MuPDFCore.MuPDFRenderer.PDFRenderer.Highlighted↩
Regions  [get], [set]
```

A collection of highlighted regions, e.g. as a result of a text search.

Definition at line 328 of file PDFRenderer.Properties.cs.

6.16.6.5 IsViewerInitialized

```
bool MuPDFCore.MuPDFRenderer.PDFRenderer.IsViewerInitialized  [get]
```

Whether the current instance has been initialised with a document to render or not. Read-only.

Definition at line 88 of file PDFRenderer.Properties.cs.

6.16.6.6 PageBackground

```
IBrush MuPDFCore.MuPDFRenderer.PDFRenderer.PageBackground  [get], [set]
```

The background colour to use for the page drawn by the control.

Definition at line 199 of file PDFRenderer.Properties.cs.

6.16.6.7 PageNumber

```
int MuPDFCore.MuPDFRenderer.PDFRenderer.PageNumber  [get]
```

Exposes the number of the page that the current instance is rendering. Read-only.

Definition at line 64 of file PDFRenderer.Properties.cs.

6.16.6.8 PageSize

```
Rect MuPDFCore.MuPDFRenderer.PDFRenderer.PageSize  [get]
```

Exposes the size of the page that is drawn by the current instance (in page units).

Definition at line 112 of file PDFRenderer.Properties.cs.

6.16.6.9 PointerEventHandlersType

```
PointerEventHandlers MuPDFCore.MuPDFRenderer.PDFRenderer.PointerEventHandlersType  [get], [set]
```

Whether the default handlers for pointer events (which are used for panning around the page) should be enabled. If this is false, you will have to implement your own way to pan around the document by changing the DisplayArea.

Definition at line 276 of file PDFRenderer.Properties.cs.

6.16.6.10 RenderThreadCount

```
int MuPDFCore.MuPDFRenderer.PDFRenderer.RenderThreadCount  [get]
```

Exposes the number of threads that the current instance is using to render the document. Read-only.

Definition at line 40 of file PDFRenderer.Properties.cs.

6.16.6.11 Selection

```
MuPDFStructuredTextAddressSpan MuPDFCore.MuPDFRenderer.PDFRenderer.Selection  [get], [set]
```

The start and end of the currently selected text.

Definition at line 302 of file PDFRenderer.Properties.cs.

6.16.6.12 SelectionBrush

```
IBrush MuPDFCore.MuPDFRenderer.PDFRenderer.SelectionBrush  [get], [set]
```

The colour used to highlight the Selection.

Definition at line 315 of file PDFRenderer.Properties.cs.

6.16.6.13 Zoom

```
double MuPDFCore.MuPDFRenderer.PDFRenderer.Zoom  [get], [set]
```

The current zoom level. Setting this will change the DisplayArea appropriately, zooming around the center of the DisplayArea.

Definition at line 216 of file PDFRenderer.Properties.cs.

6.16.6.14 ZoomEnabled

```
bool MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomEnabled  [get], [set]
```

Whether the default handlers for pointer wheel events (which are used for zooming in/out) should be enabled. If this is false, you will have to implement your own way to zoom by changing the DisplayArea.

Definition at line 289 of file PDFRenderer.Properties.cs.

6.16.6.15 ZoomIncrement

```
double MuPDFCore.MuPDFRenderer.PDFRenderer.ZoomIncrement  [get], [set]
```

Determines by how much the scale will be increased/decreased by the ZoomStep(double, Point?) method. Set this to a value smaller than 1 to invert the zoom in/out direction.

Definition at line 164 of file PDFRenderer.Properties.cs.

The documentation for this class was generated from the following files:

- MuPDFCore.MuPDFRenderer/PDFRenderer.cs
- MuPDFCore.MuPDFRenderer/PDFRenderer.Properties.cs

6.17 MuPDFCore.PointF Struct Reference

Represents a point.

Public Member Functions

- PointF (float x, float y)

  Create a new PointF from the specified coordinates.

Public Attributes

- float X

  The horizontal coordinate of the point.
- float Y

  The vertical coordinate of the point.

6.17.1 Detailed Description

Represents a point.

Definition at line 566 of file Rectangles.cs.

6.17.2 Constructor & Destructor Documentation

6.17.2.1 PointF()

```
MuPDFCore.PointF.PointF (
            float x,
            float y )
```

Create a new PointF from the specified coordinates.

Parameters

x	The horizontal coordinate of the point.
y	The vertical coordinate of the point.

Definition at line 583 of file Rectangles.cs.

6.17.3 Member Data Documentation

6.17.3.1 X

```
float MuPDFCore.PointF.X
```

The horizontal coordinate of the point.

Definition at line 571 of file Rectangles.cs.

6.17.3.2 Y

```
float MuPDFCore.PointF.Y
```

The vertical coordinate of the point.

Definition at line 576 of file Rectangles.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.18 MuPDFCore.Quad Struct Reference

Represents a quadrilater (not necessarily a rectangle).

Public Member Functions

- Quad (PointF lowerLeft, PointF upperLeft, PointF upperRight, PointF lowerRight)
  Creates a new Quad from the specified points.
- bool Contains (PointF point)
  Checks whether this Quad contains a PointF.

Public Attributes

- PointF LowerLeft
  The lower left point of the quadrilater.
- PointF UpperLeft
  The upper left point of the quadrilater.
- PointF UpperRight
  The upper right point of the quadrilater.
- PointF LowerRight
  The lower right point of the quadrilater.

6.18.1 Detailed Description

Represents a quadrilater (not necessarily a rectangle).

Definition at line 593 of file Rectangles.cs.

6.18.2 Constructor & Destructor Documentation

6.18.2.1 Quad()

```
MuPDFCore.Quad.Quad (
            PointF lowerLeft,
            PointF upperLeft,
            PointF upperRight,
            PointF lowerRight )
```

Creates a new Quad from the specified points.

Parameters

lowerLeft	The lower left point of the quadrilater.
upperLeft	The upper left point of the quadrilater.
upperRight	The upper right point of the quadrilater.
lowerRight	The lower right point of the quadrilater.

Definition at line 622 of file Rectangles.cs.

6.18.3 Member Function Documentation

6.18.3.1 Contains()

```
bool MuPDFCore.Quad.Contains (
            PointF point )
```

Checks whether this Quad contains a PointF.

Parameters

point	The PointF to check.

Returns

A boolean value indicating whether this Quad contains the *point* .

Definition at line 635 of file Rectangles.cs.

6.18.4 Member Data Documentation

6.18.4.1 LowerLeft

```
PointF MuPDFCore.Quad.LowerLeft
```

The lower left point of the quadrilater.

Definition at line 598 of file Rectangles.cs.

6.18.4.2 LowerRight

`PointF MuPDFCore.Quad.LowerRight`

The lower right point of the quadrilater.

Definition at line 613 of file Rectangles.cs.

6.18.4.3 UpperLeft

`PointF MuPDFCore.Quad.UpperLeft`

The upper left point of the quadrilater.

Definition at line 603 of file Rectangles.cs.

6.18.4.4 UpperRight

`PointF MuPDFCore.Quad.UpperRight`

The upper right point of the quadrilater.

Definition at line 608 of file Rectangles.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.19 MuPDFCore.Rectangle Struct Reference

Represents a rectangle.

Public Member Functions

- Rectangle (float x0, float y0, float x1, float y1)
  Create a new Rectangle from the specified coordinates.
- Rectangle (double x0, double y0, double x1, double y1)
  Create a new Rectangle from the specified coordinates.
- RoundedRectangle Round ()
  Round the rectangle's coordinates to the closest integers.
- RoundedRectangle Round (double zoom)
  Round the rectangle's coordinates to the closest integers, applying the specified zoom factor.
- Rectangle[ ] Split (int divisions)
  Split the rectangle into the specified number of Rectangles.
- Rectangle Intersect (Rectangle other)
  Compute the intersection between this Rectangle and another one.
- bool Contains (Rectangle other)
  Checks whether this Rectangle contains another Rectangle.
- bool Contains (PointF point)
  Checks whether this Rectangle contains a PointF.
- Quad ToQuad ()
  Converts the Rectangle to a Quad.

Public Attributes

- float X0

  The left coordinate of the rectangle.
- float Y0

  The top coordinate of the rectangle.
- float X1

  The right coordinate of the rectangle.
- float Y1

  The bottom coordinate of the rectangle.
- float Width => X1 - X0

  The width of the rectangle.
- float Height => Y1 - Y0

  The height of the rectangle.

6.19.1 Detailed Description

Represents a rectangle.

Definition at line 326 of file Rectangles.cs.

6.19.2 Constructor & Destructor Documentation

6.19.2.1 Rectangle() [1/2]

```
MuPDFCore.Rectangle.Rectangle (
            float x0,
            float y0,
            float x1,
            float y1 )
```

Create a new Rectangle from the specified coordinates.

Parameters

x0	The left coordinate of the rectangle.
y0	The top coordinate of the rectangle.
x1	The right coordinate of the rectangle.
y1	The bottom coordinate of the rectangle.

Definition at line 365 of file Rectangles.cs.

6.19.2.2 Rectangle() [2/2]

```
MuPDFCore.Rectangle.Rectangle (
            double x0,
            double y0,
            double x1,
            double y1 )
```

Create a new Rectangle from the specified coordinates.

Parameters

x0	The left coordinate of the rectangle.
y0	The top coordinate of the rectangle.
x1	The right coordinate of the rectangle.
y1	The bottom coordinate of the rectangle.

Definition at line 380 of file Rectangles.cs.

6.19.3 Member Function Documentation

6.19.3.1 Contains() [1/2]

```
bool MuPDFCore.Rectangle.Contains (
            PointF point )
```

Checks whether this Rectangle contains a PointF.

Parameters

point	The PointF to check.

Returns

A boolean value indicating whether this Rectangle contains the *point* .

Definition at line 476 of file Rectangles.cs.

6.19.3.2 Contains() [2/2]

```
bool MuPDFCore.Rectangle.Contains (
            Rectangle other )
```

Checks whether this Rectangle contains another Rectangle.

Parameters

other	The Rectangle to check.

Returns

A boolean value indicating whether this Rectangle contains the *other* Rectangle.

Definition at line 466 of file Rectangles.cs.

6.19.3.3 Intersect()

```
Rectangle MuPDFCore.Rectangle.Intersect (
            Rectangle other )
```

Compute the intersection between this Rectangle and another one.

Parameters

other	The other Rectangle to intersect with this instance.

Returns

The intersection between the two Rectangles.

Definition at line 443 of file Rectangles.cs.

6.19.3.4 Round() [1/2]

```
RoundedRectangle MuPDFCore.Rectangle.Round ( )
```

Round the rectangle's coordinates to the closest integers.

Returns

A RoundedRectangle with the rounded coordinates.

Definition at line 392 of file Rectangles.cs.

6.19.3.5 Round() [2/2]

```
RoundedRectangle MuPDFCore.Rectangle.Round (
            double zoom )
```

Round the rectangle's coordinates to the closest integers, applying the specified zoom factor.

Parameters

zoom	The zoom factor to apply.

Returns

A RoundedRectangle with the rounded coordinates.

Definition at line 407 of file Rectangles.cs.

6.19.3.6 Split()

```
Rectangle [] MuPDFCore.Rectangle.Split (
            int divisions )
```

Split the rectangle into the specified number of Rectangles.

Parameters

divisions	The number of rectangles in which the rectangle should be split. This must be factorisable using only powers of 2, 3, 5 or 7. Otherwise, the biggest number smaller than *divisions* that satisfies this condition is used.

Returns

An array of Rectangles that when positioned properly cover the same area as this object.

Definition at line 422 of file Rectangles.cs.

6.19.3.7 ToQuad()

```
Quad MuPDFCore.Rectangle.ToQuad ( )
```

Converts the Rectangle to a Quad.

Returns

A Quad corresponding to the current Rectangle.

Definition at line 485 of file Rectangles.cs.

6.19.4 Member Data Documentation

6.19.4.1 Height

```
float MuPDFCore.Rectangle.Height => Y1 - Y0
```

The height of the rectangle.

Definition at line 356 of file Rectangles.cs.

6.19.4.2 Width

```
float MuPDFCore.Rectangle.Width => X1 - X0
```

The width of the rectangle.

Definition at line 351 of file Rectangles.cs.

6.19.4.3 X0

```
float MuPDFCore.Rectangle.X0
```

The left coordinate of the rectangle.

Definition at line 331 of file Rectangles.cs.

6.19.4.4 X1

```
float MuPDFCore.Rectangle.X1
```

The right coordinate of the rectangle.

Definition at line 341 of file Rectangles.cs.

6.19.4.5 Y0

```
float MuPDFCore.Rectangle.Y0
```

The top coordinate of the rectangle.

Definition at line 336 of file Rectangles.cs.

6.19.4.6 Y1

```
float MuPDFCore.Rectangle.Y1
```

The bottom coordinate of the rectangle.

Definition at line 346 of file Rectangles.cs.

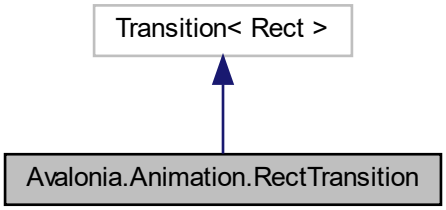
The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.20 Avalonia.Animation.RectTransition Class Reference

Transition class that handles AvaloniaProperty with Rect types.

Inheritance diagram for Avalonia.Animation.RectTransition:



Public Member Functions

- override IObservable< Rect > DoTransition (IObservable< double > progress, Rect oldValue, Rect new↩ Value)

6.20.1 Detailed Description

Transition class that handles AvaloniaProperty with Rect types.

Definition at line 26 of file RectTransition.cs.

The documentation for this class was generated from the following file:

- MuPDFCore.MuPDFRenderer/RectTransition.cs

6.21 MuPDFCore.RenderProgress Class Reference

Holds a summary of the progress of the current rendering operation.

Classes

- struct ThreadRenderProgress
  Holds the progress of a single thread.

Properties

- ThreadRenderProgress[] ThreadRenderProgresses `[get]`
  Contains the progress of all the threads used in rendering the document.

6.21.1 Detailed Description

Holds a summary of the progress of the current rendering operation.

Definition at line 270 of file MuPDF.cs.

6.21.2 Property Documentation

6.21.2.1 ThreadRenderProgresses

```
ThreadRenderProgress [] MuPDFCore.RenderProgress.ThreadRenderProgresses  [get]
```

Contains the progress of all the threads used in rendering the document.

Definition at line 297 of file MuPDF.cs.

The documentation for this class was generated from the following file:

- MuPDFCore/MuPDF.cs

6.22 MuPDFCore.RoundedRectangle Struct Reference

Represents a rectangle using only integer numbers.

Public Member Functions

- RoundedRectangle (int x0, int y0, int x1, int y1)
  Create a new RoundedRectangle from the specified coordinates.
- RoundedRectangle[] Split (int divisions)
  Split the rectangle into the specified number of RoundedRectangles.

Public Attributes

- int X0

  The left coordinate of the rectangle.
- int Y0

  The top coordinate of the rectangle.
- int X1

  The right coordinate of the rectangle.
- int Y1

  The bottom coordinate of the rectangle.
- int Width => X1 - X0

  The width of the rectangle.
- int Height => Y1 - Y0

  The height of the rectangle.

6.22.1 Detailed Description

Represents a rectangle using only integer numbers.

Definition at line 494 of file Rectangles.cs.

6.22.2 Constructor & Destructor Documentation

6.22.2.1 RoundedRectangle()

```
MuPDFCore.RoundedRectangle.RoundedRectangle (
            int x0,
            int y0,
            int x1,
            int y1 )
```

Create a new RoundedRectangle from the specified coordinates.

Parameters

x0	The left coordinate of the rectangle.
y0	The top coordinate of the rectangle.
x1	The right coordinate of the rectangle.
y1	The bottom coordinate of the rectangle.

Definition at line 533 of file Rectangles.cs.

6.22.3 Member Function Documentation

6.22.3.1 Split()

```
RoundedRectangle [] MuPDFCore.RoundedRectangle.Split (
            int divisions )
```

Split the rectangle into the specified number of RoundedRectangles.

Parameters

divisions	The number of rectangles in which the rectangle should be split. This must be factorisable using only powers of 2, 3, 5 or 7. Otherwise, the biggest number smaller than *divisions* that satisfies this condition is used.

Returns

An array of RoundedRectangles that when positioned properly cover the same area as this object.

Definition at line 546 of file Rectangles.cs.

6.22.4 Member Data Documentation

6.22.4.1 Height

```
int MuPDFCore.RoundedRectangle.Height => Y1 - Y0
```

The height of the rectangle.

Definition at line 524 of file Rectangles.cs.

6.22.4.2 Width

```
int MuPDFCore.RoundedRectangle.Width => X1 - X0
```

The width of the rectangle.

Definition at line 519 of file Rectangles.cs.

6.22.4.3 X0

```
int MuPDFCore.RoundedRectangle.X0
```

The left coordinate of the rectangle.

Definition at line 499 of file Rectangles.cs.

6.22.4.4 X1

```
int MuPDFCore.RoundedRectangle.X1
```

The right coordinate of the rectangle.

Definition at line 509 of file Rectangles.cs.

6.22.4.5 Y0

```
int MuPDFCore.RoundedRectangle.Y0
```

The top coordinate of the rectangle.

Definition at line 504 of file Rectangles.cs.

6.22.4.6 Y1

```
int MuPDFCore.RoundedRectangle.Y1
```

The bottom coordinate of the rectangle.

Definition at line 514 of file Rectangles.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.23 MuPDFCore.RoundedSize Struct Reference

Represents the size of a rectangle using only integer numbers.

Public Member Functions

- RoundedSize (int width, int height)

  Create a new RoundedSize with the specified width and height.
- RoundedRectangle[] Split (int divisions)

  Split the size into the specified number of RoundedRectangles.

Public Attributes

- int Width

  The width of the rectangle.
- int Height

  The height of the rectangle.

6.23.1 Detailed Description

Represents the size of a rectangle using only integer numbers.

Definition at line 181 of file Rectangles.cs.

6.23.2 Constructor & Destructor Documentation

6.23.2.1 RoundedSize()

```
MuPDFCore.RoundedSize.RoundedSize (
            int width,
            int height )
```

Create a new RoundedSize with the specified width and height.

Parameters

width	The width of the rectangle.
height	The height of the rectangle.

Definition at line 198 of file Rectangles.cs.

6.23.3 Member Function Documentation

6.23.3.1 Split()

```
RoundedRectangle [] MuPDFCore.RoundedSize.Split (
            int divisions )
```

Split the size into the specified number of RoundedRectangles.

Parameters

divisions	The number of rectangles in which the size should be split. This must be factorisable using only powers of 2, 3, 5 or 7. Otherwise, the biggest number smaller than *divisions* that satisfies this condition is used.

Returns

An array of RoundedRectangles that when positioned properly cover an area of the size of this object.

Definition at line 209 of file Rectangles.cs.

6.23.4 Member Data Documentation

6.23.4.1 Height

```
int MuPDFCore.RoundedSize.Height
```

The height of the rectangle.

Definition at line 191 of file Rectangles.cs.

6.23.4.2 Width

```
int MuPDFCore.RoundedSize.Width
```

The width of the rectangle.

Definition at line 186 of file Rectangles.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.24 MuPDFCore.Size Struct Reference

Represents the size of a rectangle.

Public Member Functions

- Size (float width, float height)

  Create a new Size with the specified width and height.
- Size (double width, double height)

  Create a new Size with the specified width and height.
- Rectangle[ ] Split (int divisions)

  Split the size into the specified number of Rectangles.

Public Attributes

- float Width

  The width of the rectangle.
- float Height

  The height of the rectangle.

6.24.1 Detailed Description

Represents the size of a rectangle.

Definition at line 25 of file Rectangles.cs.

6.24.2 Constructor & Destructor Documentation

6.24.2.1 Size() [1/2]

```
MuPDFCore.Size.Size (
            float width,
            float height )
```

Create a new Size with the specified width and height.

Parameters

width	The width of the rectangle.
height	The height of the rectangle.

Definition at line 42 of file Rectangles.cs.

6.24.2.2 Size() [2/2]

```
MuPDFCore.Size.Size (
            double width,
            double height )
```

Create a new Size with the specified width and height.

Parameters

width	The width of the rectangle.
height	The height of the rectangle.

Definition at line 53 of file Rectangles.cs.

6.24.3 Member Function Documentation

6.24.3.1 Split()

```
Rectangle [] MuPDFCore.Size.Split (
            int divisions )
```

Split the size into the specified number of Rectangles.

Parameters

divisions	The number of rectangles in which the size should be split. This must be factorisable using only powers of 2, 3, 5 or 7. Otherwise, the biggest number smaller than *divisions* that satisfies this condition is used.

Returns

An array of Rectangles that when positioned properly cover an area of the size of this object.

Definition at line 64 of file Rectangles.cs.

6.24.4 Member Data Documentation

6.24.4.1 Height

```
float MuPDFCore.Size.Height
```

The height of the rectangle.

Definition at line 35 of file Rectangles.cs.

6.24.4.2 Width

```
float MuPDFCore.Size.Width
```

The width of the rectangle.

Definition at line 30 of file Rectangles.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/Rectangles.cs

6.25 MuPDFCore.TesseractLanguage Class Reference

Represents a language used by Tesseract OCR.

Public Types

- enum Fast {
  Fast.Afr, Fast.Amh, Fast.Ara, Fast.Asm,
  Fast.Aze, Fast.Aze_Cyrl, Fast.Bel, Fast.Ben,
  Fast.Bod, Fast.Bos, Fast.Bre, Fast.Bul,
  Fast.Cat, Fast.Ceb, Fast.Ces, Fast.Chi_Sim,
  Fast.Chi_Sim_Vert, Fast.Chi_Tra, Fast.Chi_Tra_Vert, Fast.Chr,
  Fast.Cos, Fast.Cym, Fast.Dan, Fast.Deu,
  Fast.Div, Fast.Dzo, Fast.Ell, Fast.Eng,
  Fast.Enm, Fast.Epo, Fast.Equ, Fast.Est,
  Fast.Eus, Fast.Fao, Fast.Fas, Fast.Fil,
  Fast.Fin, Fast.Fra, Fast.Frk, Fast.Frm,
  Fast.Fry, Fast.Gla, Fast.Gle, Fast.Glg,
  Fast.Grc, Fast.Guj, Fast.Hat, Fast.Heb,
  Fast.Hin, Fast.Hrv, Fast.Hun, Fast.Hye,
  Fast.Iku, Fast.Ind, Fast.Isl, Fast.Ita,
  Fast.Ita_Old, Fast.Jav, Fast.Jpn, Fast.Jpn_Vert,
  Fast.Kan, Fast.Kat, Fast.Kat_Old, Fast.Kaz,
  Fast.Khm, Fast.Kir, Fast.Kmr, Fast.Kor,
  Fast.Kor_Vert, Fast.Lao, Fast.Lat, Fast.Lav,
  Fast.Lit, Fast.Ltz, Fast.Mal, Fast.Mar,
  Fast.Mkd, Fast.Mlt, Fast.Mon, Fast.Mri,
  Fast.Msa, Fast.Mya, Fast.Nep, Fast.Nld,
  Fast.Nor, Fast.Oci, Fast.Ori, Fast.Osd,
  Fast.Pan, Fast.Pol, Fast.Por, Fast.Pus,
  Fast.Que, Fast.Ron, Fast.Rus, Fast.San,
  Fast.Sin, Fast.Slk, Fast.Slv, Fast.Snd,
  Fast.Spa, Fast.Spa_Old, Fast.Sqi, Fast.Srp,
  Fast.Srp_Latn, Fast.Sun, Fast.Swa, Fast.Swe,
  Fast.Syr, Fast.Tam, Fast.Tat, Fast.Tel,
  Fast.Tgk, Fast.Tha, Fast.Tir, Fast.Ton,
  Fast.Tur, Fast.Uig, Fast.Ukr, Fast.Urd,
  Fast.Uzb, Fast.Uzb_Cyrl, Fast.Vie, Fast.Yid,
  Fast.Yor }

  Fast integer versions of trained models. These are models for a single language.
- enum FastScripts {
  FastScripts.Arabic, FastScripts.Armenian, FastScripts.Bengali, FastScripts.Canadian_Aboriginal,
  FastScripts.Cherokee, FastScripts.Cyrillic, FastScripts.Devanagari, FastScripts.Ethiopic,
  FastScripts.Fraktur, FastScripts.Georgian, FastScripts.Greek, FastScripts.Gujarati,
  FastScripts.Gurmukhi, FastScripts.HanS, FastScripts.HanS_Vert, FastScripts.HanT,
  FastScripts.HanT_Vert, FastScripts.Hangul, FastScripts.Hangul_Vert, FastScripts.Hebrew,
  FastScripts.Japanese, FastScripts.Japanese_Vert, FastScripts.Kannada, FastScripts.Khmer,
  FastScripts.Lao, FastScripts.Latin, FastScripts.Malayalam, FastScripts.Myanmar,
  FastScripts.Oriya, FastScripts.Sinhala, FastScripts.Syriac, FastScripts.Tamil,
  FastScripts.Telugu, FastScripts.Thaana, FastScripts.Thai, FastScripts.Tibetan,
  FastScripts.Vietnamese }

  Fast integer versions of trained models. These are models for a single script supporting one or more languages.
- enum Best {
  Best.Afr, Best.Amh, Best.Ara, Best.Asm,
  Best.Aze, Best.Aze_Cyrl, Best.Bel, Best.Ben,
  Best.Bod, Best.Bos, Best.Bre, Best.Bul,
  Best.Cat, Best.Ceb, Best.Ces, Best.Chi_Sim,
  Best.Chi_Sim_Vert, Best.Chi_Tra, Best.Chi_Tra_Vert, Best.Chr,
  Best.Cos, Best.Cym, Best.Dan, Best.Deu,
  Best.Div, Best.Dzo, Best.Ell, Best.Eng,
  Best.Enm, Best.Epo, Best.Est, Best.Eus,
  Best.Fao, Best.Fas, Best.Fil, Best.Fin,

Best.Fra, Best.Frk, Best.Frm, Best.Fry,
Best.Gla, Best.Gle, Best.Glg, Best.Grc,
Best.Guj, Best.Hat, Best.Heb, Best.Hin,
Best.Hrv, Best.Hun, Best.Hye, Best.Iku,
Best.Ind, Best.Isl, Best.Ita, Best.Ita_Old,
Best.Jav, Best.Jpn, Best.Jpn_Vert, Best.Kan,
Best.Kat, Best.Kat_Old, Best.Kaz, Best.Khm,
Best.Kir, Best.Kmr, Best.Kor, Best.Kor_Vert,
Best.Lao, Best.Lat, Best.Lav, Best.Lit,
Best.Ltz, Best.Mal, Best.Mar, Best.Mkd,
Best.Mlt, Best.Mon, Best.Mri, Best.Msa,
Best.Mya, Best.Nep, Best.Nld, Best.Nor,
Best.Oci, Best.Ori, Best.Osd, Best.Pan,
Best.Pol, Best.Por, Best.Pus, Best.Que,
Best.Ron, Best.Rus, Best.San, Best.Sin,
Best.Slk, Best.Slv, Best.Snd, Best.Spa,
Best.Spa_Old, Best.Sqi, Best.Srp, Best.Srp_Latn,
Best.Sun, Best.Swa, Best.Swe, Best.Syr,
Best.Tam, Best.Tat, Best.Tel, Best.Tgk,
Best.Tha, Best.Tir, Best.Ton, Best.Tur,
Best.Uig, Best.Ukr, Best.Urd, Best.Uzb,
Best.Uzb_Cyrl, Best.Vie, Best.Yid, Best.Yor }

Best (most accurate) trained models. These are models for a single language.

- enum BestScripts {
BestScripts.Arabic, BestScripts.Armenian, BestScripts.Bengali, BestScripts.Canadian_Aboriginal,
BestScripts.Cherokee, BestScripts.Cyrillic, BestScripts.Devanagari, BestScripts.Ethiopic,
BestScripts.Fraktur, BestScripts.Georgian, BestScripts.Greek, BestScripts.Gujarati,
BestScripts.Gurmukhi, BestScripts.HanS, BestScripts.HanS_Vert, BestScripts.HanT,
BestScripts.HanT_Vert, BestScripts.Hangul, BestScripts.Hangul_Vert, BestScripts.Hebrew,
BestScripts.Japanese, BestScripts.Japanese_Vert, BestScripts.Kannada, BestScripts.Khmer,
BestScripts.Lao, BestScripts.Latin, BestScripts.Malayalam, BestScripts.Myanmar,
BestScripts.Oriya, BestScripts.Sinhala, BestScripts.Syriac, BestScripts.Tamil,
BestScripts.Telugu, BestScripts.Thaana, BestScripts.Thai, BestScripts.Tibetan,
BestScripts.Vietnamese }

  Best (most accurate) trained models. These are models for a single script supporting one or more languages.

Public Member Functions

- TesseractLanguage (string prefix, string language)

  Create a new TesseractLanguage object using the provided prefix and language name, without processing them in any way.
- TesseractLanguage (string fileName)

  Create a new TesseractLanguage object using the specified trained model data file.
- TesseractLanguage (Fast language, bool useAnyCached=false)

  Create a new TesseractLanguage object using a fast integer version of a trained model for the specified language. The language file is downloaded from the `tesseract-ocr/tessdata_fast` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.
- TesseractLanguage (Best language, bool useAnyCached=false)

  Create a new TesseractLanguage object using the best (most accurate) version of the trained model for the specified language. The language file is downloaded from the `tesseract-ocr/tessdata_best` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.
- TesseractLanguage (FastScripts script, bool useAnyCached=false)

  Create a new TesseractLanguage object using a fast integer version of a trained model for the specified script. The language file is downloaded from the `tesseract-ocr/tessdata_fast` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

- TesseractLanguage (BestScripts script, bool useAnyCached=false)

  Create a new TesseractLanguage object using the best (most accurate) version of the trained model for the specified script. The language file is downloaded from the `tesseract-ocr/tessdata_best` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

Properties

- string Prefix `[get]`

  The name of the folder where the language file is located.
- string Language `[get]`

  The name of the language. The Tesseract library will assume that the trained language data file can be found at `Prefix/Language.traineddata`.

6.25.1 Detailed Description

Represents a language used by Tesseract OCR.

Definition at line 13 of file TesseractLanguage.cs.

6.25.2 Member Enumeration Documentation

6.25.2.1 Best

`enum MuPDFCore.TesseractLanguage.Best [strong]`

Best (most accurate) trained models. These are models for a single language.

Enumerator

Afr	The Afrikaans language.
Amh	The Amharic language.
Ara	The Arabic language.
Asm	The Assamese language.
Aze	The Azerbaijani language.
Aze_Cyrl	The Azerbaijani language (Cyrillic).
Bel	The Belarusian language.
Ben	The Bengali language.
Bod	The Tibetan language.
Bos	The Bosnian language.
Bre	The Breton language.
Bul	The Bulgarian language.
Cat	The Catalan/Valencian language.
Ceb	The Cebuano language.
Ces	The Czech language.
Chi_Sim	The Chinese (Simplified) language.
Chi_Sim_Vert	The Chinese (Simplified) language (vertical).

Enumerator

Chi_Tra	The Chinese (Traditional) language.
Chi_Tra_Vert	The Chinese (Traditional) language (vertical).
Chr	The Cherokee language.
Cos	The Corsican language.
Cym	The Welsh language.
Dan	The Danish language.
Deu	The German language.
Div	The Divehi/Dhivehi/Maldivian language.
Dzo	The Dzongkha language.
Ell	The Greek, Modern (1453-) language.
Eng	The English language.
Enm	The English, Middle (1100-1500) language.
Epo	The Esperanto language.
Est	The Estonian language.
Eus	The Basque language.
Fao	The Faroese language.
Fas	The Persian language.
Fil	The Filipino/Pilipino language.
Fin	The Finnish language.
Fra	The French language.
Frk	The German - Fraktur language.
Frm	The French, Middle (ca.1400-1600) language.
Fry	The Western Frisian language.
Gla	The Gaelic/Scottish Gaelic language.
Gle	The Irish language.
Glg	The Galician language.
Grc	The Greek, Ancient (to 1453) language.
Guj	The Gujarati language.
Hat	The Haitian/Haitian Creole language.
Heb	The Hebrew language.
Hin	The Hindi language.
Hrv	The Croatian language.
Hun	The Hungarian language.
Hye	The Armenian language.
Iku	The Inuktitut language.
Ind	The Indonesian language.
Isl	The Icelandic language.
Ita	The Italian language.
Ita_Old	The Italian language (old).
Jav	The Javanese language.
Jpn	The Japanese language.
Jpn_Vert	The Japanese language (vertical).
Kan	The Kannada language.
Kat	The Georgian language.
Kat_Old	The Georgian language (old).
Kaz	The Kazakh language.

Enumerator

Khm	The Central Khmer language.
Kir	The Kirghiz/Kyrgyz language.
Kmr	The Northern Kurdish language.
Kor	The Korean language.
Kor_Vert	The Korean language (vertical).
Lao	The Lao language.
Lat	The Latin language.
Lav	The Latvian language.
Lit	The Lithuanian language.
Ltz	The Luxembourgish/Letzeburgesch language.
Mal	The Malayalam language.
Mar	The Marathi language.
Mkd	The Macedonian language.
Mlt	The Maltese language.
Mon	The Mongolian language.
Mri	The Maori language.
Msa	The Malay language.
Mya	The Burmese language.
Nep	The Nepali language.
Nld	The Dutch/Flemish language.
Nor	The Norwegian language.
Oci	The Occitan (post 1500) language.
Ori	The Oriya language.
Osd	The Orientation and script detection module.
Pan	The Panjabi/Punjabi language.
Pol	The Polish language.
Por	The Portuguese language.
Pus	The Pushto/Pashto language.
Que	The Quechua language.
Ron	The Romanian/Moldavian/Moldovan language.
Rus	The Russian language.
San	The Sanskrit language.
Sin	The Sinhala/Sinhalese language.
Slk	The Slovak language.
Slv	The Slovenian language.
Snd	The Sindhi language.
Spa	The Spanish/Castilian language.
Spa_Old	The Spanish/Castilian language (old).
Sqi	The Albanian language.
Srp	The Serbian language.
Srp_Latn	The Serbian language (Latin).
Sun	The Sundanese language.
Swa	The Swahili language.
Swe	The Swedish language.
Syr	The Syriac language.
Tam	The Tamil language.

Enumerator

Tat	The Tatar language.
Tel	The Telugu language.
Tgk	The Tajik language.
Tha	The Thai language.
Tir	The Tigrinya language.
Ton	The Tonga (Tonga Islands) language.
Tur	The Turkish language.
Uig	The Uighur/Uyghur language.
Ukr	The Ukrainian language.
Urd	The Urdu language.
Uzb	The Uzbek language.
Uzb_Cyrl	The Uzbek language (Cyrillic).
Vie	The Vietnamese language.
Yid	The Yiddish language.
Yor	The Yoruba language.

Definition at line 690 of file TesseractLanguage.cs.

6.25.2.2 BestScripts

`enum MuPDFCore.TesseractLanguage.BestScripts [strong]`

Best (most accurate) trained models. These are models for a single script supporting one or more languages.

Enumerator

Arabic	The Arabic script.
Armenian	The Armenian script.
Bengali	The Bengali script.
Canadian_Aboriginal	The Canadian Aboriginal script.
Cherokee	The Cherokee script.
Cyrillic	The Cyrillic script.
Devanagari	The Devanagari script.
Ethiopic	The Ethiopic script.
Fraktur	The Fraktur script.
Georgian	The Georgian script.
Greek	The Greek script.
Gujarati	The Gujarati script.
Gurmukhi	The Gurmukhi script.
HanS	The Han (Simplified) script.
HanS_Vert	The Han (Simplified) script. (vertical)
HanT	The Han (Traditional) script.
HanT_Vert	The Han (Traditional) script. (vertical)
Hangul	The Hangul script.
Hangul_Vert	The Hangul script. (vertical)

Enumerator

Hebrew	The Hebrew script.
Japanese	The Japanese script.
Japanese_Vert	The Japanese script. (vertical)
Kannada	The Kannada script.
Khmer	The Khmer script.
Lao	The Lao script.
Latin	The Latin script.
Malayalam	The Malayalam script.
Myanmar	The Myanmar script.
Oriya	The Oriya script.
Sinhala	The Sinhala script.
Syriac	The Syriac script.
Tamil	The Tamil script.
Telugu	The Telugu script.
Thaana	The Thaana script.
Thai	The Thai script.
Tibetan	The Tibetan script.
Vietnamese	The Vietnamese script.

Definition at line 1193 of file TesseractLanguage.cs.

6.25.2.3 Fast

```
enum MuPDFCore.TesseractLanguage.Fast  [strong]
```

Fast integer versions of trained models. These are models for a single language.

Enumerator

Afr	The Afrikaans language.
Amh	The Amharic language.
Ara	The Arabic language.
Asm	The Assamese language.
Aze	The Azerbaijani language.
Aze_Cyrl	The Azerbaijani language (Cyrillic).
Bel	The Belarusian language.
Ben	The Bengali language.
Bod	The Tibetan language.
Bos	The Bosnian language.
Bre	The Breton language.
Bul	The Bulgarian language.
Cat	The Catalan/Valencian language.
Ceb	The Cebuano language.
Ces	The Czech language.
Chi_Sim	The Chinese (Simplified) language.

Enumerator

Chi_Sim_Vert	The Chinese (Simplified) language (vertical).
Chi_Tra	The Chinese (Traditional) language.
Chi_Tra_Vert	The Chinese (Traditional) language (vertical).
Chr	The Cherokee language.
Cos	The Corsican language.
Cym	The Welsh language.
Dan	The Danish language.
Deu	The German language.
Div	The Divehi/Dhivehi/Maldivian language.
Dzo	The Dzongkha language.
Ell	The Greek, Modern (1453-) language.
Eng	The English language.
Enm	The English, Middle (1100-1500) language.
Epo	The Esperanto language.
Equ	A language for equations.
Est	The Estonian language.
Eus	The Basque language.
Fao	The Faroese language.
Fas	The Persian language.
Fil	The Filipino/Pilipino language.
Fin	The Finnish language.
Fra	The French language.
Frk	The German - Fraktur language.
Frm	The French, Middle (ca.1400-1600) language.
Fry	The Western Frisian language.
Gla	The Gaelic/Scottish Gaelic language.
Gle	The Irish language.
Glg	The Galician language.
Grc	The Greek, Ancient (to 1453) language.
Guj	The Gujarati language.
Hat	The Haitian/Haitian Creole language.
Heb	The Hebrew language.
Hin	The Hindi language.
Hrv	The Croatian language.
Hun	The Hungarian language.
Hye	The Armenian language.
Iku	The Inuktitut language.
Ind	The Indonesian language.
Isl	The Icelandic language.
Ita	The Italian language.
Ita_Old	The Italian language (old).
Jav	The Javanese language.
Jpn	The Japanese language.
Jpn_Vert	The Japanese language (vertical).
Kan	The Kannada language.
Kat	The Georgian language.

Enumerator

Kat_Old	The Georgian language (old).
Kaz	The Kazakh language.
Khm	The Central Khmer language.
Kir	The Kirghiz/Kyrgyz language.
Kmr	The Northern Kurdish language.
Kor	The Korean language.
Kor_Vert	The Korean language (vertical).
Lao	The Lao language.
Lat	The Latin language.
Lav	The Latvian language.
Lit	The Lithuanian language.
Ltz	The Luxembourgish/Letzeburgesch language.
Mal	The Malayalam language.
Mar	The Marathi language.
Mkd	The Macedonian language.
Mlt	The Maltese language.
Mon	The Mongolian language.
Mri	The Maori language.
Msa	The Malay language.
Mya	The Burmese language.
Nep	The Nepali language.
Nld	The Dutch/Flemish language.
Nor	The Norwegian language.
Oci	The Occitan (post 1500) language.
Ori	The Oriya language.
Osd	The Orientation and script detection module.
Pan	The Panjabi/Punjabi language.
Pol	The Polish language.
Por	The Portuguese language.
Pus	The Pushto/Pashto language.
Que	The Quechua language.
Ron	The Romanian/Moldavian/Moldovan language.
Rus	The Russian language.
San	The Sanskrit language.
Sin	The Sinhala/Sinhalese language.
Slk	The Slovak language.
Slv	The Slovenian language.
Snd	The Sindhi language.
Spa	The Spanish/Castilian language.
Spa_Old	The Spanish/Castilian language (old).
Sqi	The Albanian language.
Srp	The Serbian language.
Srp_Latn	The Serbian language (Latin).
Sun	The Sundanese language.
Swa	The Swahili language.
Swe	The Swedish language.

Enumerator

Syr	The Syriac language.
Tam	The Tamil language.
Tat	The Tatar language.
Tel	The Telugu language.
Tgk	The Tajik language.
Tha	The Thai language.
Tir	The Tigrinya language.
Ton	The Tonga (Tonga Islands) language.
Tur	The Turkish language.
Uig	The Uighur/Uyghur language.
Ukr	The Ukrainian language.
Urd	The Urdu language.
Uzb	The Uzbek language.
Uzb_Cyrl	The Uzbek language (Cyrillic).
Vie	The Vietnamese language.
Yid	The Yiddish language.
Yor	The Yoruba language.

Definition at line 28 of file TesseractLanguage.cs.

6.25.2.4 FastScripts

`enum MuPDFCore.TesseractLanguage.FastScripts [strong]`

Fast integer versions of trained models. These are models for a single script supporting one or more languages.

Enumerator

Arabic	The Arabic script.
Armenian	The Armenian script.
Bengali	The Bengali script.
Canadian_Aboriginal	The Canadian Aboriginal script.
Cherokee	The Cherokee script.
Cyrillic	The Cyrillic script.
Devanagari	The Devanagari script.
Ethiopic	The Ethiopic script.
Fraktur	The Fraktur script.
Georgian	The Georgian script.
Greek	The Greek script.
Gujarati	The Gujarati script.
Gurmukhi	The Gurmukhi script.
HanS	The Han (Simplified) script.
HanS_Vert	The Han (Simplified) script. (vertical)
HanT	The Han (Traditional) script.
HanT_Vert	The Han (Traditional) script. (vertical)

Enumerator

Hangul	The Hangul script.
Hangul_Vert	The Hangul script. (vertical)
Hebrew	The Hebrew script.
Japanese	The Japanese script.
Japanese_Vert	The Japanese script. (vertical)
Kannada	The Kannada script.
Khmer	The Khmer script.
Lao	The Lao script.
Latin	The Latin script.
Malayalam	The Malayalam script.
Myanmar	The Myanmar script.
Oriya	The Oriya script.
Sinhala	The Sinhala script.
Syriac	The Syriac script.
Tamil	The Tamil script.
Telugu	The Telugu script.
Thaana	The Thaana script.
Thai	The Thai script.
Tibetan	The Tibetan script.
Vietnamese	The Vietnamese script.

Definition at line 535 of file TesseractLanguage.cs.

6.25.3 Constructor & Destructor Documentation

6.25.3.1 TesseractLanguage() [1/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            string prefix,
            string language )
```

Create a new TesseractLanguage object using the provided *prefix* and *language* name, without processing them in any way.

Parameters

prefix	The name of the folder where the language file is located. If this is `null`, the value of the environment variable `TESSDATA_PREFIX` will be used.
language	The name of the language. The Tesseract library will assume that the trained language data file can be found at *prefix* / *language* `.traineddata`.

Definition at line 1350 of file TesseractLanguage.cs.

6.25.3.2 TesseractLanguage() [2/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            string fileName )
```

Create a new TesseractLanguage object using the specified trained model data file.

Parameters

fileName	The path to the trained model data file. If the file name does not end in `.traineddata`, the file is copied to a temporary folder, and the temporary file is used by the Tesseract library.

Definition at line 1360 of file TesseractLanguage.cs.

6.25.3.3 TesseractLanguage() [3/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            Fast language,
            bool useAnyCached = false )
```

Create a new TesseractLanguage object using a fast integer version of a trained model for the specified language. The language file is downloaded from the `tesseract-ocr/tessdata_fast` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

Parameters

language	The language to use for the OCR process.
useAnyCached	If this is `true`, if a cached trained model file is available for the specified language, it will be used even if it is a "best (most accurate)" model. Otherwise, only cached fast integer trained models will be used.

Definition at line 1387 of file TesseractLanguage.cs.

6.25.3.4 TesseractLanguage() [4/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            Best language,
            bool useAnyCached = false )
```

Create a new TesseractLanguage object using the best (most accurate) version of the trained model for the specified language. The language file is downloaded from the `tesseract-ocr/tessdata_best` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

Parameters

language	The language to use for the OCR process.
useAnyCached	If this is `true`, if a cached trained model file is available for the specified language, it will be used even if it is a "fast" model. Otherwise, only cached best (most accurate) trained models will be used.

Definition at line 1453 of file TesseractLanguage.cs.

6.25.3.5 TesseractLanguage() [5/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            FastScripts script,
            bool useAnyCached = false )
```

Create a new TesseractLanguage object using a fast integer version of a trained model for the specified script. The language file is downloaded from the `tesseract-ocr/tessdata_fast` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

Parameters

script	The script to use for the OCR process.
useAnyCached	If this is `true`, if a cached trained model file is available for the specified script, it will be used even if it is a "best (most accurate)" model. Otherwise, only cached fast integer trained models will be used.

Definition at line 1519 of file TesseractLanguage.cs.

6.25.3.6 TesseractLanguage() [6/6]

```
MuPDFCore.TesseractLanguage.TesseractLanguage (
            BestScripts script,
            bool useAnyCached = false )
```

Create a new TesseractLanguage object using the best (most accurate) version of the trained model for the specified script. The language file is downloaded from the `tesseract-ocr/tessdata_best` GitHub repository. If it has already been downloaded and cached before, the downloaded file is re-used.

Parameters

script	The script to use for the OCR process.
useAnyCached	If this is `true`, if a cached trained model file is available for the specified script, it will be used even if it is a "fast" model. Otherwise, only cached best (most accurate) trained models will be used.

Definition at line 1589 of file TesseractLanguage.cs.

6.25.4 Property Documentation

6.25.4.1 Language

```
string MuPDFCore.TesseractLanguage.Language  [get]
```

The name of the language. The Tesseract library will assume that the trained language data file can be found at `Prefix/Language.traineddata`.

Definition at line 23 of file TesseractLanguage.cs.

6.25.4.2 Prefix

```
string MuPDFCore.TesseractLanguage.Prefix  [get]
```

The name of the folder where the language file is located.

Definition at line 18 of file TesseractLanguage.cs.

The documentation for this class was generated from the following file:

- MuPDFCore/TesseractLanguage.cs

6.26 MuPDFCore.RenderProgress.ThreadRenderProgress Struct Reference

Holds the progress of a single thread.

Public Attributes

- int Progress
  The current progress.
- long MaxProgress
  The maximum progress. If this is 0, this value could not be determined (yet).

6.26.1 Detailed Description

Holds the progress of a single thread.

Definition at line 275 of file MuPDF.cs.

6.26.2 Member Data Documentation

6.26.2.1 MaxProgress

```
long MuPDFCore.RenderProgress.ThreadRenderProgress.MaxProgress
```

The maximum progress. If this is 0, this value could not be determined (yet).

Definition at line 285 of file MuPDF.cs.

6.26.2.2 Progress

```
int MuPDFCore.RenderProgress.ThreadRenderProgress.Progress
```

The current progress.

Definition at line 280 of file MuPDF.cs.

The documentation for this struct was generated from the following file:

- MuPDFCore/MuPDF.cs

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