FileManagement Class

Cross-platform file IO control without Plug-ins.

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Introduction

Thanks for purchasing `FileManagement`, this class is designed to be simple and lightweight, so you will not need to learn or implement more than its useful interfaces.
This product is just that: a class, so you can add it to your project without any risks.
You also can access the full source code.
Saving and reading is as fast as the platform can admit, because interpretations and parsing are maintained at minimum.
The example scene allows testing most of the `FileManagement` functions.
There is a very important feature in `FileManagement` that allows access `PersistentData` and `StreamingAssets` as a single drive. This allows a completely safe cross-platform drive access.

Class Description

`FileManagement` is a static class. It means that you don't have to create/instantiate a `FileManagement` object, just write `FileManagement` dot (.) the interface you need.

The `FileManagement` class uses compiler directives to chose the right functions for each platform. So, there are different versions for the next functions: `SaveRawFile()`, `ReadRawFile()` and `DeleteFile()`.

This three functions are platform dependent, so they are used by every other function into this same class.
The three main groups are:

- `UNITY_WINRT`.
- `UNITY_WEBGL`.
- Everything else.

There are not special considerations when exporting to other platforms, neither any special considerations when uploading to digital markets.
Just switch platform from "Build settings" dialog on Unity editor.

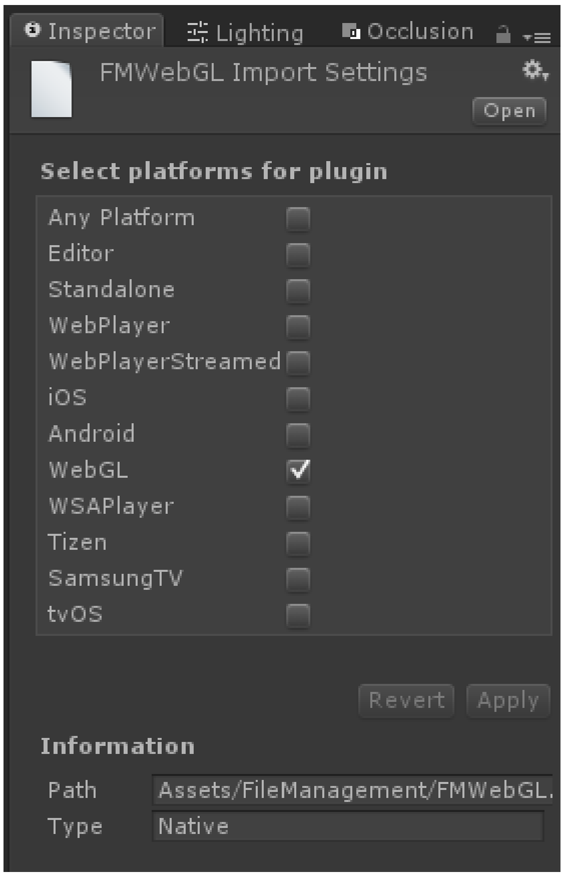
Class Integration

To integrate this class to your project you must include the three main files that are used in this product:

- "FileManagement.cs".
- "FMWebGL.jslib".
- "StreamingAssetsIndexer.cs".

The FileManagement.cs file contains the main `FileManagement` class and the secondary `FM_IniFile` class.
FMWebGL.jslib is a plug-in needed for WebGL exports. This file can be edited with any text editor, it is not a real plug-in, it's some javascript extra functionality needed to save content into browser's data base.

The plug-in importer should look like this:



Select platforms for plugin

Any Platform	☐
Editor	☐
Standalone	☐
WebPlayer	☐
WebPlayerStreamed	☐
iOS	☐
Android	☐
WebGL	✓
WSAPlayer	☐
Tizen	☐
SamsungTV	☐
tvOS	☐

Information

Path	Assets/FileManagement/FMWebGL.
Type	Native

Note that you don't need to put the plug-in into a "Plugins" folder.

The StreamingAssetsIndexer.cs file runs only in the editor generating the StreamingAssets index automatically.

PlayerPrefs replacement

`FileManagement` implements the same `PlayerPrefs` functions, so you already use `PlayerPrefs` in your project, you only have to replace `PlayerPrefs` with `FileManagement`.

This is the list of equivalent functions:

```
public static void DeleteAll()
public static void DeleteKey(string key)
public static float GetFloat(string key, float defaultValue = 0.0F)
public static int GetInt(string key, int defaultValue = 0)
public static string GetString(string key, string defaultValue = "")
public static bool HasKey(string key)
public static void Save()
public static void SetFloat(string key, float value)
public static void SetInt(string key, int value)
public static void SetString(string key, string value)
```

The `Save()` function has no effect in `FileManagement` due to there is no parsing of values into a single file (If you need this feature, you can use `FM_IniFile` instead). The interface exists just to avoid compilation issues when porting an existing application.

This is the list of non standard functions:

```
public static bool GetBool(string key, bool defaultValue = false)
public static double GetDouble(string key, double defaultValue = 0)
public static void SetBool(string key, bool value)
public static void SetDouble(string key, double value)
```

These functions works in the same way that `PlayerPrefs` does but adds some extra functionality.

FileManagement Public Interfaces

This is the complete definition of `FileManagement` public interfaces.

SaveRawFile()

```
public static void SaveRawFile(string name, byte[] content, bool enc = false,
bool fullPath = false)
```

Use a key, ID or file name to identify your file.
The **`enc`** argument enables or disables the encryption functionality.
The **`fullPath`** argument allows to treat the provided name as a path.
The name can include a relative or absolute destination path. If that path doesn't exists it will be created automatically.
NOTE: This function is used by every other function that writes to disk.

This example saves a binary file:

```
byte[] byteArray = {10, 20, 30, 40, 50};
FileManagement.SaveRawFile("data.bin", byteArray);
```

ReadRawFile()

```
public static byte[] ReadRawFile(string name, bool enc = false, bool checkSA = true,
bool fullPath = false)
```

Use a key, ID or file name to identify your file. It returns empty content if the file do not exists.
The **`enc`** argument enables or disables the encryption functionality.
The **`checkSA`** argument allows `FileManagement` to search the "StreamingAssets" folder if the requested file is not found.
The **`fullPath`** argument allows to treat the provided name as a path.

This example reads an encrypted text file (the content value is decrypted):
```
byte[] content = FileManagement.ReadRawFile ("data.txt", true);
```

DeleteFile()

```
public static void DeleteFile(string name, bool fullPath = false)
```
Deletes the file. It fails if the access is denied using `fullPath`.
The `fullPath` argument allows to treat the provided `name` as a path.

This example deletes the file:
```
FileManagement.DeleteFile("data.txt");
```

ImportAudio()

```
public static AudioClip ImportAudio(string file, bool enc = false, bool checkSA = true,
bool fullPath = false)
```
Imports an `AudioClip` from file. The wav format is the only widely supported by all platforms, for other formats check the Unity documentation (Or try the test application in your desired platform).

The file name without the extension is applied automatically to the returned `AudioClip` name.

This function implements uses `OpenWavParser` for PCM WAV files. This is the only supported format on all platforms, and the only supported format at all since Unity 2019.

SaveAudio()

```
public static void SaveAudio(string name, AudioClip clip, bool enc = false,
bool fullPath = false)
```
Saves an AudioClip to file. The file is always saved to PCM WAV format.

Only 16bit WAV files are supported (mono or stereo, 22K, 44K, etc.). The `OpenWavParser` class is used on all platforms.

FileExists()

```
public static bool FileExists(string name, bool checkSA = false, bool fullPath = false)
```
Checks if the file exists.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The `fullPath` argument allows to treat the provided `name` as a path.

This example checks if a file exists:
```
if (FileManagement.FileExists("data.txt"))
	Debug.Log("[FileManagement] This file exists.");
```

SaveFile()

```
public static void SaveFile<T>(string name, T content, bool enc = false,
bool fullPath = false)
```
Saves any C# type of variable, and the following `UnityEngine` types: `Vector2`, `Vector3`, `Vector4`, `Quaternion`, `Rect`, `Color` & `Color32`.
The enc argument enables or disables the encryption functionality.
The `fullPath` argument allows to treat the provided `name` as a path.

This example saves two types of data:
```
FileManagement.SaveFile("IntData", 12);
FileManagement.SaveFile("StringData", "Example data", true);  // Encrypt
```

ReadFile()

```
public static T ReadFile<T>(string name, bool enc = false, bool checkSA = false,
bool fullPath = false)
```
Reads any C# type of variable, and reads the following `UnityEngine` types: `Vector2`, `Vector3`, `Vector4`, `Quaternion`, `Rect`, `Color` & `Color32`.
The `enc` argument enables or disables the encryption functionality.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The `fullPath` argument allows to treat the provided `name` as a path.

This example reads two different types of file:
```
int a = FileManagement.ReadFile<int>("IntData");
string a = FileManagement.ReadFile<string>("StringData", true);       // Decrypt
```

SaveArray()

```
public static void SaveArray<T>(string name, T[] content, char separator = (char)0x09,
bool enc = false, bool fullPath = false)
public static void SaveArray<T>(string name, System.Collections.Generic.List<T> content,
char separator = (char)0x09, bool enc = false, bool fullPath = false)
```
Saves any one dimension `Array` or `List` of any `ReadFile` supported type. You can specify a custom separator as a `char` argument, default separator is the horizontal tabulator.
The `enc` argument enables or disables the encryption functionality.
The `fullPath` argument allows to treat the provided `name` as a path.

This example saves an array of strings separated by a semicolon:
```
string[] myArray = {"one", "two", "three"};
FileManagement.SaveArray("MyArray.csv", myArray, ';');
```

ReadArray()

```
public static T[] ReadArray<T>(string name, char separator = (char)0x09, bool enc = false,
bool checkSA = true, bool fullPath = false)
public static T[] ReadArray<T>(string name, string[] separator, bool enc = false,
bool checkSA = true, bool fullPath = false)
```
Reads any one dimension `Array` of any `ReadFile` supported type.
You can specify a custom separator as a `char` argument (default is horizontal tabulator) or as an array of `string` values (no default).
The `enc` argument enables or disables the encryption functionality.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The `fullPath` argument allows to treat the provided name as a path.

This example reads an array of strings separated by a semicolon:
```
string[] myArray = FileManagement.ReadArray<string>("MyArray.csv", ';');
```

ReadList()

```
public static System.Collections.Generic.List<T> ReadList<T>(string name,
char separator = (char)0x09, bool enc = false, bool checkSA = true, bool fullPath = false)
public static System.Collections.Generic.List<T> ReadList<T>(string name,
string[] separator, bool enc = false, bool checkSA = true, bool fullPath = false)
```
Reads any one dimension `List` of any `ReadFile` supported type.
You can specify a custom separator as a `char` argument (default is horizontal tabulator) or as an array of `string` values (no default).
Use this function to import CSV files.
The `enc` argument enables or disables the encryption functionality.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested

file is not found.
The **fullPath** argument allows to treat the provided **name** as a path.

This example reads an array of strings separated by a semicolon:
```
string[] myArray = FileManagement.ReadArray<string>("MyArray.csv", ';');
```

ReadAllLines()

```
public static string[] ReadAllLines(string name, bool enc = false, bool checkSA = true,
bool fullPath = false)
```
Reads all the lines from a text file. It uses `"\r\n"`, `"\n"` and `"\r"` literals for line splitting (Window, OSX and Unix compatible).
The **enc** argument enables or disables the encryption functionality.
The **checkSA** argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The **fullPath** argument allows to treat the provided **name** as a path.

This example reads a file into a string array from StreamingAssets folder:
```
string[] textInLines = FileManagement.ReadAllLines ("text.txt");
```

ImportIniFile()

```
public static FM_IniFile ImportIniFile(string name, bool enc = false, bool checkSA = true,
bool fullPath = false)
```
Imports a INI file from disk into a `FM_IniFile` object.
The **enc** argument enables or disables the encryption functionality.
The **checkSA** argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The **fullPath** argument allows to treat the provided **name** as a path.

This example imports some INI file into a variable:
```
FM_IniFile iniFile = FileManagement.ImportIniFile ("Cfg.ini");
```

ImportTexture()

```
public static Texture2D ImportTexture(string file, bool enc = false, bool checkSA = true,
bool fullPath = false)
```
Imports a JPG or PNG image file from disk into a Unity texture.
The **enc** argument enables or disables the encryption functionality.
The **checkSA** argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The **fullPath** argument allows to treat the provided **name** as a path.

This example imports an image file into a texture from the StreamingAssets folder:
```
Texture2D texture = FileManagement.ImportTexture("image.jpg");
```

ImportSprite()

```
public static Sprite ImportSprite(string file, bool enc = false, bool checkSA = true,
bool fullPath = false)
```
Imports a JPG or PNG image file from disk into a Unity sprite.
The **enc** argument enables or disables the encryption functionality.
The **checkSA** argument allows `FileManagement` to search the StreamingAssets folder if the requested file is not found.
The **fullPath** argument allows to treat the provided name as a path.

This example imports an image file into a sprite from the StreamingAssets folder:
```
Sprite sprite = FileManagement.ImportSprite("image.jpg");
```

SaveJpgTexture()

```
public static void SaveJpgTexture(string name, Texture texture, int quality = 75,
bool enc = false, bool fullPath = false)
```

Saves a `Texture` or `Texture2D` into a JPG encoded file. The quality parameter determines the file compression, the default file compression is 75.
The **`enc`** argument enables or disables the encryption functionality.
The **`fullPath`** argument allows to treat the provided **`name`** as a path.

This examples saves textures into files:

```
FileManagement.SaveJpgTexture("texture.jpg", renderer.material.mainTexture);
FileManagement.SaveJpgTexture("texture.jpg", gameObject.GetComponent<Sprite>().texture);
```

SavePngTexture()

```
public static void SavePngTexture(string name, Texture texture, bool enc = false,
bool fullPath = false)
```

Saves a `Texture` or `Texture2D` into a PNG encoded file.
The **`enc`** argument enables or disables the encryption functionality.
The **`fullPath`** argument allows to treat the provided **`name`** as a path.

This examples saves textures into files:

```
FileManagement.SavePngTexture("texture.png", renderer.material.mainTexture);
FileManagement.SavePngTexture("texture.png", sprite.texture);
```

AddLogLine()

```
public static void AddLogLine(string name, string content, bool deleteDate = false,
bool enc = false, bool fullPath = false)
```

This adds a single line of text to an existing file saving also date and time. Used for log files and error tracking.
The **`deleteDate`** variable disables the automatic printing of formatted date and time for each new line.
The **`enc`** argument enables or disables the encryption functionality.
The **`fullPath`** argument allows to treat the provided **`name`** as a path.

This examples saves textures into files:

```
FileManagement.SavePngTexture(renderer.material.mainTexture, "texture.png");
FileManagement.SavePngTexture(sprite.texture, "texture.png");
```

AddRawData()

```
public static void AddRawData(string name, byte[] content, bool enc = false,
bool fullPath = false)
```

This adds a chunk of `byte` data to an existing file. If the requested file doesn't exists, a new file will be created.
The **`enc`** argument enables or disables the encryption functionality.
The **`fullPath`** argument allows to treat the provided **`name`** as a path.

This examples saves textures into files:

```
FileManagement.SavePngTexture(renderer.material.mainTexture, "texture.png");
FileManagement.SavePngTexture(sprite.texture, "texture.png");
```

DirectoryExists()

```
public static bool DirectoryExists(string folder, bool checkSA = true,
bool fullPath = false)
```

Checks the existence of a directory.
The **`checkSA`** argument allows `FileManagement` to search the StreamingAssets folder if the requested

path is not found.
The `fullPath` argument allows to treat the provided `name` as a path.

This example checks if a directory exists:
```
if (FileManagement.DirectoryExists ("Test1"))
	Debug.Log("[FileManagement] This folder exists.");
```

CreateDirectory()

```
public static void CreateDirectory(string name, bool fullPath = false)
```
Creates a new directory. Fails if the access is denied using `fullPath`.
The `fullPath` argument allows to treat the provided `name` as a path.

This example creates a new directory:
```
FileManagement.CreateDirectory("Test1");
```

DeleteDirectory()

```
public static void DeleteDirectory(string name, bool fullPath = false)
```
Deletes a directory and its content including sub-directories. Fails if the access is denied using `fullPath`.
The `fullPath` argument allows to treat the provided `name` as a path.

This example deletes an existing directory:
```
FileManagement.DeleteDirectory("Test1");
```

EmptyDirectory()

```
public static void EmptyDirectory(string name = "", bool filesOnly = true,
bool fullPath = false)
```
Deletes the directory content. By default deletes only files. Fails if the access is denied using `fullPath`.
The `fullPath` argument allows to treat the provided `name` as a path.

This example deletes the whole content of a folder:
```
FileManagement.EmptyDirectory("Test1", false);
```

ListFiles()

```
public static string[] ListFiles(string folder, bool checkSA = true, bool fullPath = false)
public static string[] ListFiles(string folder, string[] filter, bool checkSA = true,
bool fullPath = false, bool subfolders = false)
```
Returns all of the file names contained in the requested folder. Fails if the access is denied while using `fullPath`.
The file list can be filtered using the `filter` array, make sure to include the dot (.) in the extension names like this:
```
string[] filter = {".wav", ".mp3", ".ogg"};
```
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested path is not found.
The `fullPath` argument allows to treat the provided `name` as a path.
The `subfolders` argument request a deep search into every sub-folder.

This example requests the folder content:
```
string[] fileNames = FileManagement.ListFiles("Test1");
```

ListDirectories()

```
public static string[] ListDirectories(string folder, bool checkSA = true,
bool fullPath = false)
```
Returns all of the folder names contained in the requested folder. Fails if the access is denied while

using `fullPath`.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested path is not found.
The `fullPath` argument allows to treat the provided `name` as a path.

This example requests the folder content:
```
string[] folderNames = FileManagement.ListDirectories("Test1");
```

ReadDirectoryContent()

```
public static System.Collections.Generic.List<byte[]> ReadDirectoryContent
(string folder, bool enc = false, bool checkSA = true, bool fullPath = false)
```
Returns all of the files contained in the requested folder as a `List` of `byte` arrays. The files are added to the `List` in the same order that are listed with the `ListFiles` function.
Fails if the access is denied using `fullPath`.
The `enc` argument enables or disables the encryption functionality.
The `checkSA` argument allows `FileManagement` to search the StreamingAssets folder if the requested path is not found.
The `fullPath` argument allows to treat the provided `name` as a path.

This example requests the folder content:
```
List<byte[]> files = FileManagement.ReadDirectoryContent("Test1");
string[] fileNames = FileManagement.ListFiles("Test1");
```

CopyFile()

```
public static void CopyFile(string source, string dest, bool checkSA = true,
bool fullPathSource = false, bool fullPathDest = false)
```
Copies a file from `source` to `dest`. The destination path can include a new name for the copied file.
The `checkSA` parameter only affects the `source` path.

This example copies a file:
```
FileManagement.CopyFile ("data.txt", "NewFolder/dataCopy.txt");
```

CopyDirectory()

```
public static void CopyDirectory(string source, string dest, bool checkSA = true,
bool fullPathSource = false, bool fullPathDest = false)
```
Copies a folder from `source` to `dest`. The destination path can include a new name for the copied file.
The folder content is copied too, including its sub-directory content.
If the `dest` path doesn't exists, It will be created automatically.

This example copies a file:
```
FileManagement.CopyFile ("data.txt", "NewFolder/dataCopy.txt");
```

Move()

```
public static void Move(string source, string dest, bool fullPathSource = false,
bool fullPathDest = false)
```
Moves a file or folder from `source` to `dest`. The folders are moved with all its content. If the destination folder already exists, it will combine/replace the existing file without prompting the user.

This example moves a folder and all its content:
```
FileManagement. Move ("NewFolder/Test2", "NewFolder2/Test2");
```

Rename()

```
public static void Rename(string source, string dest, bool fullPathSource = false,
bool fullPathDest = false)
```
This function is the same as `Move()`, you can use it to rename files and folders. It exists just to let you know that you can rename files/folders using `Move()`.

This example moves a folder and all its content:
```
FileManagement.Move ("NewFolder/Test2", "NewFolder2/Test2");
```

GetParentDirectory()

```
public static string GetParentDirectory(string path = "")
```

Returns a valid path but removing the file or folder.

This example request a parent folder:
```
string parentPath = FileManagement.GetParentDirectory ("Test1/Test2");
```
Now parentPath's value is "Test1".

Combine()

```
public static string Combine(string path1, string path2)
```

Returns a valid path combining correctly both paths.

This example combines a path and a file:
```
string path = FileManagement.Combine("Test1\\Test2", "icon2.png");
```
Now path's value is "Test1/Test2/icon2.png".

NormalizePath()

```
public static string NormalizePath(string path)
```

Returns a valid path, correcting possible errors in the string. The `FileManagement` class uses slashes, deletes the ending slash in a path and replaces double slashes.

This example returns a valid directory path:
```
string path = FileManagement.NormalizePath ("Test1\\Test2\\");
```
Now path's value is "Test1/Test2".

GetFileName()

```
public static string GetFileName(string path)
```

Returns the last name of the path. It can be a file or a folder.

This example returns the file name only:
```
string name = FileManagement. GetFileName ("Test1\\Test2\\data5.txt");
```
Now name's value is "data5.txt".

GetFileNameWithoutExtension()

```
public static string GetFileNameWithoutExtension(string path)
```

Returns the file name of the path (if any) excluding the last extension. If there is no extension it will return the same file name. If there are more than one extension, it will remove only the last one.

This example returns the filtered file name:
```
string name = FileManagement.GetFileNameWithoutExtension("Test2\\icon2.example.png");
```
Now name's value is "icon2.example".

GetFileExtension()

```
public static string GetFileExtension(string path)
```

Returns the file extension of the path (if any). If there is no extension it will return an empty string.

This example returns the file extension:
```
string extension = FileManagement. GetExtension ("Test1\\Test2\\icon2.png");
```
Now it's value is ".png".

CustomParser()

```
public static T CustomParser<T>(string content)
```

This function is responsible of converting the text saved data into the correct data again.
It converts a `string` into: Every C# type, `Vector2`, `Vector3`, `Vector4`, `Quaternion`, `Rect`, `Color` & `Color32`.
This parser is used internally by `FileManagement`.

Encrypt()

```
public static byte[] Encrypt(byte[] data, byte[] key)
```

This is the function that makes the encryption of a file content. It only works with byte arrays.
You can use this function to encrypt any data in a byte array.

Decrypt()

```
public static byte[] Decrypt(byte[] data, byte[] key)
```

This is the function that makes the decryption of a file content. It only works with byte arrays.
You can use this function to decrypt any data in a byte array.

ByteArrayToString()

```
public static string ByteArrayToString(byte[] content, byte[] key)
```

This function converts byte arrays into strings depending on the selected conversion mode `FM_StringMode` stringConversion.

StringToByteArray()

```
public static string StringToByteArray(string content)
```

This function converts strings into byte arrays depending on the selected conversion mode `FM_StringMode` stringConversion.

FileManagement Private Interfaces

This is the complete definition of `FileManagement` private interfaces.

CheckNameOnIndex()

```
private static bool CheckNameOnIndex(string name, string type)
```

Checks the name into automatically generated index file. Emulates the **`FileExists()`** and **`DirectoryExists()`** functions for the StreamingAssets folder on Android and WebGL builds. There are two slightly different versions of this function for both platforms.

GetNamesOnIndex()

```
private static string[] GetNamesOnIndex(string name, string type)
```

Gets the names from the automatically generated index file. Emulates the **`ListFiles()`** and **`ListDirectories()`** functions for the StreamingAssets folder on Android and WebGL builds. There are two slightly different versions of this function for both platforms.

FilterPathNames()

```
private static string[] FilterPathNames(string[] names)
```

This function does the inverse as **`GetParentDirectory`** because returns the file or folder name removing the parent.

SortPathNames()

```
private static string[] FilterPathNames(string[] names)
```

This function sorts the names by alphabet.

Its use is internal, so it's private.

XorEncryptDecrypt()

```
private static byte[] XorEncryptDecrypt(byte[] data, byte[] key)
```

Performs XOR encryption and decryption.

Experimental interfaces

The experimental interfaces are not 100% supported by all platforms. `FileManagement` will print in console if the selected platform hasn't the requested functionality.

AesEncrypt()

```
private static byte[] AesEncrypt(byte[] data, byte[] key)
```

Performs AES encryption. Not supported on Windows Store.

AesDecrypt()

```
private static byte[] AesDecrypt(byte[] data, byte[] key)
```

Performs AES decryption. Not supported on Windows Store.

OpenFolder()

```
public static void OpenFolder(string path = "", bool fullPath = false)
```

Opens the requested folder in the default file system. This functions works in standalone builds only (Windows, Linux, OSX).

ObjectToByteArray()

```
private static byte[] ObjectToByteArray(object obj)
```

Serializes an object to a byte array allowing to be saved to disk with `SaveRawFile`.

Please note that not every variable/class type can be serialized directly. That's the reason this is not the default save method.

This function is not supported in Windows Store builds.

ByteArrayToObject()

```
public static object ByteArrayToObject(byte[] arrBytes)
```

Deserializes a byte array into an object allowing to be loaded from disk with `ReadRawFile`.

Please note that not every variable/class type can be serialized directly. That's the reason this is not the default save method.

This function is not supported in Windows Store builds.

ListLogicalDrives()

```
public static string[] ListLogicalDrives()
```

Get the list of the available logical drives. This function is supported on Windows Standalone builds only.

InstallLocalApk()

```
public static void InstallLocalApk(string file, bool fullPath = false)
```

Runs the installation of an APK file stored locally in the device.

The installation runs outside the application using the standard Android installer, so the application can update itself. This function is supported on Android builds only.

AES Encryption

```
#define USE_AES
```

Define or comment this directive to allow AES Encryption.
The AES algorithm uses a fixed length key, it doesn't affects the XOR algorithm due to that algorythm uses any key length.
Don't forget to set your own new key!
IMPORTANT: AES is not supported on Windows Phone platforms.

StreamingAssets indexer

The StreamingAssetsIndexer.cs script works automatically while in editor and generates a file/sub-directory index that can be navigated once the application was built for Android or WebGL.

The index file is "FMSA_Index" and is saved automatically into your StreamingAssets folder to be included within your final build.
The StreamingAssetsIndexer.cs script detects modifications in the file system and regenerates always the index to ensure that every existing file or sub-directory can be detected correctly.
The StreamingAssets folder is inaccessible in Android and WebGL builds due to it is not a real folder, that is the main reason that this Index was implemented.
The Index interpretation is fully integrated within the `FileManagement` class.

Do not modify the StreamingAssets folder in your final build, or the index will not match the content resulting in access errors. Do it always from Unity editor, then build.

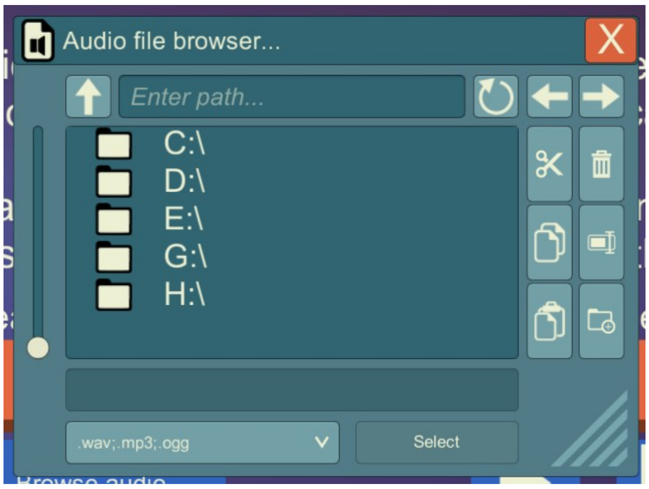
NOTE: This script is not included in your final build.

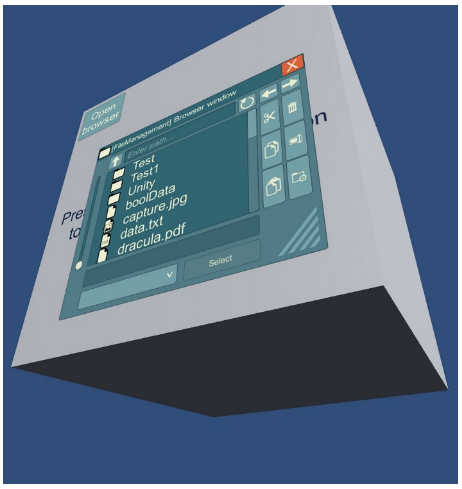
Please note that the StreamingAssets folder is read only in some platforms, but you have write access in others. You have to use `Application.streamingAssetsPath` in `fullPath mode.`

FileBrowser prefab

There is a prefab included within this package that allows you to browse the file system and to select a file/folder. This browser is prepared to work also under full 3D environments, making it perfect also for VR/AR applications.

The browser implements some useful functionality that allows it to be used without programming skills:





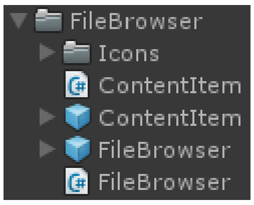
It has built in Back, Fwd, Cut, Copy, Paste, Delete, Rename and New folder buttons.

Don't forget to add an EventSystem to your scene or the Unity UI will not be able to receive click/tap events properly. You can add it from the GameObject menu: GameObject > UI > EventSystem.

The file browser is completely developed in Unity UI, so you can customize it completely at your will using the Editor tools.

The use of images are maintained at minimum to allow export easily. The only image resources that uses the prefab are contained in the "Icons" folder.

This is what you need:



The scripts used in this prefab are dependent of the `FileManagement` class, so you will need it to be imported too.

The "Icons" folder contains the image resources.

The `FileBrowser` doesn't opens the file, it just returns the path to be treated in the main application when closed.

The way you create a `FileBrowser` is as follows:

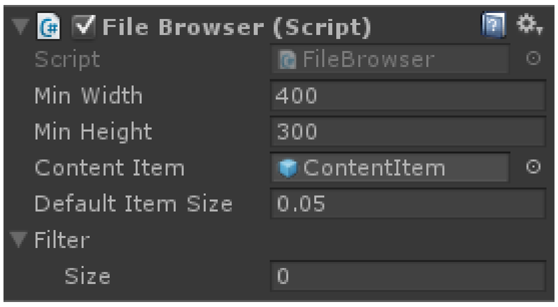
```
public GameObject fileBrowser;  // Drag the FileBrowser prefab here (in the editor).

// Create a FileBrowser window (with default options):
public void OpenFileBrowser()
{
    GameObject browserInstance = GameObject.Instantiate(fileBrowser);
    browserInstance.GetComponent<FileBrowser>().SetBrowserWindow(OnPathSelected);
    // Add file extension filters (optional):
    string[] filter = { ".wav", ".mp3", ".ogg" };
    browserInstance.GetComponent<FileBrowser>().SetBrowserWindowFilter(filter);
}

// You should use this function signature in order to receive properly:
void OnPathSelected(string path)
{
    // Do something with the returned path.
}
```

The `FileBrowser` destroys itself once a file is selected or the window is closed. You can access some public functions through the `browserInstance` variable.

You can double-click or double-tap the items to navigate and chose.

FileBrowser.cs

There are a few parameters that can be customized directly from editor in the FileBrowser.cs script:



File Browser (Script)

Script	FileBrowser
Min Width	400
Min Height	300
Content Item	ContentItem
Default Item Size	0.05
Filter	
Size	0

`public int minWidth`: The minimum width of the window when resizing (pixels).

`Public int minHeight`: The minimum height of the window when resizing (pixels).

`float defaultItemSize`: The default size for items if the size slider is disabled or deleted (percentage of the canvas height in units).

`public GameObject ContentItem`: This is the reference to the item prefab.

`string[] filter`: This `string List` defines the file extensions to be shown in the file browser. Any other file extension will be discarded. You can set this property by coding through the `SetBrowserWindowFilter()` method (it has several overloads).

SetBrowserWindow()

Here is the definition of the interface used to set the `FileBrowser` behaviour (you will find it in FileBrowser.cs):

```
public void SetBrowserWindow(OnPathSelected selectionReturn, string iniPath = "",
bool fullPath = false, string selectionMode = "F", bool save = false, string lockPath = "",
string defaultSelection = "")
```

The `OnPathSelected` delegate has a specific signature in order to be called properly:

```
void MyFunction(string)
```

The `ReturnSelectedFile()` function executes the delegate, returning the selected path/file and closes the windows.

The `iniPath` argument sets the first folder to be shown when the window becomes visible.

The `fullPath` argument allows the browser to navigate outside the unified PersistentData+StreamingAssets path without restrictions.

If you navigate until the root in `fullPath` mode, the Windows standalone builds will show the available logical drives.

The `selectionMode` argument allows the browser to select files or folders depending on its value: `"F"` for files, `"D"` for directories or logical drives (please note that in `"D"` mode files are not shown).

The `save` argument allows the `InputField` of the selected item to allow writing a custom file or folder name.

The `lockPath` argument forces the browser to stay always into that directory and sub-directories not allowing further navigation (no matter what navigation mode was selected).

The `defaultSelection` argument allows the browser in normal mode to select some existing item that matches the provided name, or in `save` mode, to also set the default name for the item to be saved.

Important: This script assumes that is attached to the root `GameObject` of the prefab (Uses the `RectTransform` of the canvas).

SetBrowserWindowFilter()

The other most important function is the one that sets the file extension filter:

```
public void SetBrowserWindowFilter(List<string> newFilter, int set = 0)
public void SetBrowserWindowFilter(string[] newFilter, int set = 0)
public void SetBrowserWindowFilter(string newFilter, int set = 0)
```

You can use any of the three overloads to set the file extension list to filter the rendered content. You can set the filter dynamically at any time and it will also set the file extension Dropdown for you.

File extensions should include the dot before the extension, and extensions can have any length: `".jpg"`, `".unity"`. You should provide the filter as a string like this: `".jpg;.unity"`.

The first filter option includes all provided filters at once.

Special characters as `"*"` or `"?"` are not allowed.

The `set` argument, allows the browser to select any of the provided filters as the default.

SetBrowserCaption()

This method sets the browser caption text and color:

```
public void SetBrowserCaption(string title)
public void SetBrowserCaption(string title, Color32 colour)
```

You can use any of the overloads to set this parameters in real time. You can set this parameter even while the `FileBrowser` is already open.

SetBrowserIcon()

This method sets the browser caption icon and color:

```
public void SetBrowserIcon(Sprite icon)
public void SetBrowserIcon(Sprite icon, Color32 colour)
```

You can use any of the overloads to set this parameters in real time. You can set this parameter even while the `FileBrowser` is already open.

There are some other very useful functions:

Cut: This button calls `Cut()` remembering the file/folder to cut. It will show a warning a message if the file/folder is read only.

Copy: This button calls `Copy()` remembering the file/folder to copy.

Paste: This button calls `Paste()` copying or moving the previously selected file or folder and all its content.

Delete: This button calls `PromtDeleteSelection()` allowing file/folder deletion. It will show a warning a message if the file/folder is read only.

Rename: This button calls `PromptForRename()` allowing rename a file or folder. It will show a warning a message if the file/folder is read only.

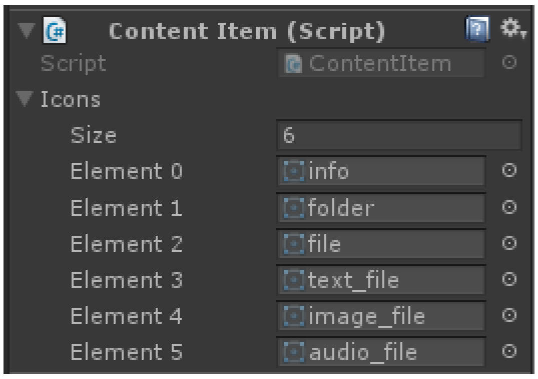
New folder: This button calls `PromtNewFolderName()` allowing create a new folder. You can create nested folders using a path notation (`"Folder1/Folder2"`).

NOTE: The copy/paste functions doesn't uses the system clipboard.

ContentItem.cs

This script controls the behavior of the rendered items.

You can modify the icons shown in items from here (in the prefab) adding or replacing them in the `icons` array of `Sprite` elements.



Content Item (Script)

Script	ContentItem
Icons	
Size	6
Element 0	info
Element 1	folder
Element 2	file
Element 3	text_file
Element 4	image_file
Element 5	audio_file

The icons rendered depending on the file extension are determined by the `SetItem` method in the ContentItem.cs script. Feel free to modify and add your own file extensions and icons.

Customize the browser window

The file browser is completely built with the Unity UI, so you can use the standard tools to customize the window at your will.

IMPORTANT: Before start customizing the prefab, please make a copy with Ctrl+D and rename or move as needed. Duplicate the ContentItem prefab too, and once renamed or moved, assign its reference to the `ContentItem` variable into your new copy of file browser prefab.

There are no scripts attached to the elements of the browser window, everything is connected from FileBrowser.cs.

You just have to keep in mind to use some special names in its hierarchy to allow the FileBrowser.cs script to find the elements that it uses to work properly.

Those elements are:

`BrowserWindow`: This is the main container panel. Everything is contained by this element (it is the window itself).

`Caption`: The title of the browser window. It can be modified through the right methods.

`Icon`: this is the icon at the left of the window caption. It can be modified through the right methods. Can be deleted if not used.

`InputCurrentPath`: This `InputField` contains the current directory being rendered. It can be edited at any time.

`ContentWindow`: This `ScrollRect` is the list controller of rendered items.

`ContentWindow>ViewPort>Content`: This is the main container of the rendered items. The ContentItem prefabs are added automatically to its `Transform`. It has a `VerticalLayoutGroup` component to arrange items.

`InputSelection`: This `InputField` contains the name of the selected item. When in `save` mode, this `InputField` can be edited to set a custom file or folder name.

`ButtonSelect`: This is the selection `Button`, it can be enabled or disabled depending on the current selection.

`ButtonSelect>Text`: the `Text` of the `ButtonSelect` changes depending on the action that can be executed: `"Select"`, `"Open"` or `"Save"`.

`Confirmation`: This is the confirmation pop-up with a `Label` and two buttons: `ButtonOk` and `ButtonCancel`.

`NewName`: This is the text input pop-up with a `Label`, an `InputField` called `InputNewName` and two buttons: `ButtonOk` and `ButtonCancel`.

`ErrorMessage`: This is the message pop-up with a `Label`, an `Image` and a button: `ButtonOk`.

`SizeSlider`: This `Slider` allows modifying the item size dynamically. Can be deleted if not used.

`FilterDropdown`: This `Dropdown` lists the available file extensions to be rendered in the content view. The first item is always a list with all the available extensions. The extensions will be added separately in the successive items. Can be deleted if not used (filters will still working internally).

Excepting `ButtonSelect`, every button or interactive element has an event that points to a method contained in FileBrowser.cs, so you can delete them if they are not needed.

To set the browser in 3D world, adjust the scale and relative transform of the custom file browser and then instantiate it normally, assigning then the containing parent:

```
GameObject instance = Instantiate(browser);
instance.transform.SetParent(parent, false);
```

Take a look at the 3D example to get more information.

INI file management

The class FM_IniFile is created to manage INI files in memory and then save them to disk using automatic formatting.

INI files are intended to save multiple parameters called “Keys” structured in groups called “Sections”. Ini files are widely used to save configurations because they are very easy to read and modify manually.

The standard INI file structure is as follows:

```
; This is a comment.
KeyIntoDefaultGroup = 10           ; Another comment

[Section1]
KeyIntoSection1 = Hello world

[Section2]
KeyIntoSection2 = 3.14
```

Blank lines and comments are discarded.

Key names can be repeated in different sections, they are in fact independent values:

```
Key = 20
[Section1]
Key = 30
```

If a section is repeated, then the values contained are also interpreted as part of the same section.

```
[Section1]
KeyIntoSection1 = Hello world
[Section2]
KeyIntoSection2 = 3.14
[Section1]
_KeyIntoSection1 = Message
```

Is the same as:

```
[Section1]
KeyIntoSection1 = Hello world
_KeyIntoSection1 = Message
[Section2]
KeyIntoSection2 = 3.14
```

If a section+key name is repeated, then the key is not duplicated but updated, so the last one has the highest priority.

```
[Section1]
KeyIntoSection1 = Hello world
[Section2]
KeyIntoSection2 = 3.14
[Section1]
KeyIntoSection1 = Message
```

Is the same as:

```
[Section1]
KeyIntoSection1 = Message
[Section2]
KeyIntoSection2 = 3.14
```

The FM_IniFile class

FileManagement now includes the FM_IniFile class that allows an easy manipulation of INI files. You can read, modify and save them with a few simple interfaces.

The class is empty when is created, you have three ways to load an INI file in order to manipulate it.

Through the constructor:

```
FM_IniFile iniFile = new FM_IniFile("ExampleCfg.ini");
```

Calling the `LoadNewIniFile` method:

```
FM_IniFile iniFile = new FM_IniFile();
iniFile.LoadNewIniFile("ExampleCfg.ini");
```

Calling the `ImportIniFile` method in the `FileManagement` class:

```
FM_IniFile iniFile = FileManagement.ImportIniFile("ExampleCfg.ini");
```

FM_IniFile constructor

```
public FM_IniFile()
public FM_IniFile(string name, bool enc = false, bool checkSA = true, bool fullPath = false)
```

There are two overloads of the constructor, the one without parameters creates an object without initialization, you'll have to load a file manually.

The constructor with parameters loads the requested file in the new object.

LoadNewIniFile( )

```
public void LoadNewIniFile(string name, bool enc = false, bool checkSA = true,
bool fullPath = false)
```

This method load the requested file into the object.

You can load a file dynamically, and the new one will replace the last one.

GetKey()

```
public T GetKey<T>(string key, T defaultValue, string section = "")
```

This method returns a value stored in a key. The method allows type conversion, this method uses the `CustomParser` internally.

The `defaultValue` parameter is the returned value in case the requested key+section not exists.

This example returns an int value:

```
FM_IniFile iniFile = FileManagement.ImportIniFile("ExampleCfg.ini");
int value = iniFile.GetKey<int>("Int", 9, "Group1");
```

Now value is "5678" (from the example file) in it, instead of "9".

SetKey()

```
public void SetKey<T>(string key, T value, string section = "")
```

Updates a key in the object. There is no action if the key is not found.

You can pass any supported type to this method, it will make the proper conversion using `CustomParser`.

This example updates an existing key to the INI object:

```
iniFile.SetKey("Int", 321, "Group1");
```

AddKey()

```
public void AddKey<T>(string key, T value, string section = "")
```

Add a new key to the object. When adding a new key, also can be added a new section. If the section is not defined, the key will be added to the default section.

You can pass any supported type to this method, it will make the proper conversion using `CustomParser`.

This example adds a new key to the INI object:
```
iniFile.AddKey("MyKey", 3,14, "MySection");
```

RemoveKey()

```
public void RemoveKey(string key, string section = "")
```

Removes a key from the object.

This example removes a key from the INI object:
```
iniFile.RemoveKey("MyKey", "MySection");
```

RemoveSection()

```
public void RemoveSection(string section = "")
```

Removes a complete section from the object, including all its keys.

This example removes a section from the INI object:
```
iniFile.RemoveSection("MySection");
```

KeyExists()

```
public bool KeyExists(string key, string section = "")
```

Checks if a key exists in the INI file.

GetSectionList()

```
public string[] GetSectionList(bool sort = false)
```

Gets the list of all the sections in the INI file.

The `sort` parameter sorts the list alphabetically.

This example gets the list and sort alphabetically:
```
string[] sections = iniFile.GetSectionList(true);
```

GetKeyList()

```
public string[] GetKeyList(string section = "", bool sort = false)
```

Gets the list of all the keys in the provided section.

The `sort` parameter sorts the list alphabetically.

This example gets the list and sort alphabetically:
```
string[] keys = iniFile.GetKeyList(true);
```

Save()

```
public void Save(string name, bool sort = false, bool enc = false,
bool fullPath = false)
```

Saves the content of the INI file object to disk. It uses the standard formatting mode (comments are not added automatically).

The `sort` parameter sorts sections and keys alphabetically.

This example saves the ini file in PersistentData folder:
```
iniFile.SaveIniFile("MyIniFile.ini", true);
```

Merge()

```
public void Merge(FM_IniFile source)
```

Merges the content of the INI file from the parameter `source` to the local INI file object.

Duplicated values are updated with the `source` values.

This example merges two ini files:
```
FM_IniFile otherFile = new FM_IniFile("Cfg.ini");
```

```
iniFile.Merge(otherFile);
```

Multi Threading

The multi-threading method discussed in this section is not supported in Windows Store builds.

To add multi-threading tasks to your application easily you have to create a `Thread` object, then assign a function to be executed and finally start the execution like this:

```
using System.Threading;
using UnityEngine;

public class SaverTest : MonoBehaviour
{
    Thread saver;                           // This is the thread object.

    // This method sets and starts the thread:
    void Start()
    {
        // Start the thread:
        saver = new Thread(new ThreadStart(Saver));
        saver.IsBackground = true;
        saver.Start();
    }

    // This is the method executed as a parallel thread:
    void Saver()
    {
        // Save the screenshot:
        FileManagement.SaveFile("MyNewFile.txt", "Hello world!");
    }
}
```

You can't stop a running `Thread`, you can only wait until it ends, so beware of infinite loops.

Use `Thread` to make long tasks, so allow your application to be responsive while the task is being performed.

Most Unity classes and methods can't be used into a `Thread`, that's the reason why some methods in `FileManagement` can't be used into a `Thread` neither.

Those methods are:

- `ImportAudio`: Excepting WebGL platform (it uses OWP).
- `ReadRawFile`: When accessing StreamingAssets in Android.
- `FileExists`: When accessing StreamingAssets in Android.
- `DirectoryExists`: When accessing StreamingAssets in Android.

String conversion and interpretation

In order to allow the most widely supported string format, `FileManagement` includes a way to select how it converts a `string` into `byte[]` (array) and vice-versa.

To do this you have to assign the selected value to the `FM_StringMode` stringConversion parameter like this:

```
FileManagement.stringConversion = FM_StringMode.Fast;
```

The `FM_StringMode` enumeration has the following values:

`UTF8`: Designed to 8bit environments. This is the default mode, it covers the majority of user cases.

`Fast`: Custom straight conversion from 8bit char to byte. This mode is recommended if you are not using extended ASCII characters.

`ASCII`: 7bit character set.

`BigEndianUnicode`: UTF16 with big endian byte order.

`Unicode`: UTF16 with little endian byte order.

`UTF32`: UTF32 with little endian byte order.

`UTF7`: Designed to 7bit environments.

Known Issues

- There is no straight compatibility with the legacy interfaces used for reading and writing cookies in Web Browsers. Nevertheless you will find those interfaces as `private` in the `FileManagement` class so you can still using them if needed (WebGL only).

- To grant SDCard access in Android you must enable the option: BuildSettings>PlayerSettings>OtherSettings>WriteAccess = External (SDCard).

- Android file system is case sensitive.

- Listing logical drives is not supported across all platforms.

- Only WAV files are supported since Unity 2019 (OGG Vorbis parser is under development).

- Those methods can't be used inside a parallel thread:

• ImportAudio: Excepting WAV files, they are widely supported through OWP.

• ImportTexture: It uses the main Unity thread.

Contact

If you need some new interfaces or if you find some errors in this documentation or the application, don't hesitate on send me an email: jmonsuarez@gmail.com

I you find that the test version is not the same version that you downloaded from the AssetStore, please send me your invoice number and I will send you back the last `FileManagement` version (new version normally is into approval process).

Please, once you have tested this product, take a minute of your time to write a good review in the Unity Asset Store, so you will help to improve this product:

See File Management in the Asset Store.

Thanks.