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List a Folder in One Call: The IOUtils Cookbook (2/2)

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In Part 1 we met `System.IOUtils` and its central surprise — that `TFile`, `TDirectory`, and `TPath` are **records, not classes**, so you call them through the type name and never `Create` or `Free` a thing. We put `TFile` through its paces: reading a whole file in one line, writing, copying, inspecting.

But files live in folders, and folders live at paths that look maddeningly different on Windows (`C:\Users\me\Documents`) than on macOS or Linux (`/Users/me/Documents`, `/home/me/Documents`). This is exactly where `IOUtils` stops being a convenience and starts being the *right* tool: `TDirectory` lists and walks folders in a single call, and `TPath` builds and takes apart paths — and tells you where the Documents folder *is* — without you ever hardcoding a separator or a drive letter.

This is the second half of the cookbook. Same format: the `SysUtils` way you know, beside the `IOUtils` way, recipe by recipe. We'll cover directories, then paths, and then — as promised — close with a complete one-page reference to every record and method in the unit, so you can bookmark this and stop guessing. Let's finish the tour.

Recipe: list the files in a folder

The classic way to enumerate a directory is the `FindFirst`/`FindNext`/`FindClose` loop — a genuine rite of passage in Delphi, and one that's easy to get subtly wrong (forget `FindClose` and you leak a handle):

```
var
  SR: TSearchRec;
begin
  if FindFirst('C:\data\*.json', faAnyFile, SR) = 0 then
  try
    repeat
      Writeln(SR.Name);
    until FindNext(SR) <> 0;
  finally
    FindClose(SR);
  end;
end;
```

The `IOUtils` way is a single call that hands you back a `TArray<string>` of full paths — no loop, no handle to close:

```
var
  Files: TArray<string>;
  FileName: string;
begin
  Files := TDirectory.GetFiles('C:\data', '*.json');
  for FileName in Files do
    Writeln(FileName);
end;
```

`TDirectory.GetFiles` is richly overloaded — that's the RTL giving you one name for many needs. The overloads let you add:

- a **search pattern** (`'*.json'`) to filter by mask;
- a `TSearchOption` — `soTopDirectoryOnly` (the default) or `soAllDirectories` to recurse into every subfolder in one call;
- a **filter predicate**, an anonymous function that gets the final say on each entry.

Here's the power move — every `.log` file in an entire tree, filtered to those over a megabyte, in one expression:

```
Files := TDirectory.GetFiles('C:\logs', '*.log', TSearchOption.soAllDirectories,
  function(const Path: string; const Rec: TSearchRec): Boolean
  begin
    Result := Rec.Size > 1024 * 1024;
  end);
```

That predicate parameter is a genuinely lovely piece of API design, and it's worth seeing how the pieces fit together.



TDirectory.GetFiles: pattern narrows, recursion widens, predicate decides

Read left to right, that's the whole filtering pipeline: start with everything, narrow by pattern, optionally widen by recursion, and let your predicate make the final call — all inside one method call that returns a plain array.

> **Millions of files? Ask for an enumerator instead**
>
> `GetFiles` builds the *entire* array before returning — fine for hundreds or thousands of entries. For enormous directories, `TDirectory.GetFilesEnumerator` returns an `IEnumerable<string>` you can iterate lazily with `for … in`, so you don't materialize the whole list in memory at once. It's an interface, so it's reference-counted and cleans up after itself — no `Free` needed, exactly as my interfaces post describes.

Recipe: create, check, and delete a directory

The directory-level cousins of the file operations from Part 1, and they read just as cleanly. Note that `CreateDirectory` makes intermediate folders for you — the equivalent of the old `ForceDirectories`, not the single-level `MkDir`:

Task	SysUtils	IOUtils
Does it exist?	`DirectoryExists(Path)`	`TDirectory.Exists(Path)`
Create (incl. parents)	`ForceDirectories(Path)`	`TDirectory.CreateDirectory(Path)`
Delete	`RemoveDir(Path)` *(must be empty)*	`TDirectory.Delete(Path, True)` *(recursive)*
List subfolders	`FindFirst` loop with `faDirectory`	`TDirectory.GetDirectories(Path)`
Is it empty?	*(manual loop)*	`TDirectory.IsEmpty(Path)`

Two of these deserve a spotlight. `TDirectory.Delete(Path, True)` deletes a folder *and everything inside it* recursively — powerful, and correspondingly easy to point at the wrong path, so treat it with the respect you'd give `rm -rf`. And `TDirectory.IsEmpty` answers a question that used to require its own little loop, which is the kind of small ergonomic win that adds up across a codebase.

> **Recursive delete is exactly as dangerous as it sounds**

> `TDirectory.Delete(SomePath, True)` will happily erase an entire subtree with no confirmation and no recycle bin. Validate the path before you call it — never pass it a value that could be empty, a drive root, or user-supplied without checking. A single wrong variable here is the difference between cleaning a temp folder and deleting a customer's data.

Recipe: copy or move a whole directory tree

This is the one that used to mean writing a recursive helper by hand. `TDirectory` does it in a single call — copying every file and subfolder, or moving the whole tree at once:

```
TDirectory.Copy('C:\project\src', 'C:\backup\src');   // deep copy, files + subfolders
TDirectory.Move('C:\project\old', 'C:\project\new');  // relocate/rename the whole tree
```

There's no tidy `SysUtils` one-liner to put beside these — that's precisely the point. The classic equivalent is a hand-rolled recursion over `FindFirst`, and every developer who wrote one wrote a slightly different set of edge-case bugs. Letting the RTL own that logic is a real reduction in surface area for mistakes.

Recipe: build a path without hardcoding a separator

Now `TPath`, and the recipe that pays for the whole unit if you ever ship to more than one OS. The instinct we all have is to glue paths with a backslash and a bit of string surgery:

```
// Fragile: assumes '\', assumes no trailing separator, breaks on macOS/Linux
FullName := Folder + '\' + FileName;
```

`TPath.Combine` does it correctly — it inserts the platform's own separator (`\` on Windows, `/` on POSIX) and handles the trailing-separator edge cases you'd otherwise get wrong:

```
FullName := TPath.Combine(Folder, FileName);
// overloads take 3, 4, or an open array of segments:
FullName := TPath.Combine([BaseDir, 'reports', '2026', 'july.pdf']);
```

And taking a path *apart* is just as clean — no `ExtractFileName`/`ExtractFileExt`/`ExtractFilePath` trio to remember which does which:

```
TPath.GetFileName('C:\data\report.pdf');              // 'report.pdf'
TPath.GetFileNameWithoutExtension('C:\data\report.pdf'); // 'report'
TPath.GetExtension('C:\data\report.pdf');             // '.pdf'
TPath.GetDirectoryName('C:\data\report.pdf');         // 'C:\data'
TPath.ChangeExtension('report.pdf', '.txt');          // 'report.txt'
```

> **The SysUtils Extract* functions are not going anywhere**
>
> To be fair to the old guard: `ExtractFileName`, `ExtractFilePath`, and friends still work perfectly and are shorter to type. The `TPath` versions win on two fronts — a single consistent naming scheme, and behavior that's defined identically across platforms — but if you're on Windows-only and happy with `ExtractFileName`, you are not doing anything wrong. Fit, not verdict.

Recipe: find *where* the Documents folder actually is

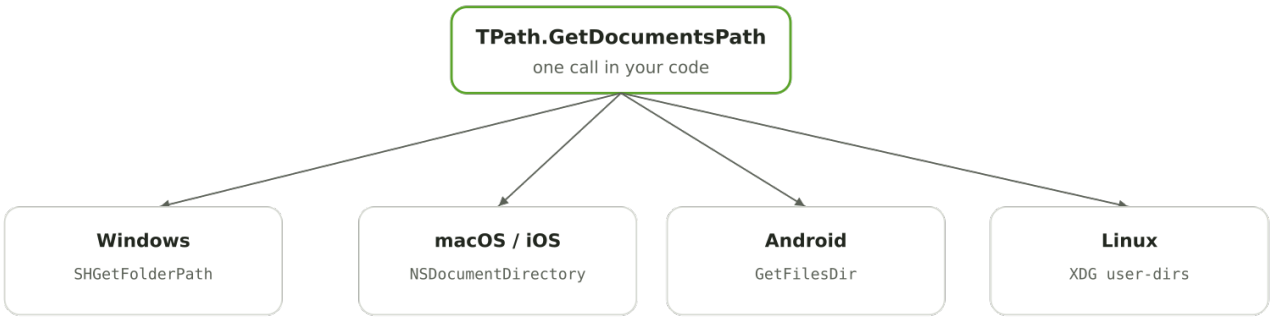
This is `TPath`'s quiet superpower, and it's the strongest single reason to learn it. Hardcoding `C:\Users\...\Documents` is wrong the moment your app runs on macOS, and even on Windows it's wrong for redirected or localized profiles. `TPath` resolves the *real* location for you, per platform, at runtime:

```
Docs   := TPath.GetDocumentsPath;   // the user's Documents folder
Home   := TPath.GetHomePath;        // the user's home / app-data root
Temp   := TPath.GetTempPath;        // the system temp directory
Cache  := TPath.GetCachePath;       // per-app cache location
Pics   := TPath.GetPicturesPath;    // the user's Pictures folder
```

To show this isn't hand-waving, here is what `TPath.GetDocumentsPath` actually does inside the RTL — a different, correct call on every platform:

```
class function TPath.GetDocumentsPath: string;
{$IFDEF MSWINDOWS}
  // SHGetFolderPath(..., CSIDL_PERSONAL, ...)
{$ENDIF}
{$IFDEF MACOS}
  // InternalGetMACOSPath(NSDocumentDirectory, NSUserDomainMask)
{$ENDIF}
{$IFDEF ANDROID}
  // GetFilesDir
{$ENDIF}
{$IFDEF LINUX}
  // InternalXDGGetUserDir(Documents)   // reads the XDG user-dirs config
{$ENDIF}
end;
```

One method name; four completely different OS mechanisms behind it. That's the value proposition of `IOUtils` distilled into a single call — you write the intent, the RTL knows the platform.



One call, four platforms: TPath.GetDocumentsPath resolves the real location everywhere

The diagram is the argument: you commit to one line at the top, and the RTL fans it out to the correct native mechanism on each OS below. That's what "cross-platform" should feel like.

The complete reference

As promised, here is the whole unit at a glance — every public record and its methods, grouped by purpose. This is the map to keep next to your keyboard. (Types and signatures are from `System.IOUtils.pas` as shipped with RAD Studio; the authoritative per-method docs live on the DocWiki.)

The types (all records and enums)

The unit declares three records and the enums they use. Every method on the records is `class ... static` — call it on the type name.

Type	Kind	What it's for
`TFile`	record	Operations on individual files (Part 1)
`TDirectory`	record	Operations on folders and their contents
`TPath`	record	Building, splitting, and locating paths
`TSearchOption`	enum	`soTopDirectoryOnly`, `soAllDirectories`
`TFileAttribute` / `TFileAttributes`	enum / set	File attributes — **platform-specific set**
`TFileMode` / `TFileAccess` / `TFileShare`	enum	Stream open modes for `TFile.Open`

`TFile` — file operations

The workhorse from Part 1. Read/write helpers return values; `Open*`/`Create*` return objects you must free.

Group	Methods
Existence & info	`Exists`, `GetSize`, `GetAttributes`, `SetAttributes`
Read whole file	`ReadAllText`, `ReadAllLines`, `ReadAllBytes`
Write whole file	`WriteAllText`, `WriteAllLines`, `WriteAllBytes`, `AppendAllText`
Streaming (returns objects to free)	`Create`, `Open`, `OpenRead`, `OpenWrite`, `OpenText`, `CreateText`, `AppendText`, `GetLinesEnumerator`
Copy / move / delete	`Copy`, `Move`, `Delete`, `Replace`
Timestamps	`GetCreationTime`, `GetLastWriteTime`, `GetLastAccessTime` (+ `…Utc` and `Set…` variants)
Symlinks	`CreateSymLink`, `GetSymLinkTarget`
Windows-only	`Encrypt`, `Decrypt`

`TDirectory` — folder operations

Listing methods return `TArray<string>`; the `…Enumerator` variants return a lazy `IEnumerable<string>`.

Group	Methods
Existence & lifecycle	`Exists`, `CreateDirectory`, `Delete`, `IsEmpty`
List contents	`GetFiles`, `GetDirectories`, `GetFileSystemEntries` (each with `…Enumerator` siblings)
Copy / move	`Copy`, `Move`
Navigation	

	`GetParent`, `GetDirectoryRoot`, `GetLogicalDrives`, `IsRelativePath`
Current directory	`GetCurrentDirectory`, `SetCurrentDirectory`
Attributes & timestamps	`GetAttributes`, `SetAttributes`, `GetCreationTime`, `GetLastWriteTime`, `GetLastAccessTime` (+ `…Utc` / `Set…`)

`TPath` — path & location operations

Pure helpers — no file system touched by the string methods. The `Get…Path` family is where the cross-platform magic lives.

Group	Methods
Build & split	`Combine`, `GetDirectoryName`, `GetFileName`, `GetFileNameWithoutExtension`, `GetExtension`, `ChangeExtension`, `HasExtension`, `GetFullPath`, `GetPathRoot`
Validation	`IsValidFileNameChar`, `IsValidPathChar`, `HasValidFileNameChars`, `HasValidPathChars`, `GetInvalidFileNameChars`, `GetInvalidPathChars`, `MatchesPattern`
Path shape tests	`IsRelativePath`, `IsPathRooted`, `IsDriveRooted`, `IsUNCPath`, `DriveExists`
Temp & random names	`GetTempPath`, `GetTempFileName`, `GetRandomFileName`, `GetGUIDFileName`
Cross-platform locations	`GetHomePath`, `GetDocumentsPath`, `GetSharedDocumentsPath`, `GetCachePath`, `GetLibraryPath`, `GetPublicPath`, `GetDesktopPath`, `GetDownloadsPath`, `GetPicturesPath`, `GetMusicPath`, `GetMoviesPath`, `GetCameraPath` (+ several `Shared…` variants)
Separators (class properties)	`DirectorySeparatorChar`, `AltDirectorySeparatorChar`, `PathSeparator`, `VolumeSeparatorChar`, `ExtensionSeparatorChar`

A fair word on the alternatives

As in Part 1, house rules ask me to name the wider field honestly, and `TPath` in particular has close cousins worth respecting. .NET's `System.IO.Path` and `Environment.SpecialFolder` do the same combining and known-folder resolution that `TPath` does — indeed `IOUtils` was modeled on them. Python's `pathlib.Path` is arguably the most elegant of the bunch, treating paths as first-class objects with operator overloading. Node's `node:path` plus `os.homedir()` cover the same ground for JavaScript. Each is a fine tool in its own ecosystem. What `TDirectory`/`TPath` offer the Delphi developer is that these conveniences are *already in your RTL*, compile to native code, and behave identically across all five Delphi targets — no extra dependency, nothing to install. Use the tool that lives where your code lives.

Takeaways

Across both parts, the thesis was simple: modern Delphi has a cleaner, cross-platform vocabulary for the file system than many of us ever learned — and it's been sitting in the RTL since 2010. Here's what to carry away:

-

`TDirectory` collapses the `FindFirst`/`FindNext`/`FindClose` loop into `GetFiles` / `GetDirectories`, with optional pattern, recursion, and predicate — and deep `Copy`/`Move`/`Delete` you no longer have to hand-roll.

- `TPath` builds and splits paths without hardcoded separators, and — its real superpower — resolves *where* the Documents, Home, Temp, and Cache folders live, correctly, on every platform.
- All three (`TFile`, `TDirectory`, `TPath`) are **records**: call them on the type name, never `Create` or `Free` them. The only things you free are the streams and readers they hand back.
- None of this makes the classic `SysUtils` functions wrong. `IOUtils` wins on *coherence and portability*, not on beating any single old function. Pick by fit.

> `TFile`, `TDirectory`, `TPath` — one coherent, cross-platform record API for everything you do with the file system, and it's already in your RTL. Open the unit.

If you skipped it, Part 1 covers files — reading, writing, and inspecting — and explains the records-not-classes design in full. Together the two parts are the tour of `System.IOUtils` I wish someone had given me years ago. Now go read a whole file in one line.

The series: the IOUtils cookbook

Two parts, recipe by recipe: 1. Files: read, write, copy, inspect — the design, and everything `TFile` 2. Directories, paths, and the full reference **— you are here**

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