

# ownCloud Desktop Client Manual

The ownCloud Team

Version: 2.10, July 22, 2022

# Table of Contents

Introduction .....	1
Improvements and New Features .....	1
Installing the Desktop App .....	2
Introduction .....	2
System Requirements and Installation .....	2
Customizing the Windows Installation .....	7
Installation Wizard .....	10
Using the Desktop App .....	12
Introduction .....	12
Used App Icons .....	12
Systray Icon .....	13
File Manager Overlay Icons .....	15
Sharing From Your Desktop .....	16
Activity Window .....	17
Settings Window .....	19
Using the Virtual Filesystem .....	23
Introduction .....	23
Microsoft VFS Implementation .....	23
ownCloud VFS Implementation .....	24
Filename Considerations .....	31
Introduction .....	31
Forbidden Printable ASCII Characters .....	31
Non-Printable Characters .....	31
Reserved File Names .....	32
Other Rules .....	32
Examples and Pitfalls .....	32
Manage Synchronisation Conflicts .....	33
Introduction .....	33
Example Situation .....	33
Uploading Conflicts (experimental) .....	33
Automatic Updating of the Desktop App .....	35
Introduction .....	35
Basic Workflow .....	35
Preventing Automatic Updates .....	35
Removing the Desktop App .....	38
Introduction .....	38
Removing the Binary .....	38
Removing the Configuration File .....	38

Windows Navigation Sidebar .....	38
Desktop Frequently Asked Questions (FAQ).....	39
Introduction .....	39
Usage.....	39
Major Configuration Changes .....	39
Error Messages .....	41
Advanced Usage .....	46
Command Line Options .....	46
Configuration File .....	46
Environment Variables .....	48
The Command Line Client .....	50
Low Disk Space .....	52
Appendices .....	53
Appendix Building the Desktop App .....	53
Appendix History and Architecture .....	60
Appendix Troubleshooting .....	67
GUI Testing the Desktop App .....	73
Release Notes .....	76

# Introduction

Available for Windows, macOS, and various Linux distributions, the ownCloud Desktop App enables you to:

- Specify one or more directories on your computer that you want to synchronize to the ownCloud server.
- Always have the latest files synchronized, wherever they are located.

Your files are always automatically synchronized between your ownCloud server and local PC.

## Improvements and New Features

Each release of the ownCloud Desktop App has new features and improvements, for details see the [complete changelog](#).

# Installing the Desktop App

## Introduction

The Desktop App enables users to access and sync files and folders from their ownCloud, work on remote files right from the desktop as if they were stored on their computer – because they are. Continuous synchronization to and from the ownCloud server provides ease of use combined with comprehensive access control.

## System Requirements and Installation

You can download the latest version of the ownCloud Desktop App from the [Desktop App Download](#) page. There are Desktop Apps for *Linux*, *macOS*, and *Microsoft Windows* available. When using Linux, you can also use AppImage.

### System Requirements

Depending on the operating system used, some minimum system requirements need to be met. ownCloud provides Linux packages for a variety of Linux distributions, see the list of supported distros below.

#### Windows

- Windows 7+
  - x86 with 32-bit or x86-64 with 64-bit
  - Native WinVFS available for Windows 10 version 1709 or later

#### macOS

- macOS 10.12+
  - x86-64 or Apple M in Rosetta 2 emulation; unsupported legacy builds for Mac OS X 10.10 & 10.11 available
  - M1 native support planned for Q4 2022 - no issues in regard to performance or otherwise known at this time!

#### Linux

- CentOS 7.x with *minimum* version x=8 (x86-64)
  - Note the Python extensions for nautilus (GNOME) and its forks nemo (Cinnamon) and caja (MATE) are available only in the third-party EPEL archives which needs to be installed separately before the ownCloud package can be installed. To do so, run

```
sudo yum install epel-release
```

- Debian 10 & 11 (x86-64)
- Fedora 34 & 35 (x86-64)
- openSUSE Leap 15.2 & 15.3 (x86-64)

- Ubuntu 20.04 & 21.04 & 21.10 (x86-64)



For Linux distributions, we support, if technically feasible, the latest 2 versions per platform and the previous Ubuntu [LTS](#).

## Installation on Mac OS X and Windows

Installation on Mac OS X and Windows is the same as for any software application: download the installer, double-click it to launch the installation and follow the installation wizard. After it is installed and configured the Desktop App will automatically keep itself updated; see [autoupdate](#) for more information.

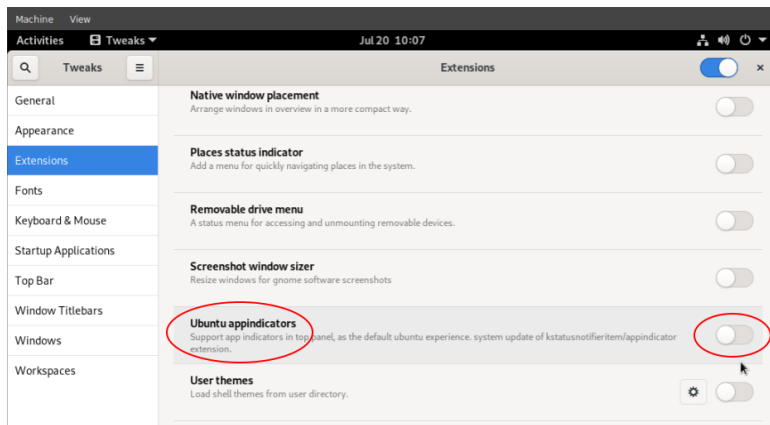
## Installation on Linux

- No matter whether the Desktop App is installed natively or used as an AppImage, you can add command line parameters when starting up post installation. One parameter to mention is the option `-s`. This option forces the settings page to be shown on startup. While not necessary during general usage, it can be helpful if system tray icons are not available any more within your desktop environment.
- Linux users should also have a password manager enabled, such as [GNOME Keyring](#) or [KWallet](#), so that the Desktop App can log in automatically.
- Note, our description focuses on the GNOME desktop. Adapt the procedures for other desktop environments accordingly.
- Using GNOME on recent distributions like Ubuntu 22.04, Debian 11 or others, the system tray is typically no longer available. This makes it hard to get back an app that has been minimized to the system tray. You have to install an extension in order to restore the system tray in this case in order to be able to find and restore the minimized application.

For distributions like Ubuntu 22.04 or Debian 11, please use the command below to install the extension, otherwise please follow the [AppIndicator Support](#) installation.

```
sudo apt install gnome-shell-extension-appindicator
```

When the extension is installed, you need to restart the GNOME shell. To do so, hit **[Alt+F2]** on the keyboard, type **[r]** and **[Enter]**. Now you will see the new extensions added to the extensions list. To enable an extension, switch the button on the right to the **[On]** position. For the particular system tray icon extension, the name for all distributions is **Ubuntu AppIndicators** because the notification system AppIndicators has been developed by Ubuntu. Once enabled, the system tray is shown again within the desktop environment.



## Native installation

Linux users must follow the instructions on the [download](#) page to add the appropriate repository for their Linux distribution, install the signing key and use their package managers to install the Desktop App. Linux users will also update their Desktop App via package manager. The Desktop App will display a notification when an update is available.

You will also find links to source code archives and older versions on the download page.

## AppImage

Starting with Desktop App version 2.9, an [AppImage](#) build of the ownCloud Desktop App is available to support more Linux platforms. You can download the AppImage at the [Linux section of the Download Desktop App](#) page.

AppImage is an alternative way to use Linux applications—instead of having multiple files in several places making up a package, the entire application is contained in a single file ending with an **.AppImage** suffix, including all necessary dependencies and libraries. ownCloud provides a single AppImage which runs on all (modern) Linux platforms.

### Known limitations for the 2.10.x AppImage

- CentOS 7 is currently not supported.
- For Ubuntu 22.04, Debian 11 and other very recent distributions, you need to install **libfuse2** as a prerequisite. For details see issue with **libfuse** on Ubuntu >=22.04 or Debian 11 [Setting up FUSE 2.x alongside of FUSE 3.x on recent Ubuntu \(>=22.04\)](#).
- The file browser integration, which means overlay icons and the context menu, is not included in the AppImage. You need to install file browser extension packages manually.
- AppImages do not start automatically. You have to configure your desktop to automatically start the Desktop App when logging in.
  - For GNOME, search for *startup applications* in the desktop menu.
  - As an alternative, use the [AppImageLauncher](#) App which also helps managing AppImages.
- There is no automatic updating. Any update is like installing the AppImage.

### Installing **libfuse2** if required

- Check if **libfuse2** is already installed:

```
dpkg -l libfuse2
```

- Check if there is an installation candidate for **libfuse2**:

```
sudo apt-cache show libfuse2
```

- Install **libfuse2**:

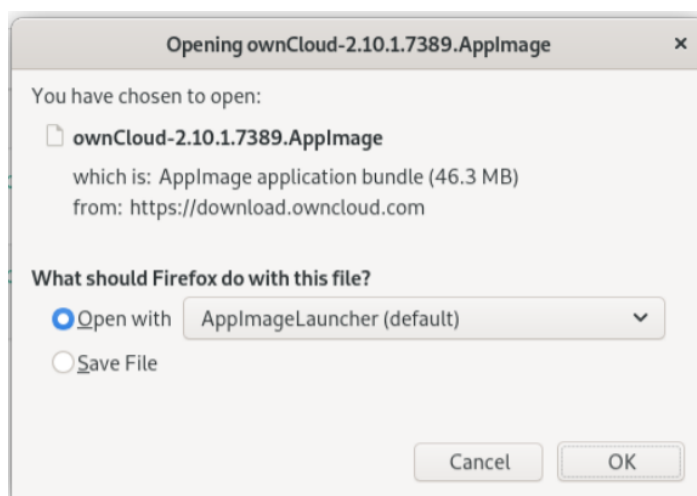
```
sudo apt install libfuse2
```

## Install the AppImageLauncher app

See the [Install AppImageLauncher](#) wiki for details about installing it. AppImageLauncher does not need to be started. It hooks in when you start an AppImage. There are different responses when starting an AppImage:

### How to launch an AppImage

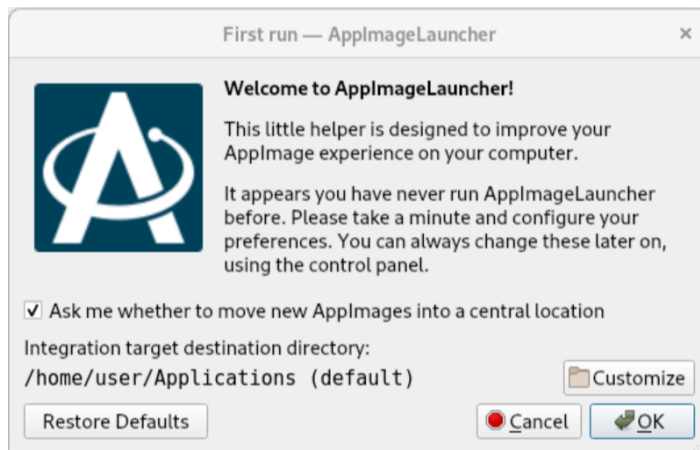
When you open an AppImage file via your file browser that you have not opened before then double click on it:



### First time usage

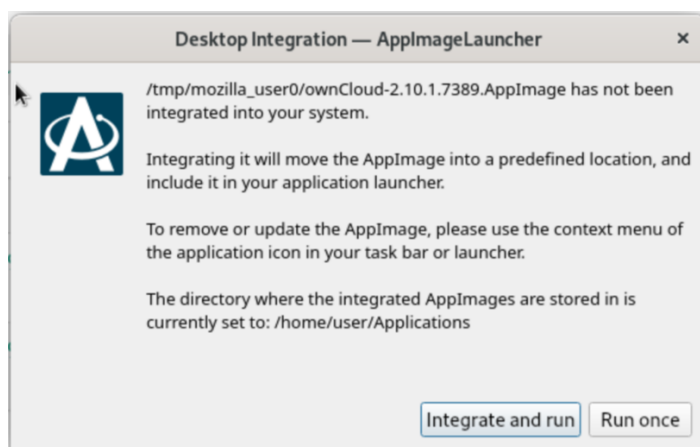
After opening an AppImage, if AppImageLauncher has been started for the first time, it will ask you to define some basic settings:





## AppImage Integration Question

Post first time configuration or when you open the AppImage file via your file browser, for example by double clicking on it:



## Install and run the Desktop App AppImage

The example below uses the terminal but you can also use the GUI. For details see [How to run an AppImage](#).

- Go to the [download](#) page and download the recent AppImage into the Applications folder in your home directory. Replace the URL from the example with the actual URL from the download page. Note the folder name **Applications** can be any name and helps to collect all AppImages you have on one location. The AppImageLauncher, if used, has this name predefined unless you change it.

```
mkdir -p ~/Applications
```

```
cd ~/Applications
```

```
wget https://download.owncloud.com/desktop/ownCloud/stable//2.10.1.7187/linux-appimage/ownCloud-2.10.1.7187.AppImage
```

- The following steps are only necessary when the AppImageLauncher is *not* used:

- Make the AppImage executable:

```
sudo chmod +x ownCloud-2.10.1.7187.AppImage
```

- Start the AppImage by invoking the following command:

```
~/Applications/ownCloud-2.10.1.7187.AppImage
```

- Note when you start the AppImage after setting it to be executable, AppImageLauncher will open if installed.

## Customizing the Windows Installation

If you just want to install the ownCloud Desktop App on your local system, you can simply launch the **.msi** file and configure it in the wizard that pops up.

### Features

The MSI installer provides several features that can be installed or removed individually, which you can also control via command-line, if you are automating the installation, then run the following command:

```
msiexec /passive /i ownCloud-x.y.z.msi.
```

The command will install the ownCloud Desktop App into the default location with the default features enabled. If you want to disable, e.g., desktop shortcut icons you can simply change the above command to the following:

```
msiexec /passive /i ownCloud-x.y.z.msi REMOVE=DesktopShortcut.
```

See the following table for a list of available features:

Feature	Enabled by default	Description	Property to disable.
Client	Yes, required	The actual client	
DesktopShortcut	Yes	Adds a shortcut to the desktop.	NO_DESKTOP_SHORTCUT
StartMenuShortcuts	Yes	Adds shortcuts to the start menu.	NO_START_MENU_SHORTCUTS
ShellExtensions	Yes	Adds Explorer integration	NO_SHELL_EXTENSIONS

## Installation

You can also choose to only install the Desktop App itself by using the following command:

```
msiexec /passive /i ownCloud-x.y.z.msi ADDDEFAULT=Client.
```

If you for instance want to install everything but the **DesktopShortcut** and the **ShellExtensions** feature, you have two possibilities:

- You explicitly name all the features you actually want to install (whitelist) where **Client** is always installed anyway.

```
msiexec /passive /i ownCloud-x.y.z.msi ADDDEFAULT=StartMenuShortcuts.
```

- You pass the **NO\_DESKTOP\_SHORTCUT** and **NO\_SHELL\_EXTENSIONS** properties.

```
msiexec /passive /i ownCloud-x.y.z.msi NO_DESKTOP_SHORTCUT="1"  
NO_SHELL_EXTENSIONS="1"
```



The ownCloud .msi file remembers these properties, so you don't need to specify them on upgrades.



You cannot use these to change the installed features, if you want to do that, see the next section.

## Changing Installed Features

You can change the installed features later by using **REMOVE** and **ADDDEFAULT** properties.

- If you want to add the desktop shortcut later, run the following command:

```
msiexec /passive /i ownCloud-x.y.z.msi ADDDEFAULT="DesktopShortcut"
```

- If you want to remove it, simply run the following command:

```
msiexec /passive /i ownCloud-x.y.z.msi REMOVE="DesktopShortcut"
```

Windows keeps track of the installed features and using **REMOVE** or **ADDDEFAULT** will only affect the mentioned features.

Compare **REMOVE** and **ADDDEFAULT** on the Windows Installer Guide.



You cannot specify REMOVE on initial installation as it will disable all features.

## Installation Folder

You can adjust the installation folder by specifying the **INSTALLDIR** property like this.

```
msiexec /passive /i ownCloud-x.y.z.msi INSTALLDIR="C:\Program Files (x86)\Non Standard  
ownCloud Client Folder"
```

Be careful when using PowerShell instead of **cmd.exe**, it can be tricky to get the whitespace escaping right there. Specifying the **INSTALLDIR** like this only works on first installation, you cannot simply re-invoke the .msi with a different path. If you still need to change it, uninstall it first and reinstall it with the new path.

## Disabling Automatic Updates.

To disable automatic updates, you can pass the **SKIPAUTOUPDATE** property.

```
msiexec /passive /i ownCloud-x.y.z.msi SKIPAUTOUPDATE="1"
```

## Launch After Installation

To launch the Desktop App automatically after installation, you can pass the **LAUNCH** property.

```
msiexec /i ownCloud-x.y.z.msi LAUNCH="1"
```

This option also removes the checkbox to let users decide if they want to launch the Desktop App for non-passive/quiet mode.



This option does not have any effect without GUI.

## No Reboot After Installation

The ownCloud Desktop App schedules a reboot after installation to make sure the Explorer extension is correctly (un)loaded. If you're taking care of the reboot yourself, you can set the **REBOOT** property.

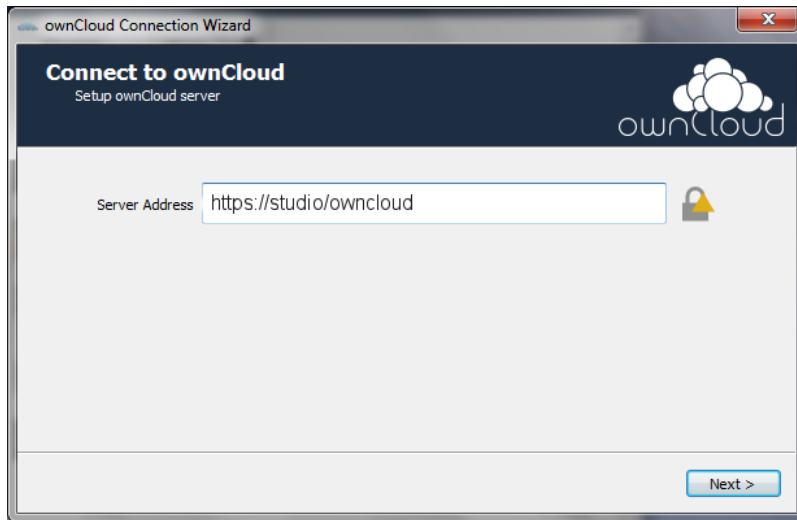
```
msiexec /i ownCloud-x.y.z.msi REBOOT=ReallySuppress.
```

This will make msiexec exit with error **ERROR\_SUCCESS\_REBOOT\_REQUIRED** (3010). If your deployment tooling interprets this as an actual error and you want to avoid that, you may want to set the **DO\_NOT\_SCHEDULE\_REBOOT** instead.

```
msiexec /i ownCloud-x.y.z.msi DO_NOT_SCHEDULE_REBOOT="1"
```

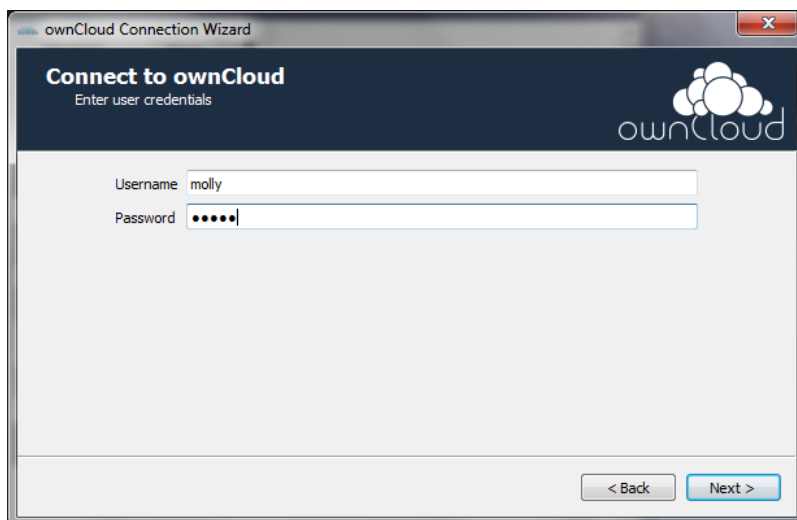
# Installation Wizard

The installation wizard takes you step-by-step through configuration options and account setup. First you need to enter the URL of your ownCloud server.



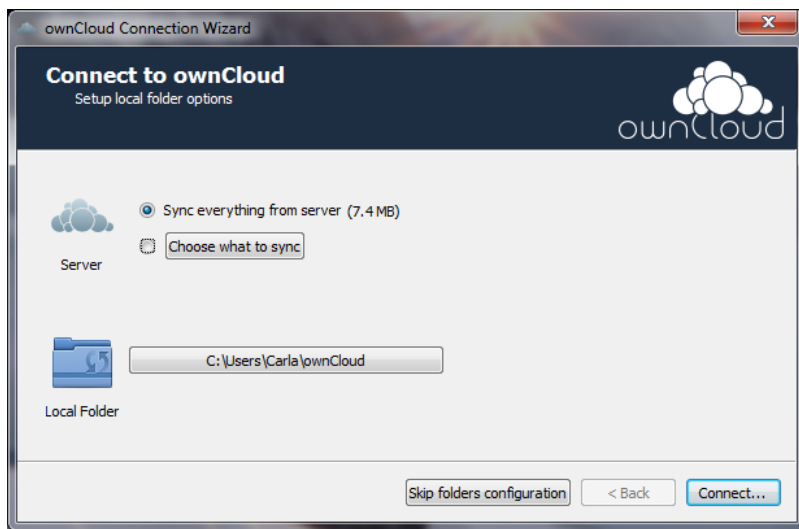
The screenshot shows the 'ownCloud Connection Wizard' window. The title bar says 'ownCloud Connection Wizard'. The main header is dark blue with the text 'Connect to ownCloud' and 'Setup ownCloud server' below it. The ownCloud logo is in the top right. The main area has a label 'Server Address' followed by a text input field containing 'https://studio/owncloud'. To the right of the input field is a small lock icon. At the bottom right is a 'Next >' button.

Enter your ownCloud login on the next screen.



The screenshot shows the 'ownCloud Connection Wizard' window at the 'Enter user credentials' step. The title bar says 'ownCloud Connection Wizard'. The main header is dark blue with the text 'Connect to ownCloud' and 'Enter user credentials' below it. The ownCloud logo is in the top right. The main area has two input fields: 'Username' with the text 'molly' and 'Password' with masked characters (dots). At the bottom are '< Back' and 'Next >' buttons.

On the *"Local Folder Option"* screen you may sync all of your files on the ownCloud server, or select individual folders. The default local sync folder is **ownCloud**, in your home directory. You may change this as well.



When you have completed selecting your sync folders, click the *"Connect"* button at the bottom right. The Desktop App will attempt to connect to your ownCloud server, and when it is successful you'll see two buttons:

- One to connect to your ownCloud Web GUI.
- One to open your local folder.

It will also start synchronizing your files.

# Using the Desktop App

## Introduction

The ownCloud Desktop App remains in the background and is visible as an icon in the system tray (Windows, KDE), menu bar (macOS), or notification area (Linux).

## Used App Icons



The status indicator uses icons to indicate the current status of your synchronization. The green circle with the white checkmark tells you that your synchronization is current and you are connected to your ownCloud server.



The blue icon with the white semi-circles means synchronization is in progress.



The yellow icon with the parallel lines tells you your synchronization has been paused. (Most likely by you.)



The gray icon with three white dots means your Desktop App has lost its connection with your ownCloud server.



When you see a white circle with the letter "i" that is the informational icon, so you should click it to see what it has to tell you.



The red circle with the white "x" indicates a configuration error, such as an incorrect login or server URL.

## Systray Icon

A right-click on the systray icon opens a menu for quick access to multiple operations.

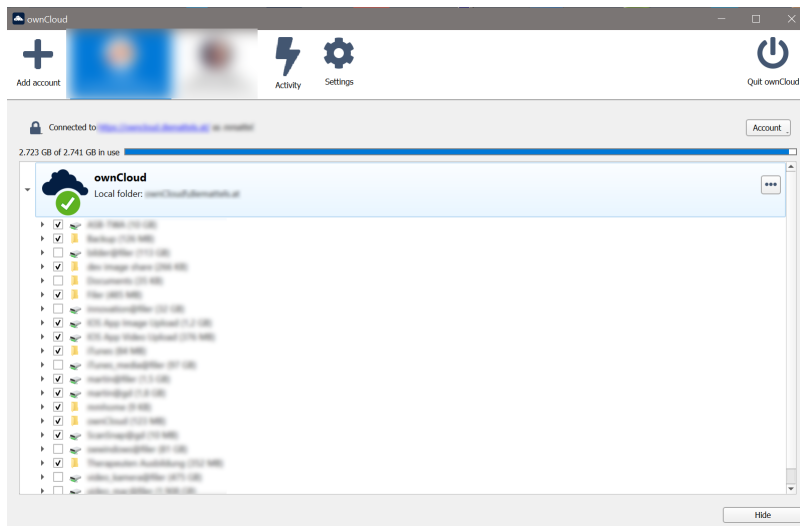
Open in browser	molly@studio ▶
Managed Folders:	freya@studio ▶
Open folder 'ownCloud'	Up to date
Pause all folders	Recent Changes ▶
Log out	Settings...
	Help
	Pause all synchronization
	Log out of all accounts
	Quit ownCloud

This menu provides the following options:

- Quick access to your accounts.
- Sync status.
- Recent Changes, showing the latest activities.
- Settings.
- Help menu.
- Pause synchronizations.
- An option to log in or log out of all of your accounts at once.
- Quit ownCloud, logging out and closing the Desktop App.

A left-click on your systray icon opens the Desktop App to the account settings window.





## Configuring ownCloud Account Settings

At the top of the window are tabs for each configured sync account, and three others for Activity, General and Network settings. On your account tabs you have the following features:

- Connection status, showing which ownCloud server you are connected to, and your ownCloud username.
- An **Account** button, which contains a dropdown menu with **Add New**, **Log Out**, and **Remove**.
- Used and available space on the server.
- Current synchronization status.
- **Add Folder Sync Connection** button.

The little button with three dots (the overflow menu) that sits to the right of the sync status bar offers four additional options:

### Show in Explorer

Opens your local ownCloud sync folder.

### Show in web browser

Opens your ownCloud via the browser.

### Choose What to Sync

Select the folders and mounts in the main window to be synced. This appears only when your file tree is collapsed, and expands the file tree.

### Force sync now / Restart sync

Start the sync process immediately - if none is running, or restart a running sync process

### Pause Sync

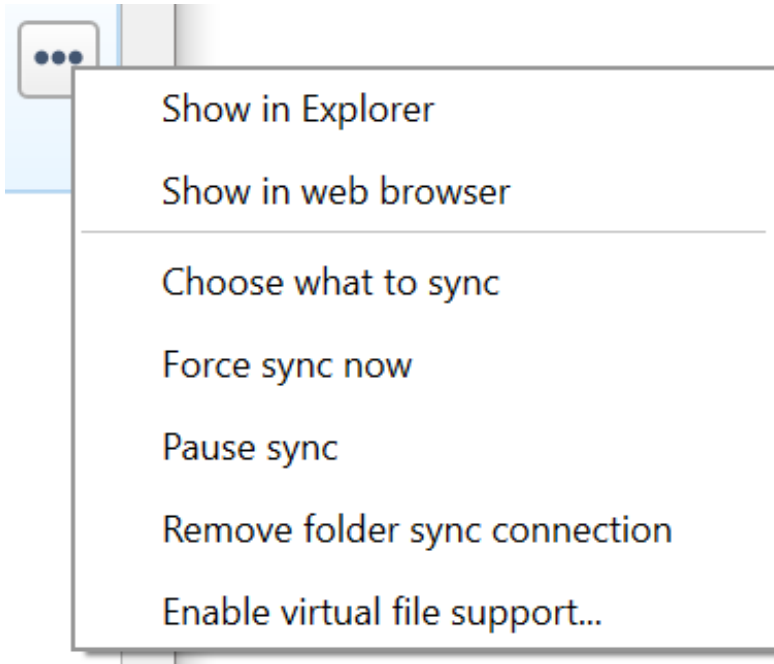
Pauses sync operations without making any changes to your account. It will continue to update file and folder lists, without downloading or updating files.

## Remove Folder Sync Connection

Stop all sync activity

## Enable virtual file support

Enable the virtual file support for an account



ownCloud does not preserve the mtime (modification time) of directories, though it does update the mtimes on files. See [Wrong folder date when syncing](#) for discussion of this.

## Adding New Accounts

You may configure multiple ownCloud accounts in your Desktop App. Simply click the **Account › Add New** button on any account tab to add a new account, and then follow the account creation wizard. The new account will appear as a new tab in the settings dialog, where you can adjust its settings at any time. Use **Account › Remove** to delete accounts.



To use **Two-Factor Authentication** (2FA), ownCloud server must have the [OAuth2 app](#) installed, configured, and enabled. Please contact your ownCloud administrator for more details.

## File Manager Overlay Icons

The ownCloud Desktop App provides overlay icons, in addition to the normal file type icons, for your system file manager (Explorer on Windows, Finder on Mac and Nautilus on Linux) to indicate the sync status of your ownCloud files.

The overlay icons are similar to the systray icons introduced above. They behave differently on files and directories according to sync status and errors.

The overlay icon of an individual file indicates its current sync state. If the file is in sync with the server version, it displays a green checkmark.

If the file is ignored from syncing, for example because it is on your exclude list, or because it is a symbolic link, it displays a warning icon.

If there is a sync error, or the file is blacklisted, it displays an eye-catching red X. If the file is waiting to be synced, or is currently syncing, the overlay icon displays a blue cycling icon.

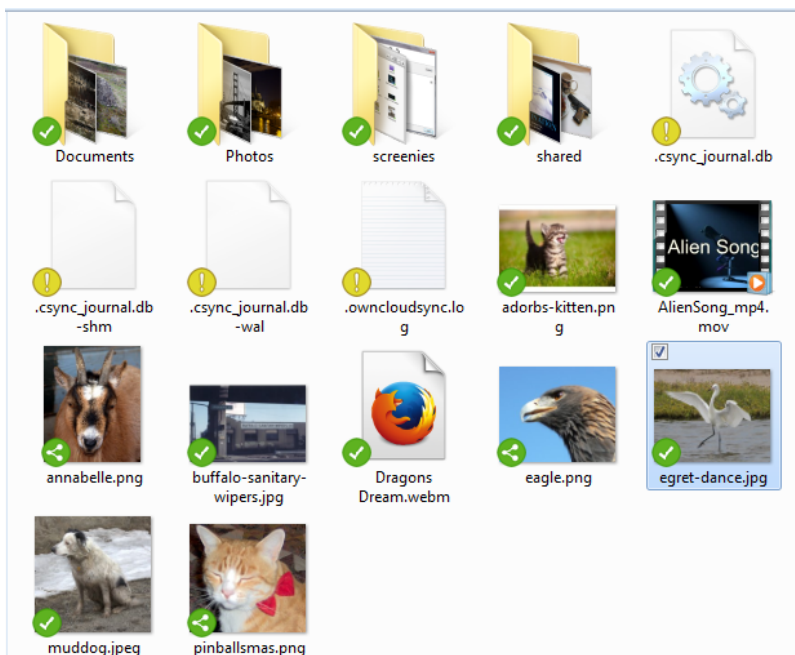
When the Desktop App is offline, no icons are shown to reflect that the folder is currently out of sync and no changes are synced to the server.

The overlay icon of a synced directory indicates the status of the files in the directory. If there are any sync errors, the directory is marked with a warning icon.

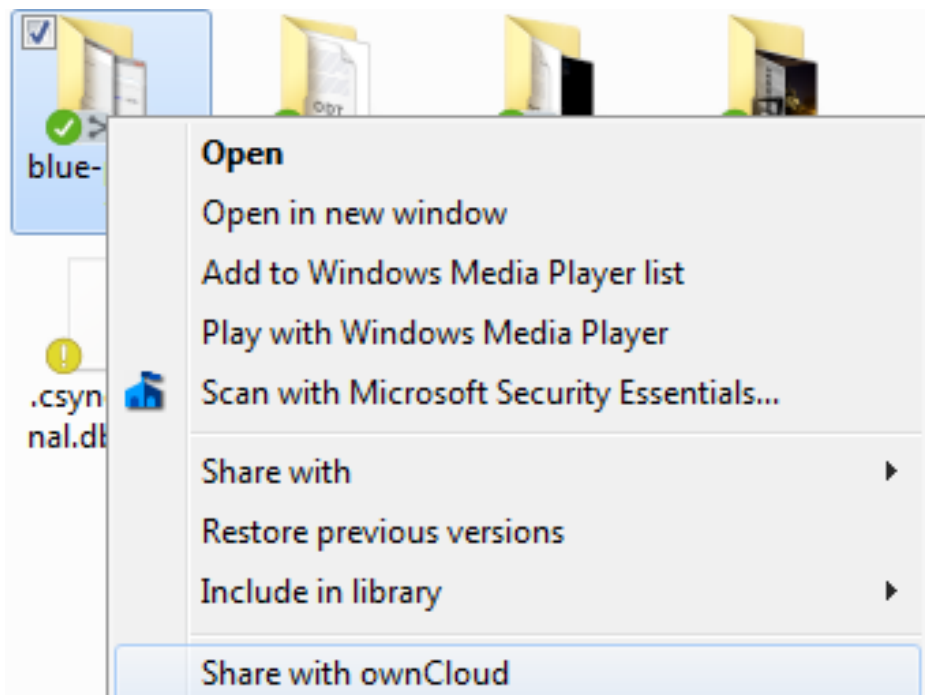
If a directory includes ignored files that are marked with warning icons that does not change the status of the parent directories.

## Sharing From Your Desktop

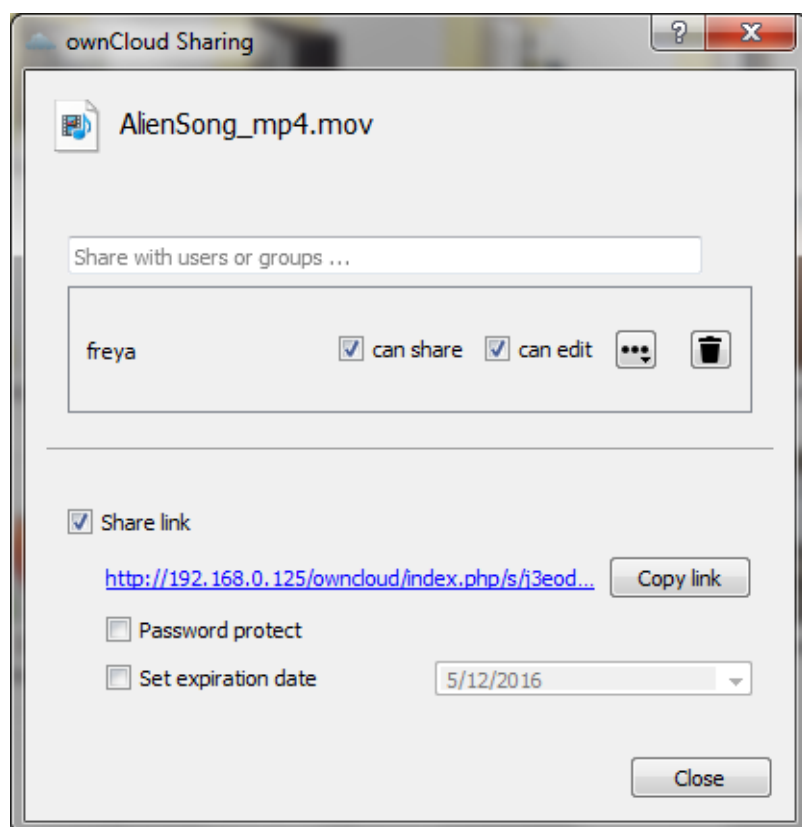
The ownCloud Desktop App integrates with your file manager: Finder on Mac OS X, Explorer on Windows, and Nautilus on Linux. (Linux users must install the [owncloud-client-nautilus](#) plugin.) You can create share links, and share with internal ownCloud users the same way as in your ownCloud Web interface.



Right-click your systray icon, hover over the account you want to use, and left-click **Open folder > "folder name"** to quickly enter your local ownCloud folder. Right-click the file or folder you want to share to expose the share dialog, and click **Share with ownCloud**.



The share dialog has all the same options as your ownCloud Web interface.



Use **Share with ownCloud** to see who you have shared with, and to modify their permissions, or to delete the share.

## Activity Window

The Activity window contains the log of your recent activities, organized over three tabs:

## Server Activities

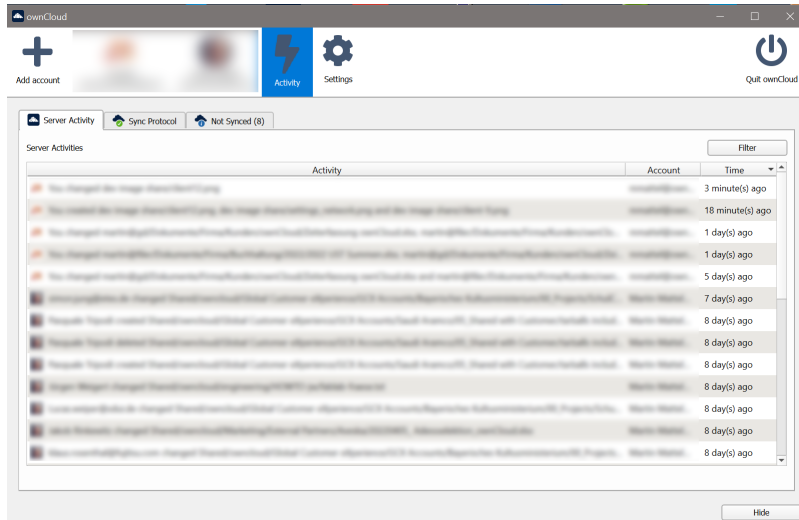
Includes new shares and files downloaded and deleted.

## Sync Protocol

Displays local activities such as which local folders your files went into.

## Not Synced

Shows errors such as files not synced because of being excluded or any other failing status.



In Windows, double-clicking an activity entry pointing to an existing file in tabs **Server Activities** or **Sync Protocol**, will open the folder containing the file and highlight it.

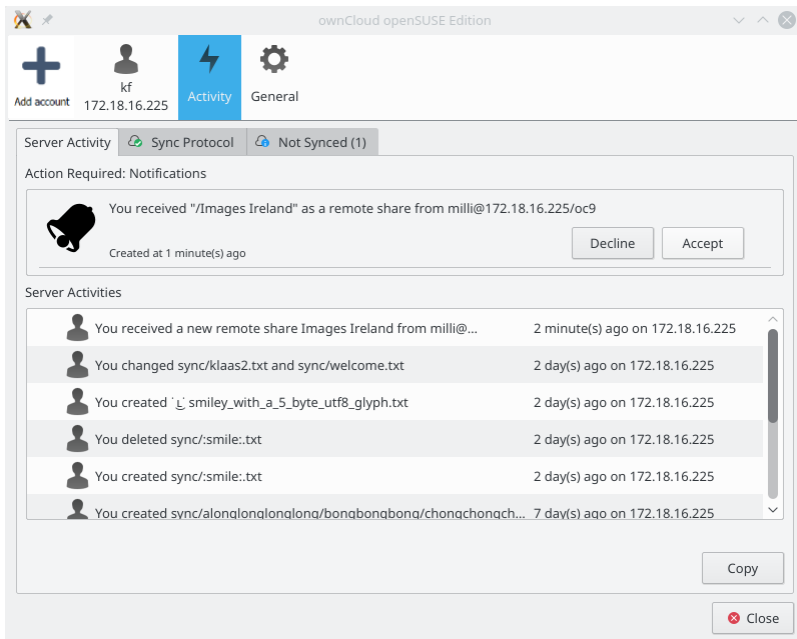
On Linux, you can do the same with **mouse › right-click › Show file in browser**

In any of the activity tabs you can mark a single line, multiple lines or all lines with **CTRL + a** and copy the selected lines to the clipboard with **mouse › right-click › Copy to clipboard**.

## Server Notifications

The desktop client will display notifications from your ownCloud server that require manual interaction. It automatically checks for available notifications automatically on a regular basis. Notifications are displayed in the Server Activity tab. If you have enabled **Settings › General Settings › Show Desktop Notifications** you'll also see a systray notification.

For example, when a user on a remote ownCloud creates a new Federated share for you, you can accept it from your desktop client. This also displays notifications sent to users by the ownCloud admin via the Announcements app.



## Settings Window

The Settings Window has configuration options such as

### General Settings

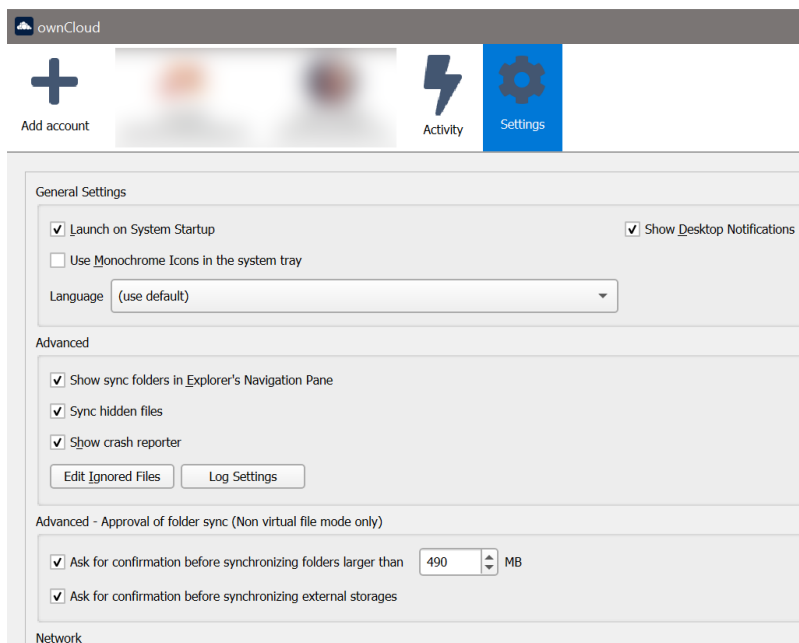
- Launch on System Startup
- Show Desktop Notifications
- Use Monochrome Icons

### Advanced

- Show sync folders in Explorer's Navigation Pane
- Sync hidden files
- Show crash reporter and the
- Buttons for [ **Edit Ignored Files** ] ([see below](#)) and [ **Log settings** ]

### Advanced - Approval of folder sync

- Ask confirmation before downloading folders larger than [folder size]
- Ask for confirmation before synchronizing external storages



While you can select whether to show or hide the crash reporter, from the Settings Window, you can also configure whether to show or hide it from the [general section of the configuration file](#) as well. Doing so can help with debugging on-startup-crashes.

## Using the Network Window

The Network settings window enables you to define network proxy settings and defines limits to the download and upload bandwidth.

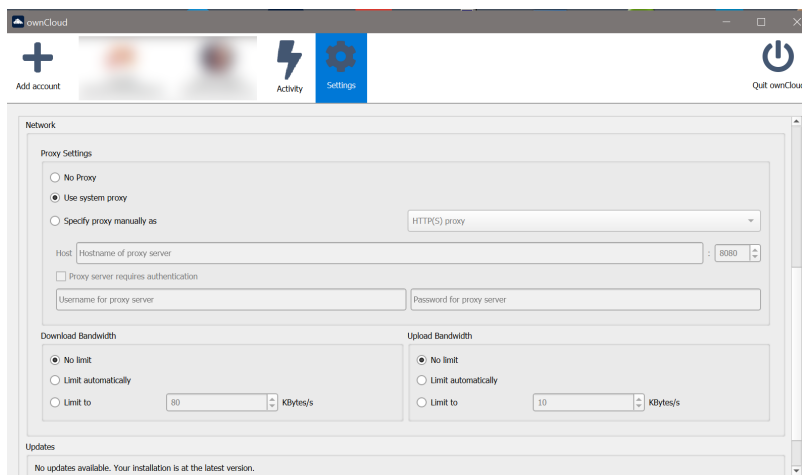
### Proxy Settings

- No proxy
- Use system proxy
- Specify proxy manually as
  - HTTP(S)
  - SOCKS5

### Download and Upload Bandwidth

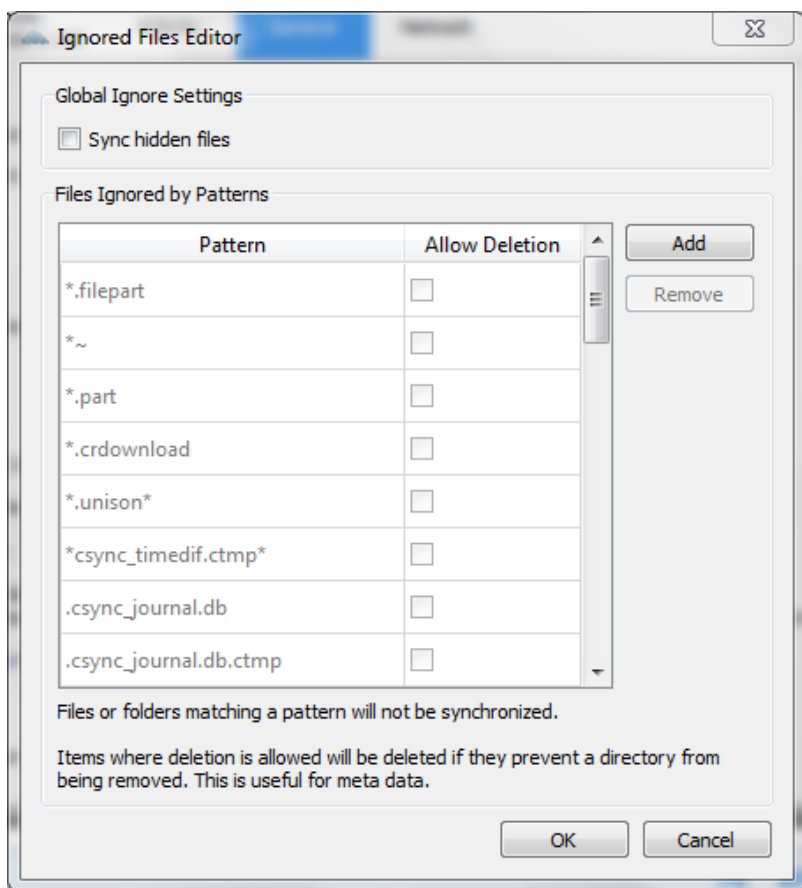
- No limit
- Limit automatically
 

When activated, the client limits the upload or download bandwidth to 25% of the currently available bandwidth for each operation. The available bandwidth is measured on the fly at the beginning of every operation for a very short period of time.
- Limit to



## Using the Ignored Files Editor

You might have some local files or directories that you do not want to backup and store on the server. To identify and exclude these files or directories, you can use the **Settings** › **Advanced** › **Ignored Files Editor**



For your convenience, the editor is pre-populated with a default list of typical ignore patterns. These patterns are contained in a system file. (typically `sync-exclude.lst`) located in the ownCloud Client application directory. You cannot modify these pre-populated patterns directly from the editor. However, if necessary, you can hover over any pattern in the list to show the path and filename associated with that pattern, locate the file, and edit the `sync-exclude.lst` file.



Modifying the global exclude definition file might render the client unusable or result in undesired behavior.



Each line in the editor contains an ignore pattern string. When creating custom patterns, in addition to being able to use normal characters to define an ignore pattern, you can use wildcards characters for matching values. As an example, you can use an asterisk (\*) to identify an arbitrary number of characters or a question mark (?) to identify a single character.

Patterns that end with a slash character (/) are applied to only directory components of the path being checked.



Custom entries are currently not validated for syntactical correctness by the editor, so you will not see any warnings for bad syntax. If your synchronization does not work as you expected, check your syntax.

Each pattern string in the list is preceded by a checkbox. When the checkbox contains a check mark, in addition to ignoring the file or directory component matched by the pattern, any matched files are also deemed "fleeting metadata" and removed by the client.

In addition to excluding files and directories that use patterns defined in this list:

- The ownCloud Client always excludes files containing characters that cannot be synchronized to other file systems.
- Files are removed that cause individual errors three times during a synchronization. However, the client provides the option of retrying a synchronization three additional times on files that produce errors.

For more detailed information see the [Ignored Files section](#).

# Using the Virtual Filesystem

## Introduction

ownCloud offers the possibility for users to enable a virtual file system (VFS) when synchronizing data. This has the big advantage that all files and folders are visible to the Desktop App, but the files are not downloaded until the user requests to do so. Here are some of the key benefits:

- Full access to files and folders without having to download them all first
- Selectively sync folders and files based on user requirements
- Optimize space usage on the Desktop App

The quote below gives you a brief overview of what a virtual file system is about.

A virtual file system (VFS) or virtual filesystem switch is an abstract layer on top of a more concrete file system. The purpose of a VFS is to allow client applications to access different types of concrete file systems in a uniform way. A VFS can, for example, be used to access local and network storage devices transparently without the client application noticing the difference. It can be used to bridge the differences in Windows, classic Mac OS/macOS and Unix filesystems, so that applications can access files on local file systems of those types without having to know what type of file system they are accessing.

— [https://en.wikipedia.org/wiki/Virtual\\_file\\_system](https://en.wikipedia.org/wiki/Virtual_file_system)

## Microsoft VFS Implementation

### Background

A sync engine is a service that syncs files, typically between a remote host and a local client. Sync engines on Windows often present those files to the user through the Windows file system and File Explorer.

— <https://docs.microsoft.com/en-us/windows/win32/cfapi/build-a-cloud-file-sync-engine>

*Files can exist in three states:*

#### Full pinned file

The file has been *hydrated* explicitly by the user through File Explorer and is guaranteed to be available offline.







#### Full file

The file has been *hydrated* implicitly and could be *dehydrated* by the system if space is needed.

## Placeholder file

An empty representation of the file and only available if the sync service is available.

The following image demonstrates how the *full pinned*, *full* and *placeholder* file states are shown in File Explorer.

Name	Status
 Full Pinned.txt	
 Full.txt	
 Placeholder.txt	

## Limitations and Restrictions

### Limitations

A virtual file system needs a root folder all synchronization items will be stored in. The following locations are **not** allowed as synchronization root:

- The root of a disk like **D:\**
- A non-NTFS Filesystem
- Mounted network shares
- Symbolic links or junction points
- Assigned drives

### Restrictions

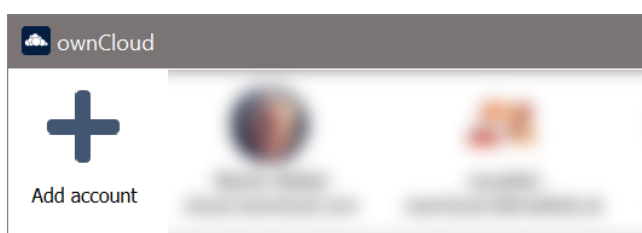
Similar to OneDrive as it also uses Microsoft's virtual file system, there are some additional restrictions which should be considered like the *maximum file size*, *invalid file or folder names*, etc. See the [Restrictions and limitations in OneDrive and SharePoint](#) for more information.

## ownCloud VFS Implementation

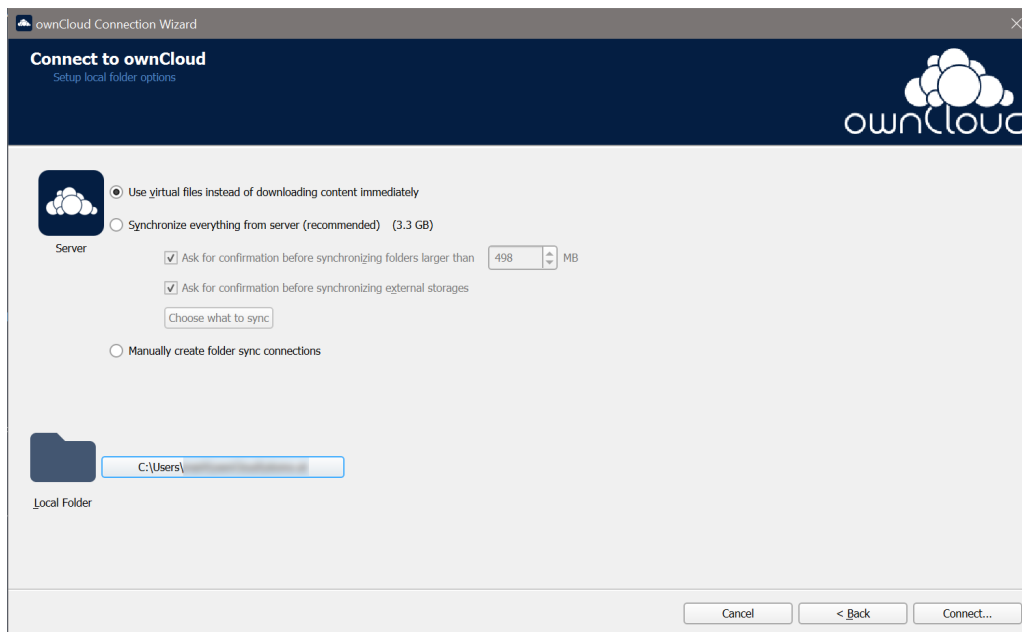
### New Sync with VFS enabled

To set up a new synchronization with virtual file system enabled, perform the following steps:

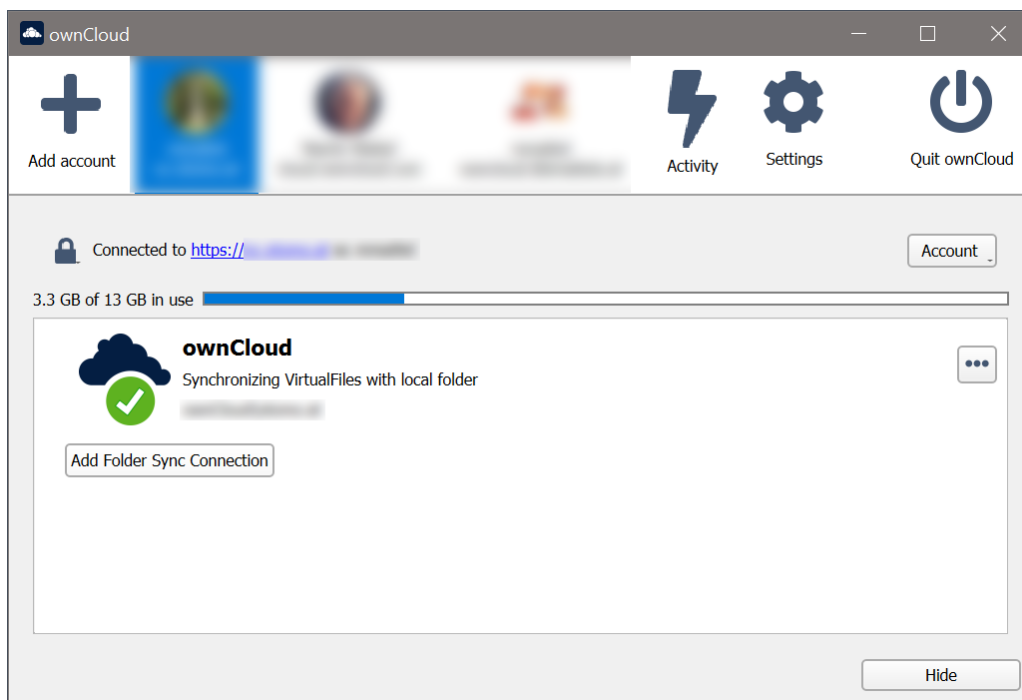
1. Add a new synchronization by clicking the [ **+ Add account** ] button.



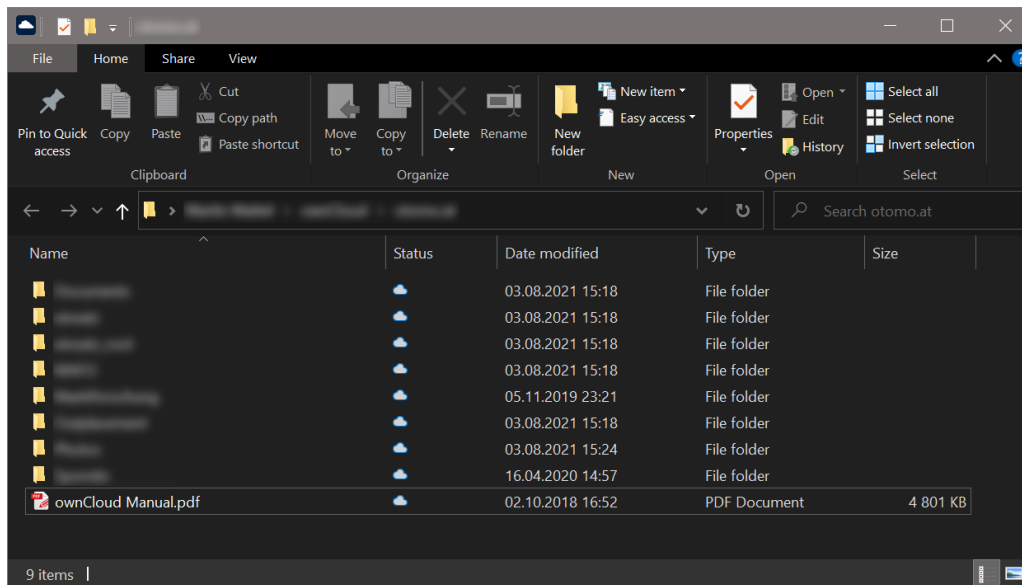
2. Enter the server address and your credentials in the following dialogs.
3. Select the radio button [ **Use virtual files** ] and set the local folder where your synchronization data will reside.



4. When everything is done, you should see a similar screen as below, showing that the setup completed successfully.



5. After the first sync, your synchronization folder will show your items with the *Placeholder* icon.

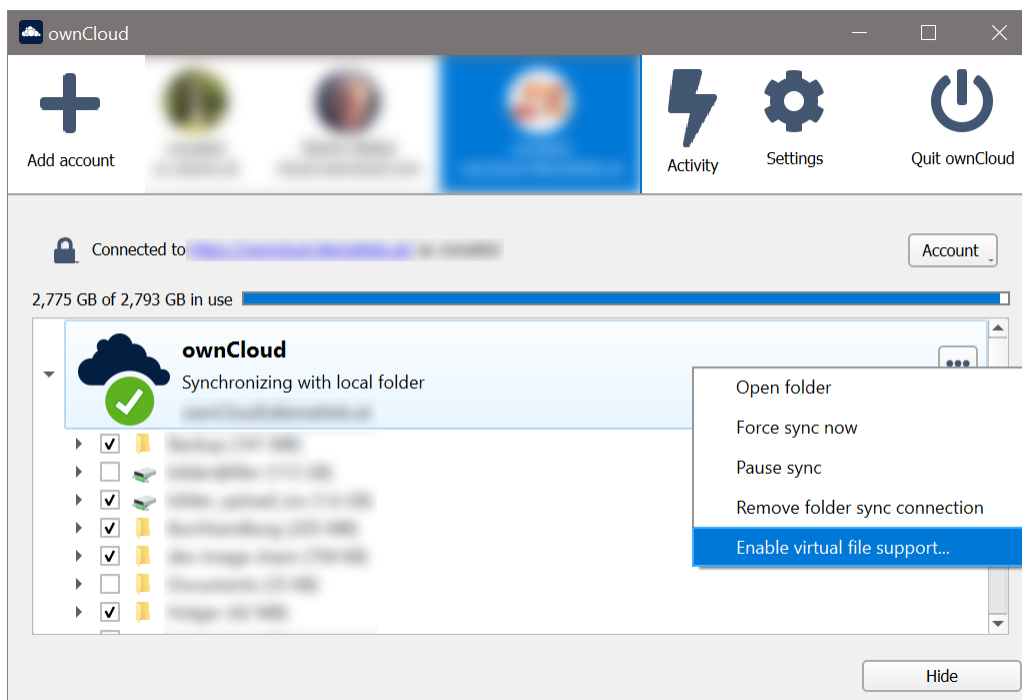


6. When opening a file, the file gets downloaded and its synchronization icon changes to *Full*.

## Convert Full Sync to VFS

If you have full synchronization enabled, you can change to a virtual file system at any time.

1. Open your existing synchronization, click the [ ... ] button and **Enable virtual file support**.

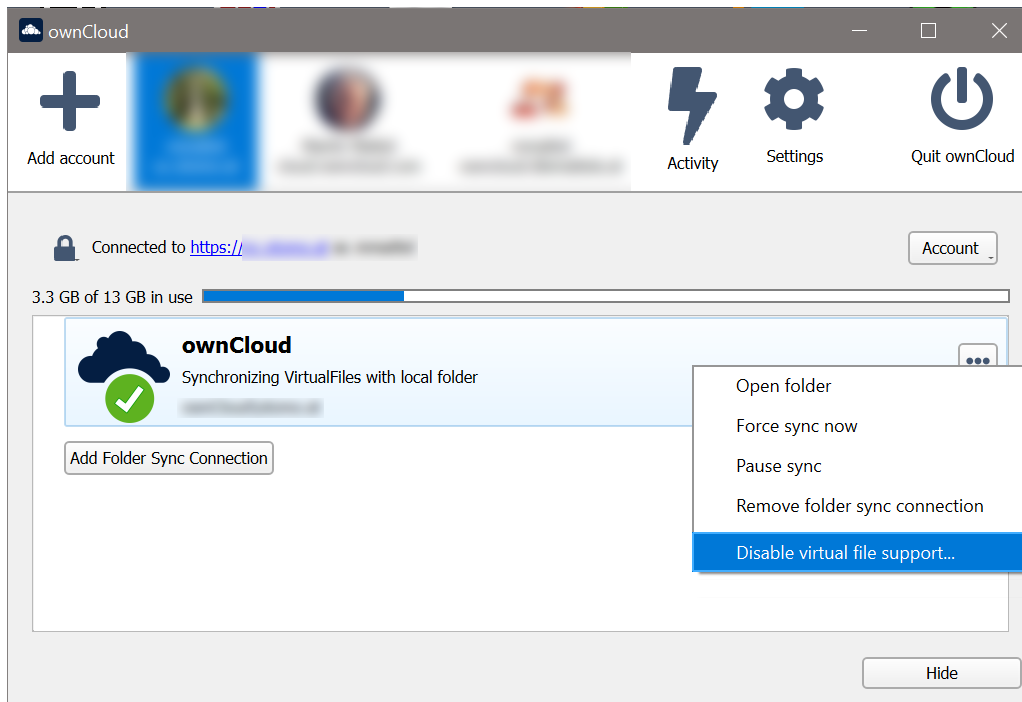


2. Your local files will get replaced by *placeholders*, thus freeing up the space previously occupied.

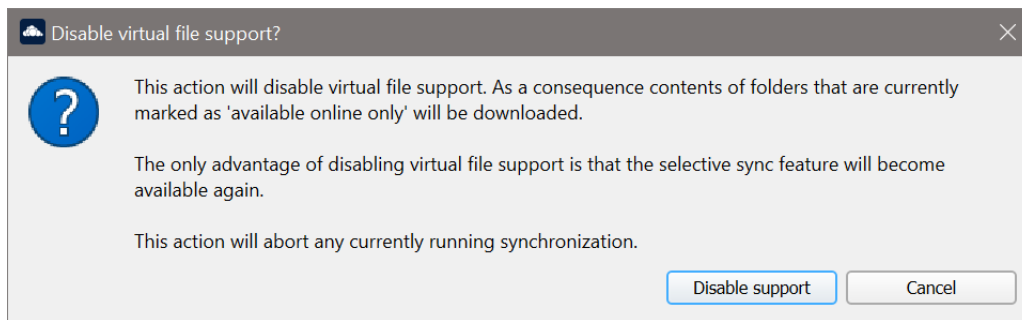
## Convert VFS to Full Sync

You can also change the synchronization setting from virtual file system to full sync.

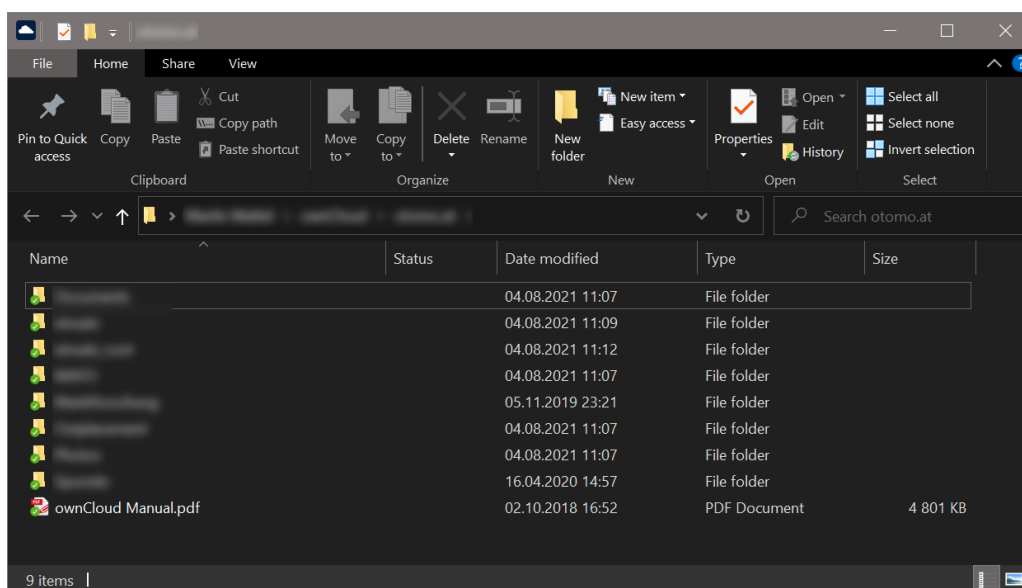
1. Open your existing synchronization, click the [ ... ] button and **Disable virtual file support**.



2. A notification window will ask you to confirm before completing the conversion.



3. When done, your files will be fully downloaded, which you can tell by the sync icons, see the example image below. Depending on the quantity and size of the files, this may take a while.

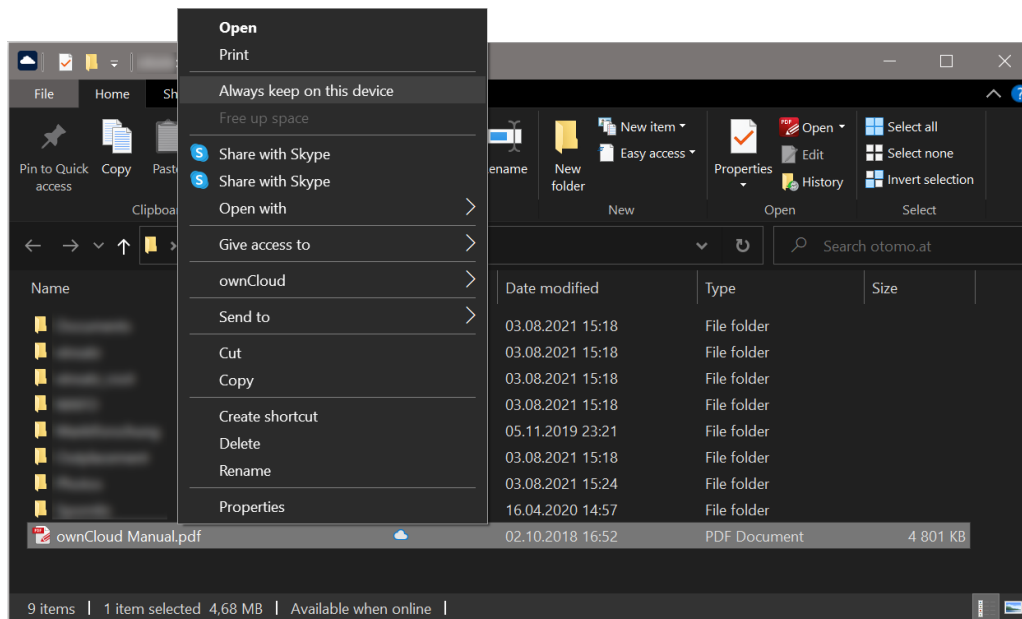


## Manage VFS from Windows Explorer

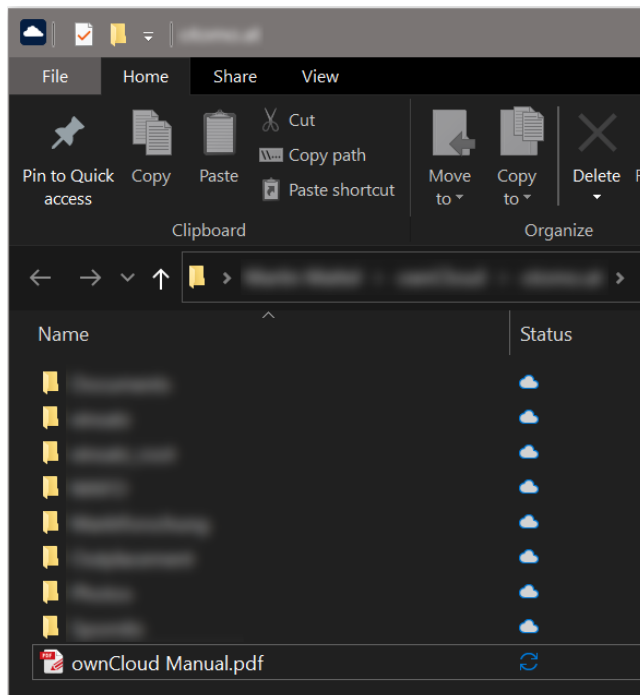
You can manage **individual** files or **complete folders** in the Explorer window by **right-clicking** on them. This opens a drop-down menu of actions that can be performed on a specific file or folder. The following example shows this on files, but it can be applied on folders too.

### Create a Local Copy

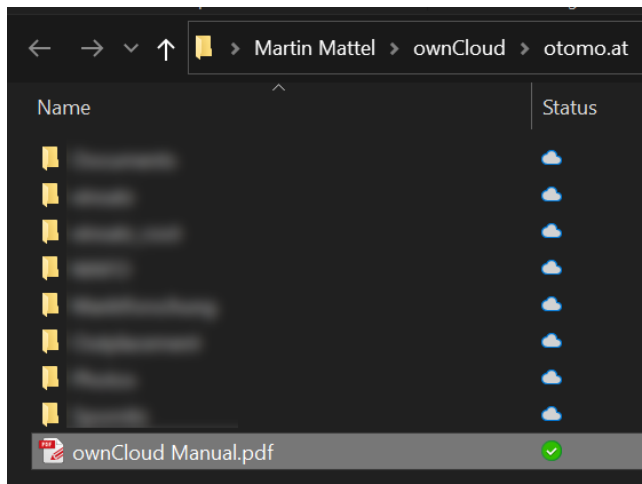
1. To create a Full Pinned file (have a local copy of it), use the action [ **Always keep on this device** ].



The state of the file will change to synchronizing.

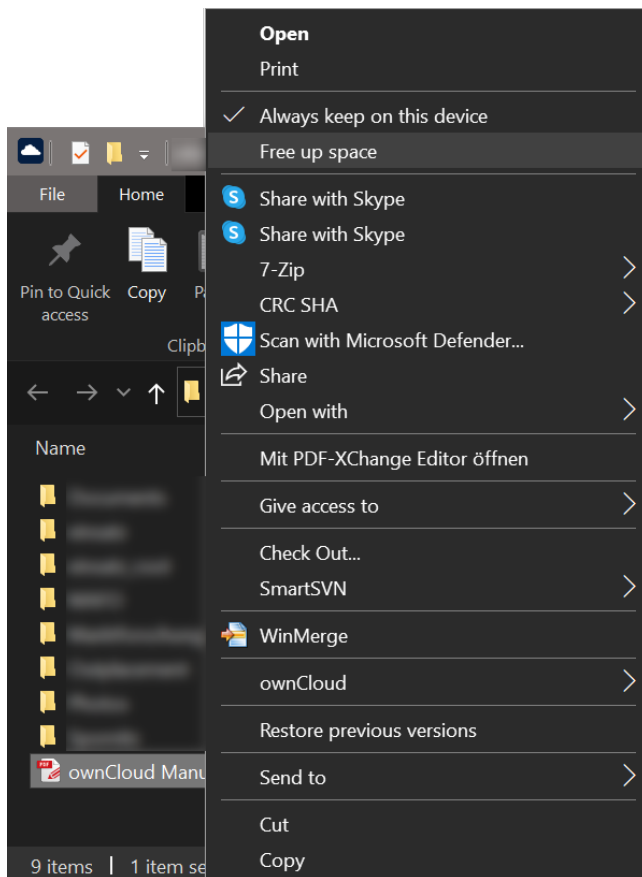


When the local copy has been created, the state (icon) changes to *Full Pinned*.



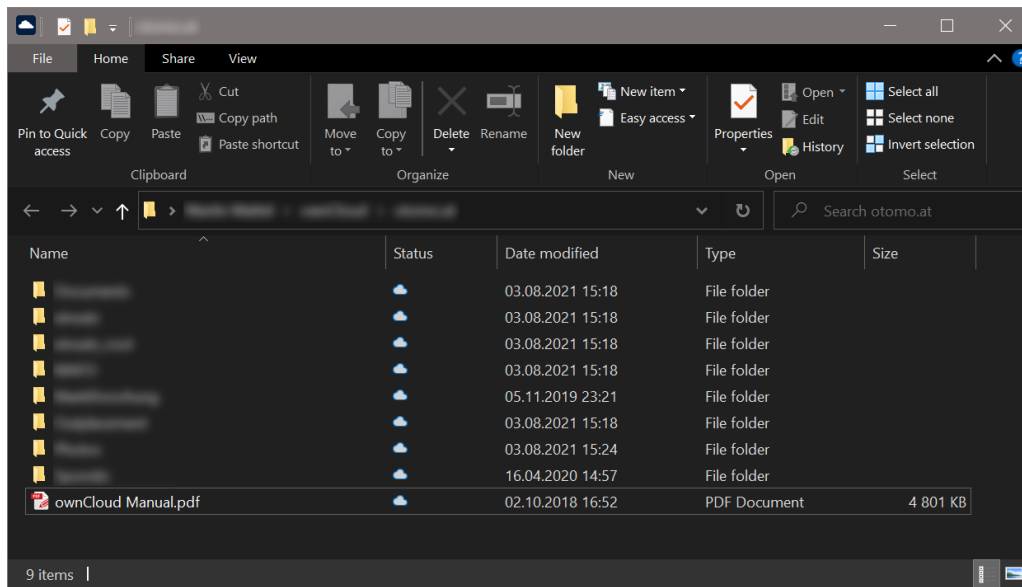
## Free up Space

1. To free up the space the file occupied, use the action [ **Free up space** ].



2. When done, Explorer will show the file in *Placeholder* state.





# Filename Considerations

## Introduction

When using the Desktop App, depending on the operating system (OS) you are using, file and folder names can have different restrictions. Creating files and folders with allowed names on one OS, may have issues or even can't be synced because of different rules in another OS. This page gives you a brief overview of limitations of different OS for file and folder names.



This is not an ownCloud rule but an OS dependency

*Here are some rules of thumb*



1. Do not use any of the mentioned characters or words in any OS when using the Desktop App.
2. When the Desktop App is on Linux/Unix and the target mount to sync on is on SMB, file and folder names on Linux/Unix must comply with the Windows rules for successful syncing.
3. When the Desktop App is on Linux/Unix and the target mount to sync on is on SMB and you want to just rename the file with different casings, rename the file to a total different name, let it sync and then rename it again to the name that you want.

## Forbidden Printable ASCII Characters

### Linux/Unix

/ (forward slash)

### Windows

< (less than)

> (greater than)

:

 (colon - sometimes works, but is actually NTFS Alternate Data Streams)

" (double quote)

/ (forward slash)

\ (backslash)

| (vertical bar or pipe)

? (question mark)

\* (asterisk)

## Non-Printable Characters

If your files are created via a program, do not use non-printable characters. See the [Wikipedia "Control code chart" section](#) for more information on ASCII control characters.

## Linux/Unix

0 (NULL byte)



While it is legal under Linux/Unix file systems to create files with control characters in the filename, they might be inaccessible and/or unsyncable.

## Windows

0-31 (ASCII control characters)

# Reserved File Names

The following file names are reserved:

## Windows

CON, PRN, AUX, NUL COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9

# Other Rules

## Linux/Unix

When the Desktop App is on Linux/Unix and the target mount to sync on is on SMB, you cannot have the same file or folder name but with different casings. A cross icon will be shown that indicates that the file can't be synced. Files on Linux/Unix must comply with the Windows rules for successful syncing.

## Windows

Filenames cannot end in a space or dot

# Examples and Pitfalls

1. When creating a file in Linux/Unix like `my-filename.` (see the dot at the end) or `my-filename.LPT1` (see the reserved name LPT1), you can sync the file to your ownCloud if the mount target is Linux/Unix. When a Windows user tries to sync these files, Windows rejects the file. Comparing the file list in both environments shows that one side has more files than the other. There will be **no notification** as this is an OS dependency.
2. When renaming an existing file in Linux/Unix by just changing the casing like `owncloud` → `ownCloud`, you might get issues on the windows sync side as for Windows the file looks the same.

# Manage Synchronisation Conflicts

## Introduction

The ownCloud Desktop App uploads local changes and downloads remote changes. When a file has changed on the local and on the remote side between synchronization runs, the Desktop App will be unable to resolve the situation on its own. It will create a conflict file with the local version, downloads the remote version and notifies the user that a conflict occurred which needs attention.

## Example Situation

Imagine there is a file called `mydata.txt` your synchronized folder. It has not changed for a while and contains the text "contents" locally and remotely. Now, nearly at the same time you update it locally to say "*local contents*" while the file on the server gets updated to contain "*remote contents*" by someone else.

When attempting to upload your local changes the Desktop App will notice that the server version has also changed. It creates a conflict, and you will now have two files on your local machine:

- `mydata.txt` containing "*remote contents*"
- `mydata (conflicted copy 2018-04-10 093612).txt` containing "*local contents*"

In this situation the file `mydata.txt` has the remote changes (and will continue to be updated with further remote changes when they happen), but your local adjustments have not been sent to the server (unless the server enables conflict uploading, see below).

The Desktop App notifies you of this situation via system notifications, the system tray icon and a yellow "unresolved conflicts" badge in the account settings window. Clicking this badge shows a list that includes the unresolved conflicts and clicking one of them opens an explorer window pointing at the relevant file.

To resolve this conflict, open both files, compare the differences and copy your local changes from the "conflicted copy" file into the base file where applicable. In this example you might change `mydata.txt` to say "local and remote contents" and delete the file with "conflicted copy" in its name. With that, the conflict is resolved.

## Uploading Conflicts (experimental)

By default, the conflict file (the file with "conflicted copy" in its name that contains your local conflicting changes) is not uploaded to the server. The idea is that you, the author of the changes, are the best person for resolving the conflict and showing the conflict to other users might create confusion.

However, in some scenarios it makes a lot of sense to upload these conflicting changes such that local work can become visible even if the conflict won't be resolved immediately.

In the future there might be a server-wide switch for this behavior. For now, it can already be

tested by setting the environment variable: `OWNCLOUD_UPLOAD_CONFLICT_FILES = 1`.

# Automatic Updating of the Desktop App

## Introduction

The Automatic Updater ensures that you always have the latest features and bug fixes for your ownCloud Desktop App. The Automatic Updater updates only on Mac OS X and Windows computers; Linux users only need to use their normal package managers. However, on Linux systems the Updater will check for updates and notify you when a new version is available.

## Basic Workflow

The following sections describe how to use the Automatic Updater on different operating systems.

### Windows

The ownCloud Desktop App checks for updates and downloads them when available. You can view the update status under **Settings › General › Updates** in the ownCloud Desktop App.

If an update is available, and has been successfully downloaded, the ownCloud Desktop App starts a silent update prior to its next launch and then restarts itself. Should the silent update fail, the Desktop App offers a manual download.



Administrative privileges are required to perform the update.

### Mac OS X

If a new update is available, the ownCloud Desktop App initializes a pop-up dialog to alert you of the update and requesting that you update to the latest version. Due to their use of the Sparkle frameworks, this is the default process for Mac OS X applications.

### Linux

Linux distributions provide their own update tools. The ownCloud Desktop App use the Linux operating system do not perform any updates on their own. The client will inform you (**Settings › General › Updates**) when an update is available.

## Preventing Automatic Updates

In controlled environments, such as companies or universities, you might not want to enable the auto-update mechanism, as it interferes with controlled deployment tools and policies. To address this case, it is possible to disable the auto-updater entirely. The following sections describe how to disable the auto-update mechanism for different operating systems.

### Preventing Automatic Updates in Windows Environments

Users may disable automatic updates by adding this line to the **[General]** section of their

owncloud.cfg files:

owncloud.cfg is usually located in `C:\Users\<USERNAME>\AppData\Roaming\ownCloud\owncloud.cfg`.

```
skipUpdateCheck=true
```

Windows administrators have more options for preventing automatic updates in Windows environments by using one of two methods. The first method allows users to override the automatic update check mechanism, whereas the second method prevents any manual overrides.

To prevent automatic updates, but allow manual overrides:

1. Edit these Registry keys:

- a. (32-bit-Windows) `HKEY_LOCAL_MACHINE\Software\ownCloud\ownCloud`
- b. (64-bit-Windows) `HKEY_LOCAL_MACHINE\Software\Wow6432Node\ownCloud\ownCloud`

2. Add the key `skipUpdateCheck` (of type `DWORD`).
3. Specify a value of `1` to the machine.

To manually override this key, use the same value in `HKEY_CURRENT_USER`. To prevent automatic updates and disallow manual overrides:



This is the preferred method of controlling the updater behavior using Group Policies.

1. Edit this Registry key:

```
HKEY_LOCAL_MACHINE\Software\Policies\ownCloud\ownCloud
```

2. Add the key `skipUpdateCheck` (of type `DWORD`).
3. Specify a value of `1` to the machine.



Enterprise branded Desktop Apps ([Building Branded ownCloud Clients](#)) have different key names, which are set in ownBrander using the Application Vendor and Application Name fields.

Your key names look like this:

```
HKEY_LOCAL_MACHINE\Software\Policies\myCompanyName\myAppName
```

## Preventing Automatic Updates in Mac OS X Environments

You can disable the automatic update mechanism, in the Mac OS X operating system, by copying the

file `owncloud.app/Contents/Resources/deny_autoupdate_com.owncloud.desktopclient.plist` to `/Library/Preferences/com.owncloud.desktopclient.plist`.

## Preventing Automatic Updates in Linux Environments

Because the Linux Desktop App does not provide automatic updating functionality, there is no need to remove the automatic-update check. However, if you want to disable it, edit your Desktop App configuration file: `$HOME/.config/ownCloud/owncloud.cfg`. Add this line to the [General] section:

```
skipUpdateCheck=true
```



# Removing the Desktop App

## Introduction

This page describes the necessary steps to remove the Desktop App.

## Removing the Binary

Follow the procedures of your operating system about how to remove the Desktop App binary.

When using an AppImage, just delete the AppImage file.

## Removing the Configuration File

When you remove the Desktop App — the configuration file remains on your system. If you then decide to install the client again, you won't need to re-enter the connection information.

In case you want a clean removal of the Desktop App, you manually have to delete the configuration file. The location of the configuration file is operating system dependent and can be found in the [Configuration File](#) description.

## Windows Navigation Sidebar

If you have removed the Desktop App but still have the ownCloud shortcut or symbol in the Windows Navigation Side Bar, here is how you to remove it:

1. Open **regedit**. (press the Windows Key and type regedit)
2. Search (CTL+F) for the name of the Desktop App, in this case **owncloud**.
3. Press **F3** for next search result.
4. Look for the key **System.IsPinnedToNameSpaceTree**.
5. Right-click on the key name, change, set to **0** instead of **1**.

You have to do this twice. Once for the **x64** and **x32** system settings.

Once this is done, you don't need a reboot, just open and close your explorer — the sidebar is clean.

# Desktop Frequently Asked Questions (FAQ)

## Introduction

Here you can find some of the most frequently asked questions about the ownCloud Desktop App.

## Usage

### Some Files Are Continuously Uploaded to the Server, Even When They Are Not Modified

It is possible that another program is changing the modification date of the file. If the file has an `.eml` extension (Windows Mail, Windows Live Mail), the Microsoft Indexer automatically and continually changes the file. To solve this issue, you can:

- Remove the extension from the indexer (**Indexing Options** > **Advanced** > **File Types**)
- Uninstall Windows Mail, Windows Live Mail. Note that when reinstalling, the issue reappears again. See [Windows indexer changes modification dates of .eml files](#) for more information.
- Remove at your own risk the corresponding key for `.eml` files in the registry at `\HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\PropertySystem\PropertyHandle rs`

### Syncing Stops When Attempting to Sync Deeper Than 100 Sub-Directories

The Desktop App has been intentionally limited to sync no deeper than 100 sub-directories. The hard limit exists to guard against bugs with cycles like symbolic link loops. When a deeply nested directory is excluded from synchronization it will be listed with other ignored files and directories in the "Not synced" tab of the "Activity" pane.

### My Sync Folder Displays a Different Quota Than the Web Interface

When other users share data with you, it's downloaded to the sync folder and counted as space used by the Desktop App, although it doesn't affect your quota for storage usage. There are more factors taken into account when calculating the quota status. For more information, see the [Storage Quotas in the User Manual](#).

## Major Configuration Changes

### I Want to Move My Local Sync Folder

The ownCloud Desktop App does not provide a way to change the local sync folder directly. However, it can be done in two ways:

1. Copy the folder and avoid a full re-sync:
  - a. Stop the Desktop App and edit the `localPath=` line in the [configuration file](#) according your

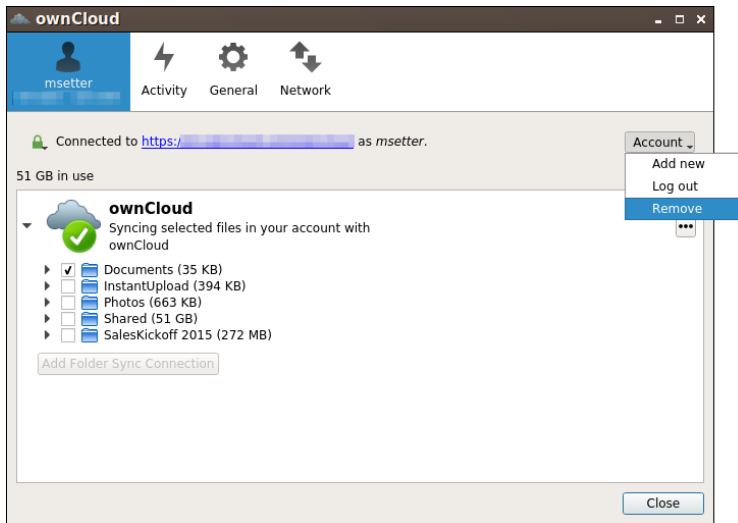
needs.

- b. Copy (or move) all your data from the current to the new location manually and start the Desktop App.

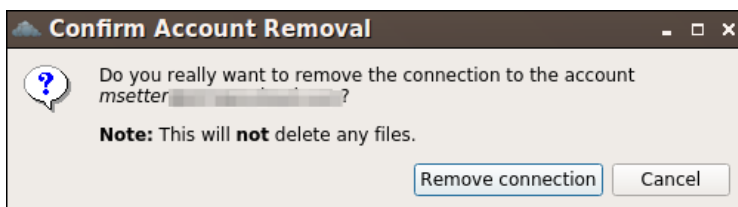
2. Create a new sync connection with a new location:

- a. Remove the existing connection which syncs to the old directory.

To do so, in the Desktop App UI, which you can see below, click the drop-down menu **Account** > **Remove**.



This will display a **"Confirm Account Removal"** dialog window. If you're sure, click **[ Remove connection ]**.



- b. Add a new connection which syncs to the desired directory.

Click the drop-down menu **Account** > **Add new**.

This opens the ownCloud Connection Wizard, which you can see below, *but* with an extra option. This option provides the ability to either keep the existing data (*synced by the previous connection*) or to start a clean sync (*erasing the existing data*).



Be careful before choosing the "Start a clean sync" option. The old sync folder *may* contain a considerable amount of data, ranging into the gigabytes or terabytes. If it does, after the Desktop App creates the new connection, it will have to download **all** of that information again.

Instead, first move or copy the old local sync folder, containing a copy of the existing files, to the new location. Then, when creating the new connection choose *"keep existing data"* instead. The ownCloud Desktop App will check the files in the newly-added sync folder and find that they match

what is on the server and not need to download anything.



Make your choice and click [ **Connect...** ] This will then lead you through the Connection Wizard, just like when you set up the previous sync connection, but giving you the opportunity to choose a new sync directory.

## I Want to Change My Server URL

Since changing server URLs is a potentially dangerous operation the ownCloud Desktop App does not provide a user interface for this change. Typically, server URL changes should be implemented by serving a permanent redirect to the new location on the old URL. The Desktop App will then permanently update the server URL the next time it queries the old url.

For situations where arranging for a redirect is impossible, url changes can be done by editing the config file. Before doing so make sure that the new url does indeed point to the same server, with the same users and the same data. Then go through these steps:

1. Shut down the ownCloud Desktop App.
2. Locate the [configuration file](#)
3. Open it with a text editor.
4. Find your old server URL and adjust it.
5. Save the file and start the ownCloud Desktop App again.

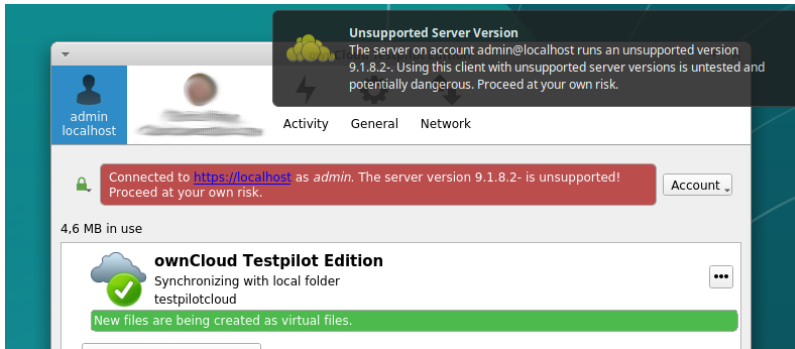
## Error Messages

### Warning Message for Unsupported Versions

Keeping software up to date is crucial for file integrity and security – if software is outdated, there can be unfixed bugs. That's why you should always upgrade your software when there is a new version.

The ownCloud Desktop App talks to a server, e.g. the ownCloud server, so you do not only have to upgrade your Desktop App when there is a new version for it, also the server has to be kept up-to-

date by your sysadmin. Starting with version 2.5.0, the Desktop App will show a warning message if you connect to an outdated or unsupported server:



## Only ownCloud 10.0.0 or Higher Is Supported

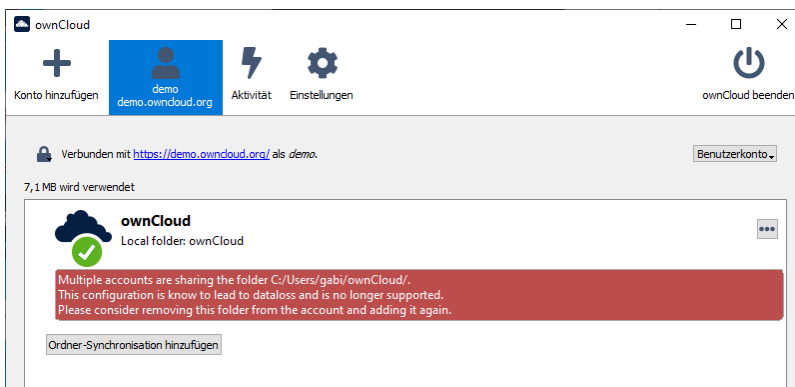
If you encounter such a message, you should ask your administrator to upgrade ownCloud to a secure version because earlier versions are not maintained anymore. An important feature of the ownCloud Desktop App is checksumming – each time you download or upload a file, the Desktop App and the server both check if the file was corrupted during the sync. This way you can be sure that you don't lose any files.

There are servers out there which don't have checksumming implemented on their side, or which are not tested by ownCloud's QA team. They can't ensure file integrity, they have potential security issues, and we can't guarantee that they are compatible with the ownCloud Desktop App.

## We Care About Your Data and Want It to Be Safe

That's why you see this warning message, so you can evaluate your data security. Don't worry – you can still use the Desktop App with an unsupported server, but do so at your own risk.

## Multiple Accounts Sharing the Folder

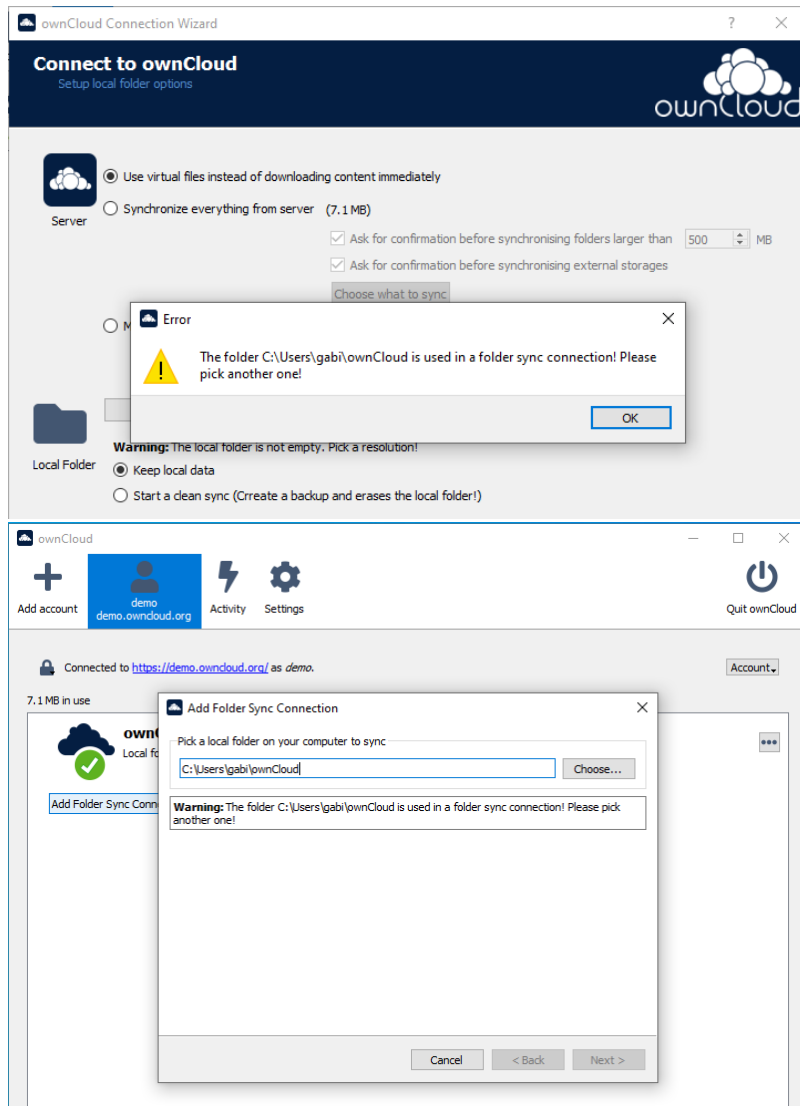


Desktop App discovered multiple sync journals (SQLite database files) in the folder. That indicates that multiple Desktop Apps are using the same folder as a sync root. Under certain conditions it could also mean that there is an old `.sync#HASH.db` or `.sync_#HASH.db` in the folder.

## Resolve:

Such a file will have an old change date and usually can be removed.

## Folder Is Used in a Folder Sync Connection

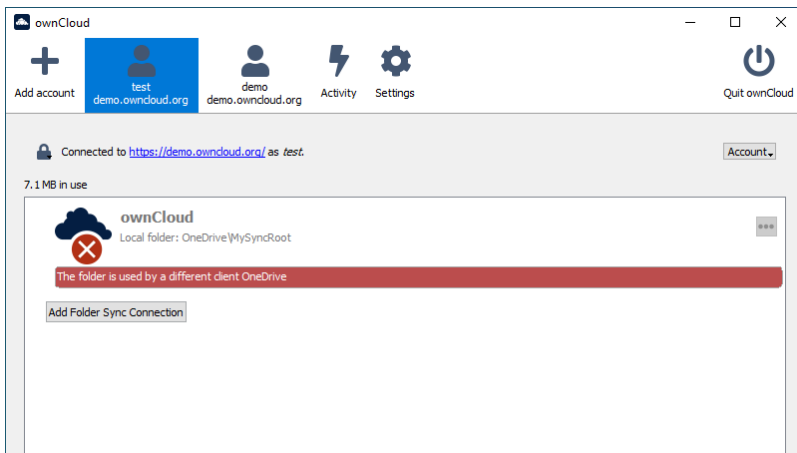


Similar to the above case, the Desktop App discovered one or more `.sync_journal.db` files in the directory. That means the folder is either already used by a different Desktop App for syncing or we again have an old SQLite database file in that folder. This can also happen if a user tries to import an old folder.

### Resolve:

Such a file will have an old change date and usually can be removed.

## Parent Folder Managed by Another Desktop App



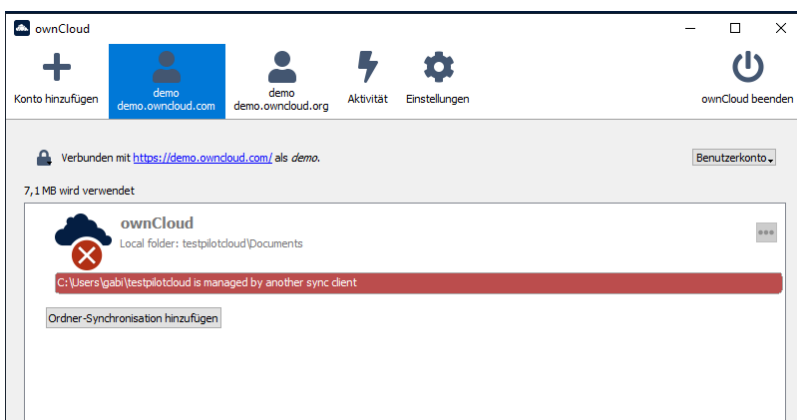
This error can only happen with native Windows VFS. The Desktop App discovered that the folder is part of a subtree that is managed by another Desktop App, for example testpilotcloud. The difference to the next error is that we can't be sure it's a different Desktop App or an orphaned sync root.

Both errors are windows only. In the future we will try to prevent the situation leading to this.

### Resolve:

Pick another sync folder.

## Folder Used by Different Desktop App



This error can only happen with native Windows VFS. Desktop App discovered that the folder is part of a subtree that is managed by another Desktop App, for example OneDrive.

### Resolve:

Pick another sync folder.

## Warning About Changes in Synchronized Folders Not Being Tracked Reliably

On Linux, when the synchronized folder contains a high number of subfolders, the operating system may not allow for enough `inotify` watches to monitor the changes in all of them.

In this case the Desktop App will not be able to immediately start the synchronization process when

a file in one of the unmonitored folders changes. Instead, the Desktop App will show the warning and manually scan folders for changes at a regular interval (two hours by default).

This problem can be solved by setting the `fs.inotify.max_user_watches` `sysctl` to a higher value like `524288` permanently in the config file `/etc/sysctl.conf` or temporarily with the following command:

```
echo 524288 > /proc/sys/fs/inotify/max_user_watches.
```



# Advanced Usage

In this section, you find information about advanced usage.

## Command Line Options

### Introduction

Depending on your operating system and how you have installed the Desktop App, you can start the ownCloud Desktop App from the command line by typing `owncloud`, `owncloud.exe` or by the AppImage file name. You may need to change to the directory of the binary first. When starting `owncloud` manually, you can add options to this command.

### List Options

To get the list of options, run the following example command:

```
owncloud -h
or
owncloud --help
```

### Use Options

Option	Description
<code>--logwindow</code>	Opens a window displaying log output.
<code>-s --showsettings</code>	Show the settings dialog while starting
<code>-q --quit</code>	Quit the running instance
<code>--logfile &lt;filename&gt;</code>	Write log output to the file specified. To write to stdout, specify <code>-</code> as the filename.
<code>--logdir &lt;name&gt;</code>	Writes each synchronization log output in a new file in the specified directory.
<code>--logexpire &lt;hours&gt;</code>	Removes logs older than the value specified (in hours). This command is used with <code>--logdir</code> .
<code>--logflush</code>	Clears (flushes) the log file after each write action.
<code>--logdebug</code>	Also output debug-level messages in the log equivalent to setting the environment variable <code>QT_LOGGING_RULES = "qt.*=true;.debug=true"</code> .
<code>--confdir &lt;dirname&gt;</code>	Uses the specified configuration directory.

## Configuration File

## Introduction

The ownCloud Desktop App uses a configuration file. It has several sections for particular settings. You will find more sections in the configuration file than described here. Do not change any of those settings except support advises you to do so.

## Location of the Configuration File

The location of the configuration file depends on the operating system used. You can locate this configuration file as follows:

System	Location
Linux	<code>\$HOME/.config/ownCloud/owncloud.cfg</code>
Microsoft Windows	<code>%APPDATA%\ownCloud\owncloud.cfg</code>
macOS	<code>\$HOME/Library/Preferences/ownCloud/owncloud.cfg</code>

The configuration file contains settings using the [Microsoft Windows .ini file format](#). You can overwrite changes using the ownCloud configuration dialog.



Use caution when making changes to the ownCloud Desktop App configuration file. Incorrect settings can produce unintended results.

## Section [ownCloud]

Variable	Default	Meaning
<code>remotePollInterval</code>	<code>30000</code>	Specifies the poll time for the remote repository in milliseconds.
<code>forceSyncInterval</code>	<code>7200000</code>	The duration of no activity after which a synchronization run shall be triggered automatically.
<code>fullLocalDiscoveryInterval</code>	<code>3600000</code>	The interval after which the next synchronization will perform a full local discovery.
<code>notificationRefreshInterval</code>	<code>300000</code>	Specifies the default interval of checking for new server notifications in milliseconds.

## Section [General]

Variable	Default	Meaning
<code>chunkSize</code>	<code>10000000</code> (or 10 MB)	Specifies the initial chunk size of uploaded files in bytes. The Desktop App will dynamically adjust this size within the maximum and minimum bounds (see below).
<code>maxChunkSize</code>	<code>100000000</code> (or 100 MB)	Specifies the maximum chunk size of uploaded files in bytes.

Variable	Default	Meaning
<code>minChunkSize</code>	<code>1000000</code> (or 1 MB)	Specifies the minimum chunk size of uploaded files in bytes.
<code>targetChunkUploadDuration</code>	<code>60000</code> (1 minute)	Target duration in milliseconds for chunk uploads. The Desktop App adjusts the chunk size until each chunk upload takes approximately this long. Set to 0 to disable dynamic chunk sizing.
<code>promptDeleteAllFiles</code>	<code>true</code>	If a UI prompt should ask for confirmation if it was detected that all files and folders were deleted.
<code>crashReporter</code>	<code>true</code>	Whether to show the crash reporter when a crash occurs.
<code>timeout</code>	<code>300</code>	The timeout for network connections in seconds.
<code>moveToTrash</code>	<code>false</code>	If non-locally deleted files should be moved to trash instead of deleting them completely. This option only works on linux
<code>showExperimentalOptions</code>	<code>false</code>	Whether to show experimental options that are still undergoing testing in the user interface. Turning this on does not enable experimental behavior on its own. It does enable user interface options that can be used to opt in to experimental features.

## Section [Proxy]

Variable	Default	Meaning
<code>host</code>	<code>127.0.0.1</code>	The address of the proxy server.
<code>port</code>	<code>8080</code>	The port where the proxy is listening.
<code>type</code>	<code>2</code>	<ul style="list-style-type: none"> <li>* <code>0</code> for System Proxy</li> <li>* <code>1</code> for SOCKS5 Proxy</li> <li>* <code>2</code> for No Proxy</li> <li>* <code>3</code> for HTTP(S) Proxy</li> </ul>

# Environment Variables

## Introduction

The behavior of the client can also be controlled using environment variables.



The value of the environment variables override the values in the configuration file.



Most environment variables only exist for debugging or testing. They are not officially supported and may change from version to version. If you end up relying on a setting only available through an environment variable, please create a bug

report.

## Available Environment Variables

Setting	Default	Description
<code>OWNCLOUD_CHUNK_SIZE</code>	10000000 (or 10 MB)	Specifies the initial chunk size of uploaded files in bytes. The client will dynamically adjust this size within the maximum and minimum bounds (see below). To disable chunking completely, set <code>OWNCLOUD_CHUNK_SIZE=0</code> .
<code>OWNCLOUD_MAX_CHUNK_SIZE</code>	100000000 (or 100 MB)	Specifies the maximum chunk size of uploaded files in bytes.
<code>OWNCLOUD_MIN_CHUNK_SIZE</code>	1000000 (or 1 MB)	Specifies the minimum chunk size of uploaded files in bytes.
<code>OWNCLOUD_TARGET_CHUNK_UPLOAD_DURATION</code>	60000	Target duration in milliseconds for chunk uploads. The client adjusts the chunk size until each chunk upload takes approximately this long. Set to 0 to disable dynamic chunk sizing.
<code>OWNCLOUD_CHUNKING_NG</code>	depend on server capability	Force-enable ("1") or force-disable ("0") the NG chunking algorithm.
<code>OWNCLOUD_NO_TUS</code>		Set to any value to disable uploads using the tus protocol
<code>OWNCLOUD_TIMEOUT</code>	300	The timeout for network connections in seconds.
<code>OWNCLOUD_CRITICAL_FREE_SPACE_BYTES</code>	50*1000*1000 bytes	The minimum disk space needed for operation. A fatal error is raised if less free space is available.
<code>OWNCLOUD_FREE_SPACE_BYTES</code>	250*1000*1000 bytes	Downloads that would reduce the free space below this value are skipped. More information available under the "Low Disk Space" section.
<code>OWNCLOUD_MAX_PARALLEL</code>	6	Maximum number of parallel jobs.
<code>OWNCLOUD_BLACKLIST_TIME_MIN</code>	25	Minimum timeout, in seconds, for blacklisted files.
<code>OWNCLOUD_BLACKLIST_TIME_MAX</code>	24*60*60 (or one day)	Maximum timeout, in seconds, for blacklisted files.
<code>OWNCLOUD_HTTP2_ENABLED</code>	depend on Qt version	Force-enable ("1") or force-disable ("0") HTTP2 support. Note that HTTP2 use also depends on whether the server supports it.
<code>OWNCLOUD_MINIMAL_TRAY_MENU</code>	unset	If set a minimal tray menu is used. Helpful if a platform's tray has problematic behavior.
<code>OWNCLOUD_TRAY_UPDATE_WHILE_VISIBLE</code>	0	Set to "1" to allow the tray menu to be updated while it's visible to the user.
<code>OWNCLOUD_FORCE_TRAY_SHOW_HIDE</code>	unset	Set to "1" to reestablish the tray icon every time the menu changes.

Setting	Default	Description
<code>OWNCLOUD_FORCE_TRAY_FAKE_DOUBLE_CLICK</code>	unset	Set to "1" if single tray clicks sometimes get recognized as double clicks.
<code>OWNCLOUD_FORCE_TRAY_MANUAL_VISIBILITY</code>	unset	Set to "1" if the tray menu is flickering while opened.
<code>OWNCLOUD_FORCE_TRAY_NO_ABOUT_TO_SHOW</code>	unset	Set to "1" if the tray menu sometimes contains stale entries.
<code>OWNCLOUD_FULL_LOCAL_DISCOVERY_INTERVAL</code>	3600000 (1 hour)	Maximum time in milliseconds that fast local discovery is allowed for after a full local discovery. Set to 0 to always require full local discovery. Set to -1 to never require full local discovery.
<code>OWNCLOUD_SQLITE_JOURNAL_MODE</code>	depends on filesystem	Set a specific sqlite journal mode.
<code>OWNCLOUD_SQLITE_LOCKING_MODE</code>	EXCLUSIVE	Set a specific sqlite locking mode.
<code>OWNCLOUD_SQLITE_TEMP_STORE</code>	unset	Set the given temp_store on the sqlite database.
<code>OWNCLOUD_DISABLE_CHECKSUM_COMPUTATIONS</code>	unset	Set to disable all file checksum computations.
<code>OWNCLOUD_DISABLE_CHECKSUM_UPLOAD</code>	unset	Set to disable computing checksums for uploaded files.
<code>OWNCLOUD_CONTENT_CHECKSUM_TYPE</code>	SHA1	Select the file checksumming algorithm. "Adler32", "MD5", "SHA1", "SHA256", "SHA3-256" are valid, but not all have server support.
<code>OWNCLOUD_UPLOAD_CONFLICT_FILES</code>	unset	Set to "1" to enable uploading conflict files to the server.
<code>QT_LOGGING_RULES</code>	unset	Set to "sync.httplogger=true" to enable verbose http logging. See also troubleshooting.adoc for more.
<code>OWNCLOUD_OVERRIDE_SERVER_URL</code>	unset	Set to override a previously configured/branded server URL

## The Command Line Client

### Introduction

The ownCloud Client packages contain a command line client, `owncloudcmd`, that can be used to synchronize ownCloud files to client machines.

`owncloudcmd` performs a single *sync run* and then exits the synchronization process. In this manner, `owncloudcmd` processes the differences between client and server directories and propagates the files to bring both repositories to the same state. Contrary to the GUI-based client, `owncloudcmd` does not repeat synchronizations on its own. It also does not monitor for file system changes.

To invoke `owncloudcmd`, you must provide the local and the remote repository URL using the

following command:

```
owncloudcmd [OPTIONS...] sourcedir owncloudurl.
```

`sourcedir` is the local directory and `owncloudurl` is the server URL. Other command line switches supported by `owncloudcmd` include the following:

Switch	Description
<code>--user, -u [user]</code>	Use <code>user</code> as the login name.
<code>--password, -p [password]</code>	Use <code>password</code> as the password.
<code>-n</code>	Use <code>netrc (5)</code> for login.
<code>--non-interactive</code>	Do not prompt for questions.
<code>--silent, -s</code>	Inhibits verbose log output.
<code>--trust</code>	Trust any SSL certificate, including invalid ones.
<code>--httpproxy</code> <code>http://[user@pass:]&lt;server&gt;:&lt;port&gt;</code>	Uses <code>server</code> as HTTP proxy.
<code>--davpath [path]</code>	Overrides the WebDAV Path with <code>path</code>
<code>--exclude [file]</code>	Exclude list file.
<code>--unsyncedfolders [file]</code>	File containing the list of un-synced remote folders (selective sync)
<code>--max-sync-retries [n]</code>	Retries maximum <code>n</code> times (defaults to 3)
<code>-h</code>	Sync hidden files,do not ignore them.

## Credential Handling

`owncloudcmd` requires the user to specify the username and password using the standard URL pattern, for example:

```
$ owncloudcmd /home/user/my_sync_folder  
https://carla:secret@server/owncloud/remote.php/webdav/
```

To synchronize the ownCloud directory `Music` to the local directory `media/music`, through a proxy listening on port `8080`, and on a gateway machine using IP address `192.168.178.1`, the command line would be:

```
$ owncloudcmd --httpproxy http://192.168.178.1:8080 \  
$HOME/media/music \  
https://server/owncloud/remote.php/webdav/Music.
```

`owncloudcmd` will prompt for the username and password, unless they have been specified on the command line or `-n` has been passed.

## Exclude List

`owncloudcmd` requires access to an exclude list file. It must either be installed along with `owncloudcmd` and thus be available in a system location, be placed next to the binary as `sync-exclude.lst` or be explicitly specified with the `--exclude` switch.

# Low Disk Space

## Introduction

When disk space is low, the ownCloud Desktop App will be unable to synchronize all files. This section describes its behavior in a low disk space situation as well as the adjustable environment variables that influence it.

## Cases

Issue	Adjustable Environment Variable
Synchronization of a folder aborts entirely if the remaining disk space falls below 50 MB.	<code>OWNCLOUD_CRITICAL_FREE_SPACE_BYTES</code>
Downloads that would reduce the free disk space below 250 MB will be skipped or aborted. The download will be retried regularly and other synchronization is unaffected.	<code>OWNCLOUD_FREE_SPACE_BYTES</code>

# Appendices

In this section, you find supporting information.

## Appendix Building the Desktop App

### Introduction

This section explains how to build the [ownCloud Desktop App](#) from source for all major platforms. You should read this section if you want to develop for the Desktop App. Build instructions are subject to change as development proceeds.



Please check the version for which you want to build.

These instructions are updated to work with the latest version of the ownCloud Desktop App.

### Getting the Source Code

The [generic build instructions](#) pull the latest code directly from GitHub, and work on [Linux](#), [Mac OS X](#), and [Windows](#).

### Linux

For the published Desktop Apps we link against QT5 dependencies from our own repositories so that we can have the same versions on all distributions. This chapter shows you how to build the Desktop App yourself with this setup. If you want to use the QT5 dependencies from your system, see the next chapter.

You may wish to use source packages for your Linux distribution, as these give you the exact sources from which the binary packages are built. These are hosted on the [ownCloud repository from OBS](#). Go to the [Index of repositories](#) to see all the Linux client repositories.

To get the `.deb` source packages, add the source repository for your Debian or Ubuntu version, as in the following example for Debian 9, run the examples below as root:



```
echo 'deb
http://download.opensuse.org/repositories/isv:/ownCloud:/desktop/Debian
_9.0/ /' >> /etc/apt/sources.list.d/owncloud-client.list
```

```
echo 'deb-src
http://download.opensuse.org/repositories/isv:/ownCloud:/desktop/Debian
_9.0/ /' >> /etc/apt/sources.list.d/owncloud-client.list
```

The above registers the source repository of the released Desktop App. There is also ...



`/desktop:/testing/...` and e.g. `.../desktop:/daily:/2.7/...` for beta versions or daily snapshots.

Install the dependencies using the following commands for your specific Linux distribution. Make sure the repositories for source packages are enabled. These are:

Distribution	Installation Instructions
Debian/Ubuntu	<code>apt update; apt build-dep owncloud-client</code>
openSUSE/SLES	<code>zypper ref; zypper si -d owncloud-client</code>
Fedora/CentOS/RHEL	<code>yum install yum-utils; yum-builddep owncloud-client</code>

Follow the [generic build instructions](#), starting with step 2.

## Linux with System Dependencies

Build sources from a GitHub checkout with dependencies provided by your Linux distribution. While this allows more freedom for development, it does not exactly represent what we ship as packages. See above for how to recreate packages from source.



To get the source dependencies on Debian and Ubuntu, run the following command:

```
sudo apt install qtdeclarative5-dev libnotifytools-dev \  
qt5keychain-dev python3-sphinx \  
libsqlite3-dev
```

Follow the [generic build instructions](#), starting with step 1.

## macOS

In addition to needing Xcode (along with the command line tools), developing in the macOS environment requires extra dependencies. You can install these dependencies through [MacPorts](#) or [Homebrew](#). These dependencies are required only on the build machine, because non-standard libs are deployed in the app bundle.

The tested and preferred way to develop in this environment is through the use of [HomeBrew](#). The ownCloud team has its own repository containing non-standard recipes. To set up your build environment for development using [HomeBrew](#):

1. Install [Xcode](#).
2. Install Xcode command line tools using

```
xcode-select --install
```

3. [Install Homebrew](#) using

```
/bin/bash -c "$(curl -fsSL
https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"
```

4. Add the ownCloud repository using the command

```
brew tap owncloud/owncloud
```

5. Install a Qt5 version, ideally from 5.10.1, using the command

```
brew install qt5
```

6. Install any missing dependencies, using the command:

```
brew install $(brew deps owncloud-client)
```

7. Install **qtkeychain** by running

```
git clone https://github.com/frankosterfeld/qtkeychain.git
```

Make sure you make the same install prefix as later while building the Desktop App e.g.

```
-DCMAKE_INSTALL_PREFIX=/Path/to/client/./install
```

8. For compilation of the Desktop App, follow the [generic build instructions](#).
9. Install the [Packages](#) package creation tool.
10. In the build directory, run

```
admin/osx/create_mac.sh <CMAKE_INSTALL_DIR> <build dir> <installer sign identity>
```

If you have a developer signing certificate, you can specify its Common Name as a third parameter (use quotes) to have the package signed automatically.



Contrary to earlier versions, version 1.7 and later are packaged as a **pkg** installer. Do not call **make package** at any time when compiling for OS X, as this will build a disk image, which will not work correctly.

## Windows Development Build with KDE Craft

If you want to test some changes, you can build the ownCloud Desktop App natively on Windows using [KDE Craft](#). You can also use it to build unsupported and unoptimized installers.

## Install KDE Craft

To install KDE Craft, [Python 2.7](#) or [Python 3.6+](#), and [PowerShell 5.0+](#) must be installed. You can find the full installation guide in the [KDE Community Wiki](#).



If you want to use Microsoft Visual Studio, naturally, that must be installed as well.

When the dependencies are installed, install KDE Craft using the following lines in PowerShell:

```
Set-ExecutionPolicy -Scope CurrentUser RemoteSigned  
iex ((new-object net.webclient).DownloadString  
(https://raw.githubusercontent.com/KDE/craft/master/setup/install\_craft.ps1))
```

The first command allows running scripts from remote sources. The second command starts installing KDE Craft. You are asked where you want to put the main folder, called **CraftRoot**, which will contain all source, build, and install folders. Please choose a disk with sufficient free space.

Last but not least, you need to choose the compiler you want to use. The official builds only supports [Microsoft Visual Studio 2019](#). However, if you're feeling adventurous, you can also try to use [Mingw-w64](#). In contrast to Visual Studio, which you need to install in advance, KDE Craft can install **Mingw-w64** for you.



Unless you need 32bit builds, you should stick to the default of x64 builds.

## Setup KDE Craft

After you install KDE Craft, there are two steps left before the ownCloud Desktop App can be compiled. These are:

1. [Launch the KDE Craft Environment](#)
2. [Build the Desktop App](#)

### Launch the KDE Craft Environment

To launch the KDE Craft environment, you need to run the following command in PowerShell. This provides you with a shell with all the environment variables set that you need to work with KDE Craft.

```
C:\CraftRoot\craft\craftenv.ps1
```



This needs to be done every time you want to work with Craft.



We're assuming that you installed KDE Craft in the default path of **C:\CraftRoot**. If you have installed it somewhere else, please adjust the path as necessary.

## Setup the ownCloud repository

The last step before we can begin, is adding the ownCloud repository. It provides you with additional dependencies and tools, which are not available from the standard KDE repository.

```
craft --add-blueprint-repository https://github.com/owncloud/craft-blueprints-owncloud.git
```



You only need to do this once.

## Build The Desktop App

Finally, we can build the Desktop App with the following command:

```
craft owncloud-client
```

This installs all required dependencies and builds the ownCloud Desktop App from the **master** git branch. If you want to build a different branch, first install all dependencies and then clone the source code from git, like this:

```
craft --install-deps owncloud-client  
craft --fetch owncloud-client
```

You can find the git checkout in **C:\CraftRoot\downloads\git\owncloud\owncloud-client**. There you can use the usual git commands to switch branches and remotes, e.g., to build the **2.10** stable branch you can use craft with **--set** version parameter:

```
git checkout 2.10  
craft --set version=2.10 owncloud-client
```

Afterwards you can build the Desktop App like this:

```
craft --configure --make --install  
craft owncloud-client
```

## Run the Desktop App

Neither **craft owncloud-client** nor **craft --configure --make --install** make the ownCloud Desktop App available in your PATH, they only install to the so-called image directory. This is so KDE Craft knows which files belong to which package. In order to run the Desktop App, you first need to merge the image directory to the regular KDE Craft root (**C:\CraftRoot**). Afterwards, you can run **owncloud.exe** from your shell.

```
craft --qmerge owncloud-client
```

```
owncloud.exe
```

### Package the Desktop App (Unsupported)

Although this is not officially supported, it is, generally, possible to build an installer with:

```
craft nsis  
craft --package owncloud-client
```

Now you should have a file called: `owncloud-client-master-${COMMIT_HASH}-windows-${COMPILER}.exe` in `C:\CraftRoot\tmp`.



This is not supported, optimised, nor regularly tested! Fully supported Windows installers are currently only provided by [ownBrander](#).

## Generic Build Instructions

To build the most up-to-date version of the Desktop App:

1. Clone the latest versions of the Desktop App from [Git](#) as follows:

```
git clone git://github.com/owncloud/client.git  
cd client
```

Note master this default, but you can also check out a tag like v2.5.4

```
git checkout master  
git submodule init  
git submodule update
```

2. Create the build directory:

```
mkdir client-build  
cd client-build
```

3. Configure the Desktop App build:

```
cmake -DCMAKE_PREFIX_PATH=/opt/ownCloud/qt-5.12.4  
-DCMAKE_INSTALL_PREFIX=/Users/path/to/client/./install/ ..
```

For Linux builds (using QT5 libraries via build-dep) a typical setting is

```
-DCMAKE_PREFIX_PATH=/opt/ownCloud/qt-5.12.4/
```

However, the version number may vary. For Linux builds using system dependencies `-DCMAKE_PREFIX_PATH` is not needed. You must use absolute paths for the `include` and `library` directories.

On Mac OS X, you need to specify `-DCMAKE_INSTALL_PREFIX=target`, where `target` is a private location, i.e. in parallel to your build dir by specifying `../install`.

qtkeychain must be compiled with the same prefix e.g.,

```
-DCMAKE_INSTALL_PREFIX=/Users/path/to/client/../install/
```

#### 4. Call

```
make
```

The ownCloud binary will appear in the `bin` directory.

#### 5. (Optional) Call `make install` to install the Desktop App to the `/usr/local/bin` directory (or as per `CMAKE_INSTALL_PREFIX`).

The following are known CMake parameters:

- `QTKEYCHAIN_LIBRARY=/path/to/qtkeychain.dylib`  
`-DQTKEYCHAIN_INCLUDE_DIR=/path/to/qtkeychain/` Used for stored credentials. When compiling with Qt5, the library is called `qt5keychain.dylib`. You need to compile QtKeychain with the same Qt version. If you install QtKeychain into the `CMAKE_PREFIX_PATH` then you don't need to specify the path manually.
- `WITH_DOC=TRUE`: Creates doc and man pages through running `make`; also adds install statements, providing the ability to install using `make install`.
- `CMAKE_PREFIX_PATH=/path/to/Qt5.12.4/5.12.4/yourarch/lib/cmake/`: Builds using that Qt version.
- `CMAKE_INSTALL_PREFIX=path`: Set an install prefix. This is mandatory on Mac OS.

#### 6. **Optional:** Run a Desktop App that was installed in a custom `CMAKE_INSTALL_PREFIX` may not pick up the correct libraries automatically. You can use `LD_LIBRARY_PATH` to help find the libraries like this:

```
LD_LIBRARY_PATH=/opt/ownCloud/qt-5.12.4/lib/x86_64-linux-gnu:/Users/path/to/client/../install/lib/x86_64-linux-gnu/  
/Users/path/to/client/../install/bin/owncloud
```

## Compiling via ownBrander

If you don't want to go through the trouble of doing all the compiling work manually, you can use [ownBrander](#) to create installer images for all platforms.

# Appendix History and Architecture

## Introduction

ownCloud provides Desktop Apps to synchronize the contents of local directories from computers, tablets, and handheld devices to the ownCloud server.

Synchronization is accomplished using [csync](#), a bidirectional file synchronizing tool that provides both a command line client and a library. A special module for csync was written to synchronize with the ownCloud built-in WebDAV server.

The ownCloud Desktop App software is written in C++ using the [Qt Framework](#). As a result, the ownCloud Desktop App runs on Linux, Windows, and MacOS.

## The Synchronization Process

The process of synchronization keeps files in two separate repositories the same. When synchronized:

- If a file is added to one repository it is copied to the other synchronized repository.
- When a file is changed in one repository, the change is propagated to any other synchronized repository.
- If a file is deleted in one repository, it is deleted in any other.

It is important to note that the ownCloud synchronization process does not use a typical client/server system where the server is always master. This is a major difference between the ownCloud synchronization process and other systems like a file backup, where only changes to files or folders and the addition of new files are propagated, but these files and folders are never deleted unless explicitly deleted in the backup.

During synchronization, the ownCloud Desktop App checks both repositories for changes frequently. This process is referred to as a *sync run*. In between sync runs, the local repository is monitored by a file system monitoring process that starts a sync run immediately if something was edited, added, or removed.

## Synchronization by Time versus ETag

Until the release of ownCloud 4.5 and ownCloud Desktop App 1.1, the ownCloud synchronization process employed a single file property—the file modification time—to decide which file was newer and needed to be synchronized to the other repository.

The *modification timestamp* is part of the file's metadata. It is available on every relevant filesystem and is the typical indicator for a file change. Modification timestamps do not require special action to create, and have a general meaning. One design goal of csync is to not require a special server component. This design goal is why csync was chosen as the backend component.

To compare the modification times of two files from different systems, csync must operate on the same base. Before ownCloud Desktop App version. 1.1.0, csync required both device repositories to

run on the exact same time. This requirement was achieved through the use of enterprise standard [NTP time synchronization](#) on all machines.

Because this timing strategy is rather fragile without the use of NTP, ownCloud 4.5 introduced a unique number (for each file?) that changes whenever the file changes. Although this number is a unique value, it is not a hash of the file. Instead, it is a randomly chosen number, that is transmitted in the [Etag](#) field. Because the file number changes if the file changes, its use is guaranteed to determine if one of the files has changed and, thereby, launching a synchronization process.



ownCloud Desktop App release 1.1 and later requires file ID capabilities on the ownCloud server. Servers that run with release earlier than 4.5.0 do not support using the file ID functionality.

Before the 1.3.0 release of the Desktop App, the synchronization process might create false conflict files if time deviates. Original and changed files conflict only in their timestamp, but not in their content. This behavior was changed to employ a binary check if files differ.

Like files, directories also hold a unique ID that changes whenever one of the contained files or directories is modified. Because this is a recursive process, it significantly reduces the effort required for a synchronization cycle, because the Desktop App only analyzes directories with a modified ID.

The following table outlines the different synchronization methods used, depending on server/client combination:

*Table 1. Compatibility Table*

Server Version	Desktop App Version	Sync Methods
4.0.x or earlier	1.0.5 or earlier	Time Stamp
4.0.x or earlier	1.1 or later	n/a (incompatible)
4.5 or later	1.0.5 or earlier	Time Stamp
4.5 or later	1.1 or later	File ID, Time Stamp

We strongly recommend using ownCloud Server release 4.5 or later when using ownCloud Desktop App 1.1 or later. Using an incompatible time stamp-based synchronization mechanism can lead to data loss in rare cases, especially when multiple Desktop Apps are involved and one utilizes a non-synchronized NTP time.

## Comparison and Conflict Cases

As mentioned above, during a *sync run* the Desktop App must first detect if one of the two repositories have changed files. On the local repository, the Desktop App traverses the file tree and compares the modification time of each file with an expected value stored in its database. If the value is not the same, the Desktop App determines that the file has been modified in the local repository.



On the local side, the modification time is a good attribute to use for detecting



changes, because the value does not depend on time shifts and such.

For the remote (that is, ownCloud server) repository, the Desktop App compares the ETag of each file with its expected value. Again, the expected ETag value is queried from the Desktop App database. If the ETag is the same, the file has not changed and no synchronization occurs.

In the event a file has changed on both the local and the remote repository since the last sync run, it can not easily be decided which version of the file is the one that should be used. However, changes to any side will not be lost. Instead, a *conflict case* is created. The Desktop App resolves this conflict by renaming the local file, appending a conflict label and timestamp, and saving the remote file under the original file name.

**Example:** Assume there is a conflict in message.txt because its contents have changed both locally and remotely since the last sync run. The local file with the local changes will be renamed to `message. (conflicted copy 2016-01-01 153110).txt` and the remote file will be downloaded and saved as message.txt.

Conflict files are always created on the Desktop App and never on the server.

## Checksum Algorithm Negotiation

In ownCloud 10.0 we implemented a checksum feature which checks the file integrity on upload and download by computing a checksum after the file transfer finishes. The Desktop App queries the server capabilities after login to decide which checksum algorithm to use. Currently, SHA1 is hard-coded in the official server release and can't be changed by the end-user. Note that the server additionally also supports **MD5** and **Adler-32**, but the Desktop App will always use the checksum algorithm announced in the capabilities:

```
GET http://localhost:8000/ocs/v1.php/cloud/capabilities?format=json
```

```
{
  "ocs":{
    "meta":{
      "status":"ok",
      "statusCode":100,
      "message":"OK",
      "totalitems":"",
      "itemsperpage":""
    },
    "data":{
      "version":{
        "major":10,
        "minor":0,
        "micro":0,
        "string":"10.0.0 beta",
        "edition":"Community"
      },
      "capabilities":{
```

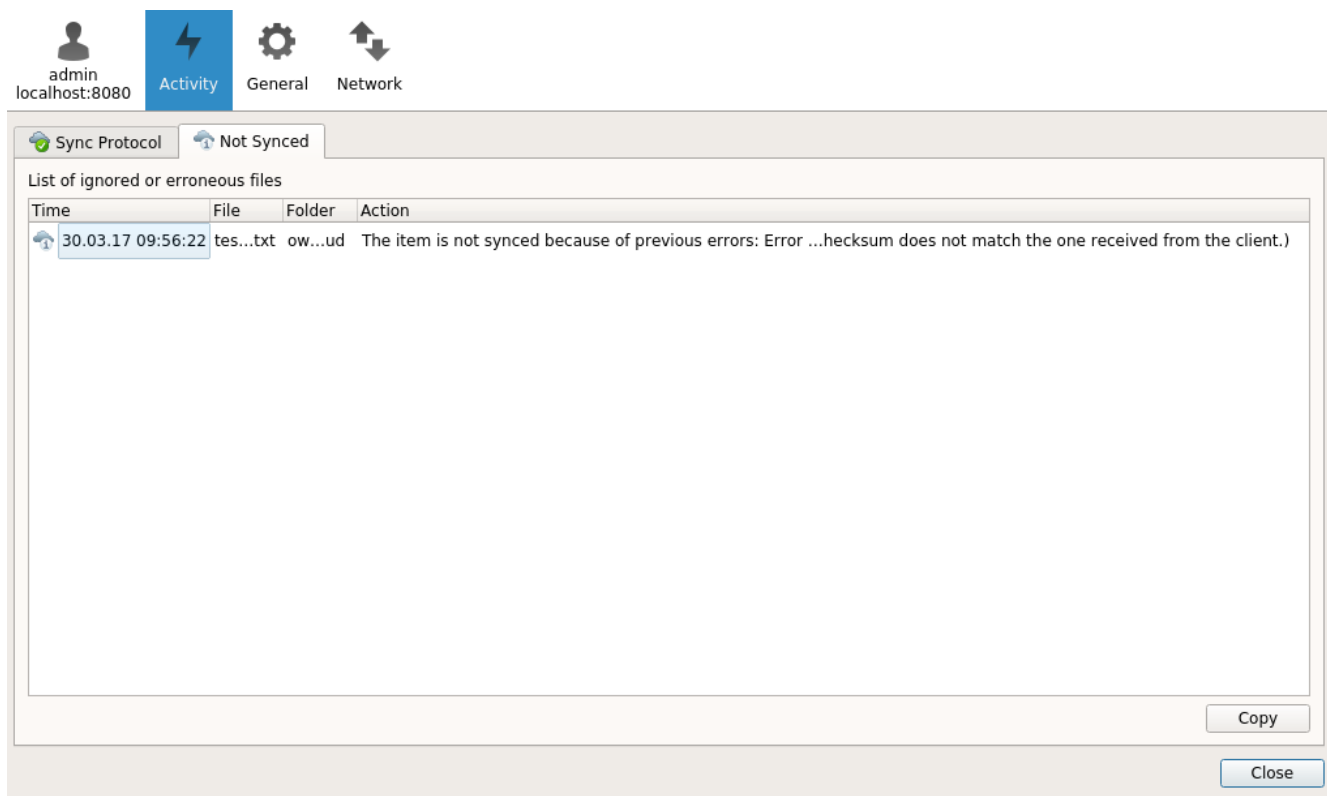
```

"core":{
  "pollinterval":60,
  "webdav-root":"remote.php/webdav"
},
"dav":{
  "chunking":"1.0"
},
"files_sharing":{
  "api_enabled":true,
  "public":{
    "enabled":true,
    "password":{
      "enforced":false
    },
    "expire_date":{
      "enabled":false
    },
    "send_mail":false,
    "upload":true
  },
  "user":{
    "send_mail":false
  },
  "resharing":true,
  "group_sharing":true,
  "federation":{
    "outgoing":true,
    "incoming":true
  }
},
"checksums":{
  "supportedTypes":[
    "SHA1"
  ],
  "preferredUploadType":"SHA1"
},
"files":{
  "bigfilechunking":true,
  "blacklisted_files":[
    ".htaccess"
  ],
  "undelete":true,
  "versioning":true
}
}
}
}
}
}

```

## Upload

A checksum is calculated with the previously negotiated algorithm by the Desktop App and sent along with the file in an HTTP Header: **OC-Checksum:** [algorithm]:[checksum].



During file upload, the server computes SHA1, MD5, and Adler-32 checksums and compares one of them to the checksum supplied by the Desktop App.

On mismatch, the server returns HTTP Status code 400 (Bad Request) thus signaling the Desktop App that the upload failed. The server then discards the upload, and the Desktop App blacklists the file:

```
2017-03-30 09:33:05 PUT http://localhost:8000/remote.php/dav/files/admin/test_file.txt
+ 204 text/html [no content] 200ms

Request Response Detail
Content-Type: application/octet-stream
If-Match: "77ald843ecalc5bbe9e33ecb305e620c"
OC-Async: 1
OC-Checksum: SHA1:3262b849425676d67ea23855d1f5136eaeb67432
OC-Chunk-Size: 10000000
OC-Total-Length: 27
X-OC-Mtime: 1490859183
Authorization: Basic YWRtaW46YWRTaW4=
User-Agent: Mozilla/5.0 (Linux) mirall/2.3.1
Accept: */*
Cookie: oc_sessionPassphrase=LKTqShq7gn3CE3lRoLEpjYGrmoFCqfDxAIobQujQsvfUPu%2B820
JXPvE6Zz8g2iyq1%2BSSwJ2%2BMSNcoBlA80110RftxKTWEBSSb%2FhKHrKNqiFVZKdshgYCI
9yeJkrnfilW; occn7u29s9u9=vudtni439uLgk6mpj6p6kmg81
Content-Length: 27
Connection: Keep-Alive
Accept-Encoding: gzip, deflate
Accept-Language: en-US,*
host: localhost:8080
Raw [m:Auto]
Textfile to test checksums.
```

```
<?xml version='1.0' encoding='utf-8'?>
<d:error xmlns:d="DAV:" xmlns:s="http://sabredav.org/ns">
  <s:exception>Sabre\DAV\Exception\BadRequest</s:exception>
  <s:message>The computed checksum does not match the one received from the
client.</s:message>
</d:error>
```

The Desktop App retries the upload using exponential back-off. On success, (matching checksum) the computed checksums are stored by the server in `oc_filecache` alongside the file.

## Chunked Upload

Mostly same as above. The checksum of the full file is sent with every chunk of the file. But the server only compares the checksum after receiving the checksum sent with the last chunk.

## Download

The server sends the checksum in an HTTP header with the file. (same format as above) If no checksum is found in `oc_filecache` (freshly mounted external storage) it is computed and stored in `oc_filecache` on the first download. The checksum is then provided on all subsequent downloads but not on the first.

## Ignored Files

The ownCloud Desktop App supports the ability to exclude or ignore certain files from the synchronization process. Some system-wide file patterns that are used to exclude or ignore files are included with the Desktop App by default and the ownCloud Desktop App provides the ability to add custom patterns.

By default, the ownCloud Desktop App ignores the following files:

- Files matched by one of the patterns defined in the Ignored Files Editor.
- Files starting with `.sync*.db*`, `.sync_*.db*`, `.csync_journal.db*`, `.owncloudsync.log*`, as these files are reserved for journaling.
- Files with a name longer than 254 characters.
- The file `Desktop.ini` in the root of a synced folder.
- Files matching the pattern `_conflict-` unless conflict file uploading is enabled.
- Files matching the pattern `(conflicted copy` unless conflict file uploading is enabled.
- Windows only: Files containing characters that do not work on typical Windows filesystems (`\`, `/`, `:`, `?`, `*`, `"`, `>`, `<`, `|`).
- Windows only: Files with a trailing space or dot.
- Windows only: Filenames that are reserved on Windows.

If a pattern selected using a checkbox in the [Ignored Files Editor](#), or if a line in the exclude file starts with the character `]` directly followed by the file pattern, files matching the pattern are

considered.

### fleeting meta data.

These files are ignored and *removed* by the Desktop App if found in the synchronized folder. This is suitable for meta files created by some applications that have no sustainable meaning.

If a pattern ends with the forward slash (/) character, only directories are matched. The pattern is only applied for directory components of filenames selected using the checkbox.

To match filenames against the exclude patterns, the UNIX standard C library function `fnmatch` is used. This process checks the filename against the specified pattern using standard shell wildcard pattern matching. For more information, please refer to [the pattern matching documentation](#).

The path that is checked is the relative path under the sync root directory.

### Pattern and File Match Examples:.

Pattern	File Matches
<code>~\$*</code>	<code>~\$foo</code> , <code>~\$example.doc</code>
<code>fl?p</code>	<code>flip</code> , <code>flap</code>
<code>moo/</code>	<code>map/moo/</code> , <code>moo/</code>

## The Sync Journal

The Desktop App stores the ETag number in a per-directory database, called the *journal*. This database is a hidden file contained in the directory to be synchronized.

If the journal database is removed, the ownCloud Desktop App CSync backend rebuilds the database by comparing the files and their modification times. This process ensures that both server and Desktop App are synchronized using the appropriate NTP time before restarting the Desktop App following a database removal.

## Custom WebDAV Properties

In the communication between Desktop App and server a couple of custom WebDAV properties were introduced. They are either needed for sync functionality or help have a positive effect on synchronization performance.

This chapter describes additional XML elements which the server returns in response to a successful `PROPFIND` request on a file or directory. The elements are returned in the namespace `oc`.

## Server Side Permissions

The XML element `<oc:permissions>` represents the permission- and sharing state of the item. It is a list of characters, and each of the chars has a meaning as outlined in the table below:

Code	Resource	Description
S	File or Folder	is shared.
R	File or Folder	can share (includes re-share)
M	File or Folder	is mounted (like on Dropbox, Samba, etc.)
W	File	can write file.
C	Folder	can create file in folder.
K	Folder	can create folder (mkdir)
D	File or Folder	can delete file or folder.
N	File or Folder	can rename file or folder.
V	File or Folder	can move file or folder.

Example:

```
<oc:permissions>RDNVCK</oc:permissions>
```

## File- or Directory Size

The XML element `<oc:size>` represents the file- or directory size in bytes. For directories, the size of the whole file tree underneath the directory is accumulated.

Example:

```
<oc:size>2429176697</oc:size>
```

## FileID

The XML element `<oc:id>` represents the so-called file ID. It is a non-volatile string id that stays constant as long as the file exists. It is not changed if the file changes or is renamed or moved.

Example:

```
<oc:id>00000020oc5cfy6qqizm</oc:id>
```

# Appendix Troubleshooting

## Introduction

The following two general issues can result in failed synchronization:

- The server setup is incorrect.
- The Desktop App contains a bug.

When reporting bugs, it is helpful if you first determine what part of the system is causing the issue.

## Identifying Basic Functionality Problems

### Performing a general ownCloud Server test

The first step in troubleshooting synchronization issues is to verify that you can log on to the ownCloud web application. To verify connectivity to the ownCloud server try logging in via your Web browser. If you are not prompted for your username and password, or if a red warning box appears on the page, your server setup requires modification. Please verify that your server installation is working correctly.

### Ensure the WebDAV API is working

If all Desktop Apps fail to connect to the ownCloud Server, but access using the Web interface functions properly, the problem is often a misconfiguration of the WebDAV API. The ownCloud Desktop App uses the built-in WebDAV access of the server content. Verify that you can log on to ownCloud's WebDAV server. To verify connectivity with the ownCloud WebDAV server, open a browser window and enter the address to the ownCloud WebDAV server. For example, if your ownCloud instance is installed at <https://yourserver.com/owncloud>, your WebDAV server address is <https://yourserver.com/owncloud/remote.php/webdav>. If you are prompted for your username and password but, after providing the correct credentials, authentication fails, please ensure that your authentication backend is configured properly.

### Use a WebDAV command line tool to test

A more sophisticated test method for troubleshooting synchronization issues is to use a WebDAV command line client and log into the ownCloud WebDAV server. One such command line client—called **cadaver**—is available for Linux distributions. You can use this application to further verify that the WebDAV server is running properly using PROPFIND calls. As an example, after installing the **cadaver** app, you can issue the **proppet** command to obtain various properties pertaining to the current directory and also verify WebDAV server connection.

## CSync Unknown Error

If you see this error message stop your Desktop App, delete the `._sync_XXXXXXX.db` file, and then restart your Desktop App. There is a hidden `._sync_XXXXXXX.db` file inside the folder of every account configured on your Desktop App.



Please note that this will also erase some of your settings about which files to download.

See <https://github.com/owncloud/client/issues/5226> for more discussion of this issue.

## Isolating Other Issues

Other issues can affect synchronization of your ownCloud files:

- If you find that the results of the synchronizations are unreliable, please ensure that the folder to which you are synchronizing is not shared with other synchronization applications.
- Synchronizing the same directory with ownCloud and other synchronization software such as

Unison, rsync, Microsoft Windows Offline Folders, or other cloud services such as Dropbox or Microsoft SkyDrive is not supported and should not be attempted. In the worst case, it is possible that synchronizing folders or files using ownCloud and other synchronization software or services can result in data loss.

- If you find that only specific files are not synchronized, the synchronization protocol might be having an effect. Some files are automatically ignored because they are system files, other files might be ignored because their filename contains characters that are not supported on certain file systems. For more detailed information see [the Ignored Files section](#).
- If you are operating your own server, and use the local storage backend (the default), make sure that ownCloud has exclusive access to the directory.



The data directory on the server is exclusive to ownCloud and must not be modified manually.

- If you are using a different file backend on the server, you can try to exclude a bug in the backend by reverting to the built-in backend.
- If you are experiencing slow upload/download speed or similar performance issues be aware that those could be caused by on-access virus scanning solutions, either on the server (like the [files\\_antivirus app](#)) or the Desktop App.

## Log Files

Effectively debugging software requires as much relevant information as can be obtained. To assist the ownCloud support personnel, please try to provide as many relevant logs as possible. Log output can help with tracking down problems and, if you report a bug, log output can help to resolve an issue more quickly.

The Desktop App log file is often the most helpful log to provide.

### Obtaining the Desktop App Log File

There are several ways to produce log files. The most commonly useful is enabling logging to a temporary directory, described first.



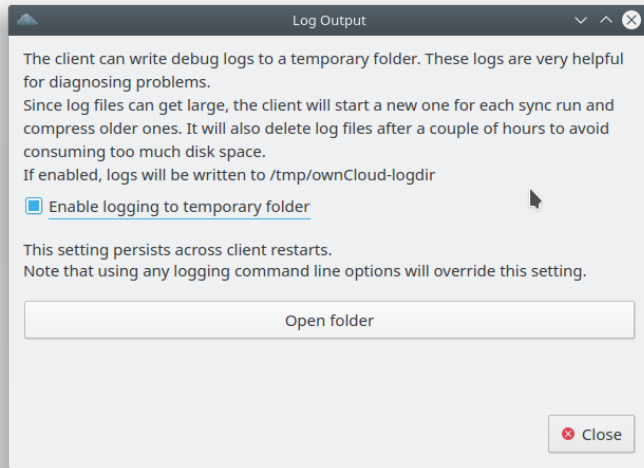
Desktop App log files contain file and folder names, metadata, server URLs and other private information. Only upload them if you are comfortable sharing the information. Logs are often essential for tracking down a problem though, so please consider providing them to developers privately.

#### Logging to a Temporary Directory

1. Open the ownCloud Desktop App.
2. Press [ F12 ] or [ Ctrl-L ] or [ Cmd+L ] on your keyboard.

The Log Output window opens.





3. Enable the [ **Enable logging to temporary folder** ] checkbox.
4. Later, to find the log files, click the [ **Open folder** ] button.
5. Select the logs for the time frame in which the issue occurred.



That the choice to enable logging will be persisted across Desktop App restarts.

### Saving Files Directly

The ownCloud Desktop App allows you to save log files directly to a custom file or directory. This is a useful option for easily reproducible problems, as well as for cases where you want logs to be saved to a different location.

To save log files to a file or a directory:

1. To save to a file, start the Desktop App using the `--logfile <file>` command, where `<file>` is the filename to which you want to save the file.
2. To save to a directory, start the Desktop App using the `--logdir <dir>` command, where `<dir>` is an existing directory.

When using the `--logdir` command, each sync run creates a new file. To limit the amount of data that accumulates over time, you can specify the `--logexpire <hours>` command. When combined with the `--logdir` command, the Desktop App automatically erases saved log data in the directory that is older than the specified number of hours.

Adding the `--logdebug` flag increases the verbosity of the generated log files.

As an example, to define a test where you keep log data for two days, you can issue the following command:

```
owncloud --logdir /tmp/owncloud_logs --logexpire 48
```

## Logging in the Console

If the ownCloud Desktop App isn't able to start and immediately crashes the first two options are not available. Therefore, it might be necessary to start the ownCloud Desktop App using the command line in order to see the error message

On Linux and Mac simply open the terminal and run:

```
owncloud --logfile - --logflush
```

On Windows open a PowerShell and run the following command:

```
& 'C:\Program Files\ownCloud\owncloud.exe' --logfile - --logflush | Write-Host
```

Make sure to copy the whole command and adjust the path to your `owncloud.exe`, if you have chosen to install the Desktop App in a different path.

To further increase the verbosity of the output you can also combine these commands with the `--logdebug` argument.

## Control Log Content

Thanks to the Qt framework, logging can be controlled at run-time through the `QT_LOGGING_RULES` environment variable.

### Exclude log item categories

```
QT_LOGGING_RULES='gui.socketapi=false;sync.database*=false' \  
/PATH/TO/CLIENT \  
--logdebug --logfile <file>
```

### Add HTTP logging entries

```
QT_LOGGING_RULES='sync.httplogger=true' \  
/PATH/TO/CLIENT \  
--logdebug --logfile <file>
```

### Only show specific log item categories

```
QT_LOGGING_RULES='*=false;sync.httplogger=true' \  
/PATH/TO/CLIENT \  
--logdebug --logfile <file>
```

## ownCloud Server Log File

The ownCloud server also maintains an ownCloud specific log file. This log file must be enabled through the ownCloud Administration page. On that page, you can adjust the log level. We recommend that when setting the log file level that you set it to a verbose level like **Debug** or **Info**.

You can view the server log file using the web interface or you can open it directly from the file system in the ownCloud server data directory.

Need more information on this. How is the log file accessed? Need to explore procedural steps in access and in saving this file, similar to how the log file is managed for the Desktop App. Perhaps it is detailed in the Admin Guide and a link should be provided from here. I will look into that when I begin heavily editing the Admin Guide.

## Webserver Log Files

It can be helpful to view your webserver's error log file to isolate any ownCloud-related problems. For Apache on Linux, the error logs are typically located in the `/var/log/apache2` directory. Some helpful files include the following:

- **error\_log** — Maintains errors associated with PHP code.
- **access\_log** — Typically records all requests handled by the server; very useful as a debugging tool because the log line contains information specific to each request and its result.

You can find more information about Apache logging at <http://httpd.apache.org/docs/current/logs.html>

## Core Dumps

On Mac OS X and Linux systems, and in the unlikely event the Desktop App software crashes, the Desktop App is able to write a core dump file. Obtaining a core dump file can assist ownCloud Customer Support tremendously in the debugging process.

To enable the writing of core dump files, you must define the **OWNCLOUD\_CORE\_DUMP** environment variable on the system.

For example:

```
OWNCLOUD_CORE_DUMP=1 owncloud
```

This command starts the Desktop App with core dumping enabled and saves the files in the current working directory.



Core dump files can be fairly large. Before enabling core dumps on your system, ensure that you have enough disk space to accommodate these files. Also, due to their size, we strongly recommend that you properly compress any core dump files prior to sending them to ownCloud Customer Support.

# GUI Testing the Desktop App

## Introduction

This document explains how to run GUI tests for the Desktop App locally in your system. To run GUI tests, the Squish GUI Test Automation Tool for all kinds of cross-platform desktop, mobile, embedded and web applications is used.

## Prerequisites

Before we can actually run the test, we will need to make a Desktop App build and install and configure Squish first.



Before running tests, you need to make sure that you have disabled `oauth2` and `openidconnect` in ownCloud Server.

## Building the Desktop App

To be able to run tests, you need to [build the Desktop App](#) from the latest master.

## Prepare Tests

There are two ways to run tests:

- [Using Squish IDE](#)
- [Using Docker](#)



You can use docker or Squish IDE to run the tests but if you want to add new test steps use Squish IDE or any other IDE.

## Using Squish IDE

- [Install Squish IDE](#)
- [Configure Squish](#)

## Install Squish IDE

After building the ownCloud Desktop App, install and configure Squish. To install Squish, follow these steps:

1. Download the latest version of Squish from [froglogic](#) to a location of your choice.
2. Depending upon the version and system you are using, you will get a file like `squish-6.6.2-qt512x-linux64.run`.
3. Make the downloaded file executable by running the following example command:

```
sudo chmod +x ./squish-6.6.2-qt512x-linux64.run
```

4. Execute the file:

```
sudo ./squish-6.6.2-qt512x-linux64.run
```

5. You will be asked for a license key. When asked, enter your existing license/url of the license server or get a [free trial license](#)
6. After you have entered the license key, Squish opens.

### Configure Squish

After installing Squish, follow these steps to configure it:

1. Close Squish if opened.
2. [Download](#) the `PythonChanger.py` script and save it in your squish installation folder.
3. Run the downloaded script.

```
sudo python3 PythonChanger.py --force
```

Some necessary steps before running tests:

1. Clone the [Desktop App](#) from GitHub
2. Copy `test/gui/config.sample.ini` to `test/suite_oc-desktop/config.ini`
3. Edit `test/gui/config.ini` and set `BACKEND_HOST=` to the URL of your ownCloud server, e.g. `BACKEND_HOST=http://localhost/owncloud-core`



BACKEND\_HOST can be any server, but it is required that the password for the user `admin` is set to `admin`.

4. Start Squish
5. Open the existing test-suite via: **File** > **Open Test Suite** > `test/gui`
6. Go to **Edit** > **Server Settings** > **Manage AUTs** > **Mapped AUTs**
7. Click **[ Add ]** and select the compiled binary, e.g.: `client/client-build/bin/owncloud`
8. Close any running Desktop Apps by clicking **[ Quit ownCloud ]** in the settings page
9. Run the AUT (Application under Test) to check if everything works properly via **Run** > **Launch AUT** (the Desktop App settings window should appear)



If there are problems with starting Squish, please check the log file `~/.squish/squishlibraryx.log.x`. Also make sure that the `~/squish-for-qt-6.x.x/etc/paths.ini` is user-readable.

## Using Docker

You can also use the [Squish docker image](#) to run tests. Proceed with the following steps:

1. Copy `server.ini` file from `test/gui/drone` to a new folder called `local`
2. Change `AUT/owncloud` value to `"/app/client-build/bin"`
3. Pull the docker image with the following command:

```
sudo docker pull owncloudci/squish
```

## Run Tests

- [Run Tests Using Squish](#)
- [Run Tests Using Docker](#)



Before running middleware, install yarn following the instructions from [here](#) and clone middleware from [here](#).

### Run Tests Using Squish

- Start the [owncloud-test-middleware](#)
- Quit the Desktop App if you have opened it earlier and make sure that Desktop App is not running in the background.
- Click the play button for a [test-case](#) or [scenario](#).

### Run Tests Using Docker

- Start the [owncloud-test-middleware](#)
- Run the Squish docker image using the following command:

```
docker run --rm --network=host -e LICENSEKEY='YOUR_SQUISH_LICENSE' -e  
MIDDLEWARE_URL='http://localhost:3000/' -e BACKEND_HOST='http://localhost/owncloud-  
server/' -e SERVER_INI='/app/test/gui/local/server.ini' -e CLIENT_REPO='/app/' -e  
SQUISH_PARAMETERS='--retry 1' -v ${PWD}:/app owncloudci/squish:qt512
```

## Create New Steps

- The language used for the tests is basically the same as in other repos. See [how to write acceptance tests](#) for more information.
- Steps that have to go through the test-middleware are named the same way they are named in the [middleware](#) but have additionally `on the server` either at the end or in the middle of the sentence.

## Object Identification

See [object mapping and identification](#) for more details.

## Release Notes

### Changelog for the Desktop App

ownCloud provides a full changelog with a summary and details for each release of the Desktop App. Click the following link to access it at [GitHub](#).