



# GUIDE TO USE RESILIO SYNC



Updated 26 August 2022.

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## What article is this?

This article offers an in-depth look at Resilio Sync, a file-sharing application utilized within our network. It operates as a peer-to-peer networking tool, enabling users to share files stored on their local devices. The software allows for customizable file permissions, granting peers either read-only access or both read and write privileges to your documents.

## Why do we need it?

Resilio plays a pivotal role in Ubinodes' operation, embodying its ethos of decentralization, security, and productivity. Prioritizing security, Resilio employs various network protocols for diverse tasks. Whether you're a client or a node at Ubinodes, expect regular interactions with Resilio. Familiarizing yourself with its features and functionalities is highly recommended for effective daily use.

## TL; DR.

Resilio Sync is a peer-to-peer networking tool, creating a network of connected devices for resource sharing. Its wide range of functions supports, for instance, a small development team to seamlessly share files during collaborative projects. The user-friendly interface lets you work on your computer, organizing files in folders just as if working solo.

Meanwhile, the content of these folders is quietly replicated across all peers, reducing your workload by eliminating the need for manual content sharing and ensuring all team members are consistently up-to-date.

# Table of Contents.

Updated 26 August 2022.....	2
What article is this? .....	2
Why do we need it?.....	2
TL; DR. ....	2
<b>Table of Contents.</b> .....	3
<b>Part 1 : Review.</b> .....	4
<b>01.1 Company.</b> .....	<b>Error! Bookmark not defined.</b>
<b>01.2 Application.</b> .....	<b>Error! Bookmark not defined.</b>
<b>01.3 Security.</b> .....	<b>Error! Bookmark not defined.</b>
<b>01.4 Download.</b> .....	<b>Error! Bookmark not defined.</b>
<b>01.5 License.</b> .....	<b>Error! Bookmark not defined.</b>
<b>01.6 Support.</b> .....	<b>Error! Bookmark not defined.</b>
<b>Part 2 : Guide.</b> .....	8
<b>02.1 Preferences.</b> .....	8
<b>02.1.1 General.</b> .....	9
<b>02.1.2 Identity.</b> .....	10
<b>02.1.3 Advanced.</b> .....	11
<b>02.1.4 History.</b> .....	13
<b>02.2 Naming Folders.</b> .....	14
<b>02.1.2 Privacy.</b> .....	<b>Error! Bookmark not defined.</b>
<b>02.3 Adding Folders.</b> .....	<b>Error! Bookmark not defined.</b>
<b>02.3.1 Pros and Cons of Advanced folders versus encrypted folders.</b> .....	<b>Error! Bookmark not defined.</b>
<b>02.4 Sharing keys.</b> .....	16
<b>02.4.1 Folder States.</b> .....	<b>Error! Bookmark not defined.</b>
<b>02.5 Updating Files in Folders.</b> .....	19
<b>02.6 Removing a Folder.</b> .....	<b>Error! Bookmark not defined.</b>
<b>02.7 Mobile Device.</b> .....	21
<b>Part 3 : Research.</b> .....	25
<b>03.1 Protocols.</b> .....	<b>Error! Bookmark not defined.</b>

## Part 1: Review.



# Part 1: Review.

## 1.1 About Resilio

Resilio, headquartered in San Francisco, California, is a key application employed by Ubinodes for decentralized operations. Founded in 2016 by technical experts from BitTorrent, Resilio has become a trusted resource for both individual users and enterprise clients, offering secure and cohesive file transfer solutions across IP networks.

## 1.2 Application

Resilio Sync excels in rapidly synchronizing data across a network. Modifications to files on Resilio are instantly replicated on all connected devices. Its user interface is straightforward, facilitating secure file sharing without restrictions on size or data usage. This allows nodes and clients to exchange files in real-time, peer-to-peer, bypassing the need for cloud uploads.

Using BitTorrent's peer-to-peer technology, Resilio Sync identifies the fastest data transmission routes across devices. It supports file synchronization both locally and over the internet, adhering to the BitTorrent protocol. This capability enables decentralized organizations like Ubinodes to manage their file-based data across various devices, locations, networks, IT infrastructures, and cloud providers, integrating dispersed data and devices.

A significant advantage of Resilio Sync is its continuous network availability. Even if a computer is off and a folder is inaccessible, work continuity is maintained, enhancing employee uptime and productivity. Ubinodes prefers Resilio over other cloud services, largely due to the cost-efficiency in maintaining cloud infrastructure.

## 1.3 Security

Resilio's robust security management features, including SHA-256 hashing and TCP/UDP forwarding protocols, make it an ideal file-sharing solution for Ubinodes. This aligns well with Ubinodes' emphasis on security, particularly in the face of potential breaches common in borderless and transnational organizations.


Ubinodes prioritizes security over convenience, a principle mirrored in Resilio's design. The software consistently places security first, utilizing various network protocols for specific tasks. Resilio Sync, as a key part of our suite of encrypted applications, enables nodes to securely share files with peers and clients remotely. This ensures that project security is maintained and sensitive data is transmitted through secure channels, crucial for the integrity and success of operations at Ubinodes.

## 1.4 Download

Resilio Sync is available for download on multiple platforms including Windows, Mac, Linux, and FreeBSD. It offers both mobile and desktop app versions, ensuring seamless file synchronization across all your devices. You can download the Resilio Sync Home version [here](#).

Page 5 of 28, Revised 26<sup>th</sup> August 2022.

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Resilio must be installed on the C: drive, but the folder you use for syncing can be located anywhere, including removable devices. Additionally, you have the option to upgrade to the Home Pro license directly from the user interface at a later time.

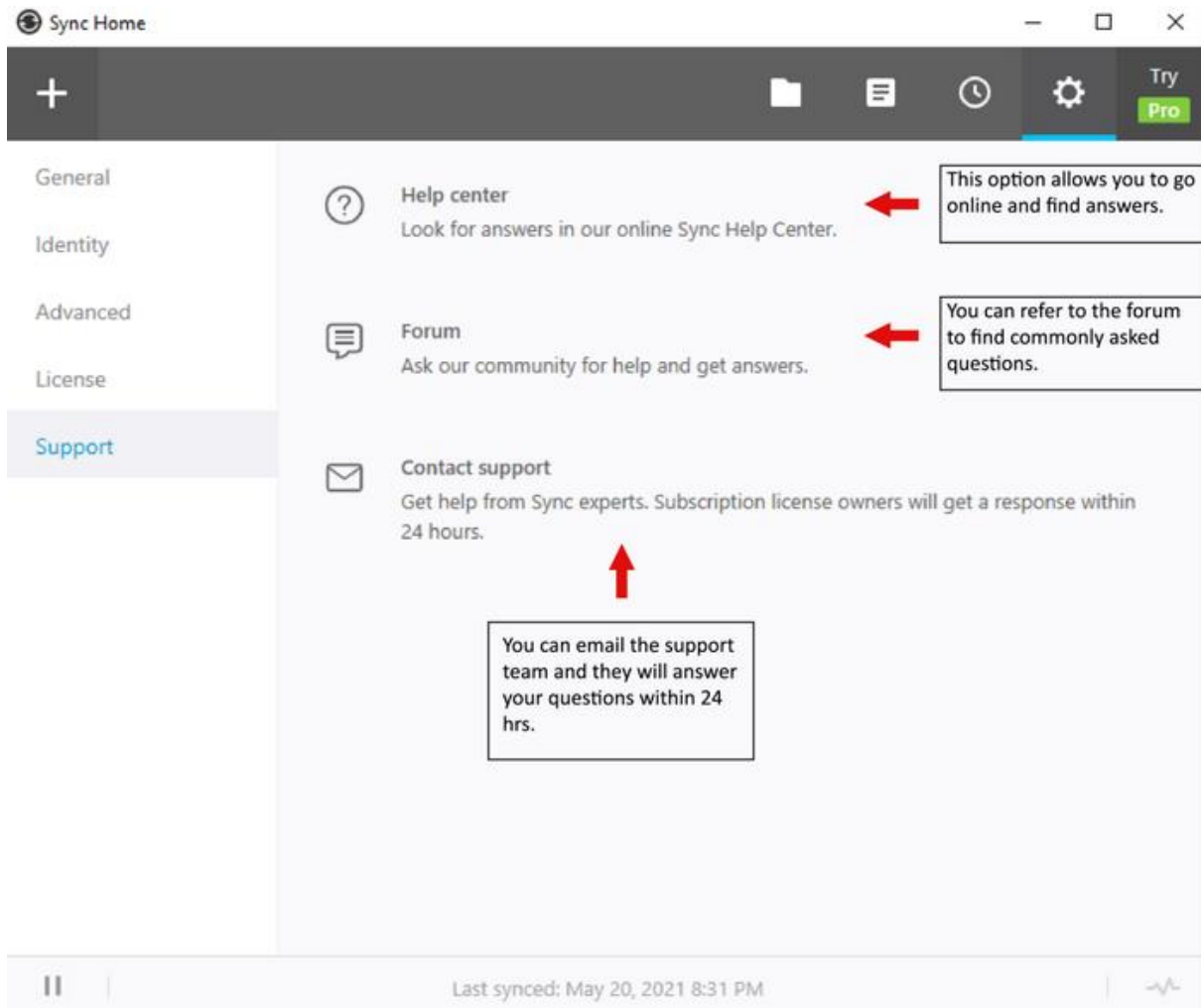
## 1.5 License

The key differences between a Pro license and a standard license in Resilio Sync are as follows:

1. **Folder Types:** With the standard Sync Home, users can only create standard folders. In contrast, Sync Home Pro allows for both standard and advanced folders. Standard folders restrict user control over access permissions and sharing capabilities. Advanced folders, available in the Pro version, give users the flexibility to change or revoke access permissions at any time.
  - For example, altering a folder's permission from 'Read Only' to 'Read & Write' doesn't require removing and re-adding the folder; it can be done easily with a single button in Pro, maintaining the existing connection. This feature makes advanced folders more suitable for collaborative work.
2. **Device Identity Management:** The Pro license offers a streamlined identity management system. Unlike the standard version, where an identity must be created for each device, the Pro version allows users to link all their devices under a single identity.
  - This integration means that any folder added on one device, like a desktop, will automatically be available on all linked devices, such as a mobile phone or laptop. This feature enhances ease of access and synchronization across multiple devices.

## 1.6 Support

In the user interface of Resilio Sync, you have access to various support channels for assistance and guidance. The application offers comprehensive support options to help users navigate any issues they encounter, ensuring a smooth and efficient file-sharing experience.



This section offers multiple support resources for users. It features a **'Help Center'** option, directing users to Resilio's online Sync Help Center for answers to common queries. Additionally, there's a **'Forum'** option, where users can interact with other Resilio users, ask questions, and seek assistance. Lastly, the **'Contact Support'** option connects users with Sync experts for specialized help.

## Part 2: Guide





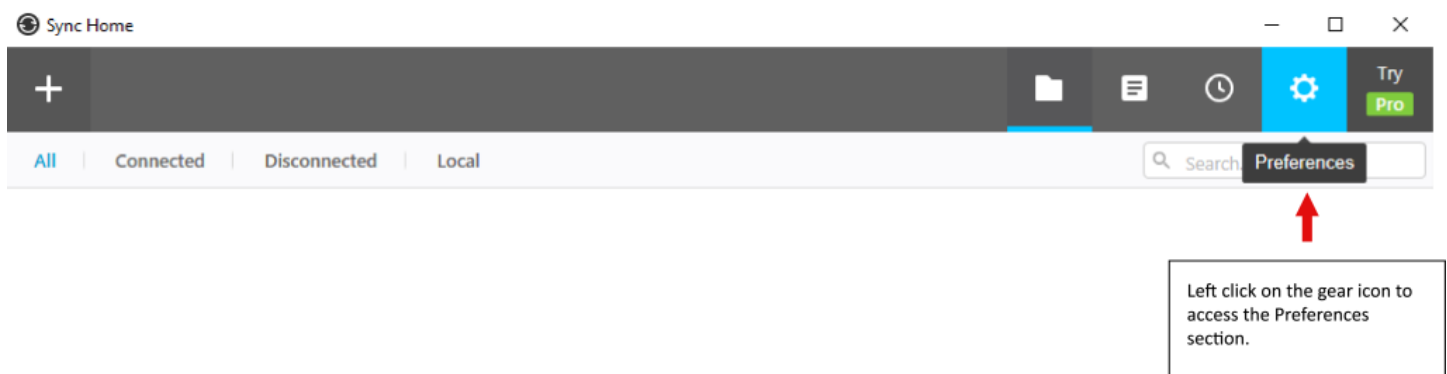
## Part 2: Guide.

### 2.1 Preferences

On the homepage of Resilio Sync, you can find the settings button positioned at the top right of the page. Within this section, you will encounter five distinct preference options:

1. General
2. Identity
3. Advanced
4. License
5. Support

Screenshot: Settings.



### Device Name

By default, Resilio Sync automatically assigns your computer's name as the device name, but it's important to customize this for clarity among peers. The device name should be recognizable and relevant to your peers, not just to you.

For Ubinodes members, it's expected to change this name to your Ubinodes ID. This helps other nodes and colleagues identify when you are online and avoids simultaneous file access, which can lead to synchronization conflicts and potential data loss. The last file closed could overwrite any work done by teammates.

For instance:

- **Good Name:** "Node013\_Desktop" (or Android, Macbook, etc.). Including the type of device is useful; it indicates whether you are likely editing a document (as on a computer) or not (as on a mobile device).
- **Bad Name:** Simply "Windows". This doesn't clarify who the user is or the type of device being used.

## Start Up

After updating your device name in Resilio Sync, it's advisable to uncheck the option that says "Start Resilio Sync on startup." This step is particularly important if you're using a USB drive for data storage, separate from the device's operating system. Ensuring that your USB drive is properly mounted before Resilio Sync launches will help maintain data synchronization and prevent potential issues.

## Default Folder Location

You have the option to select a default folder location for your files in Resilio Sync. However, it is recommended to keep the option "Ask where to save each file before downloading" checked.

Given the specific way folders are classified in your setup, you'll likely need to assign different locations for each new folder as it's created. This setting ensures you can choose the appropriate destination for each file, maintaining your organization's classification system.

Screenshot: General.

The screenshot shows the 'General' settings page of the Resilio Sync application. The window title is 'Sync Home'. On the left, there is a navigation menu with options: General, Identity, Advanced, License, and Support. The main content area is divided into sections: Device name, Updates, Startup, Default folder location, File download location, and Language. Annotations with red arrows point to specific elements: a box around the device name field with the text 'The device name that your peers will see when you share files.'; a box around the 'Change...' button for the default folder location with the text 'Click change to select a default folder location.'; a box around the 'Change...' button for the file download location with the text 'Click change to select a file download location.'; and a box around the version information at the bottom with the text 'Your Sync version and Date /Time'. The status bar at the bottom shows 'Last synced: May 20, 2021 1:43 PM'.

Sync Home

+

General

Identity

Advanced

License

Support

Device name: [redacted] [Change...](#) The device name that your peers will see when you share files.

Updates

Always check for updates to this version | [Check now](#)

Startup

Start Resilio Sync on startup

Show notifications

Default folder location

C:\Users\[redacted]\Resilio Sync [Change...](#) Click change to select a default folder location.

File download location

C:\Users\[redacted]\Downloads [Change...](#) Click change to select a file download location.

Ask where to save each file before downloading

Language: System default

Sync

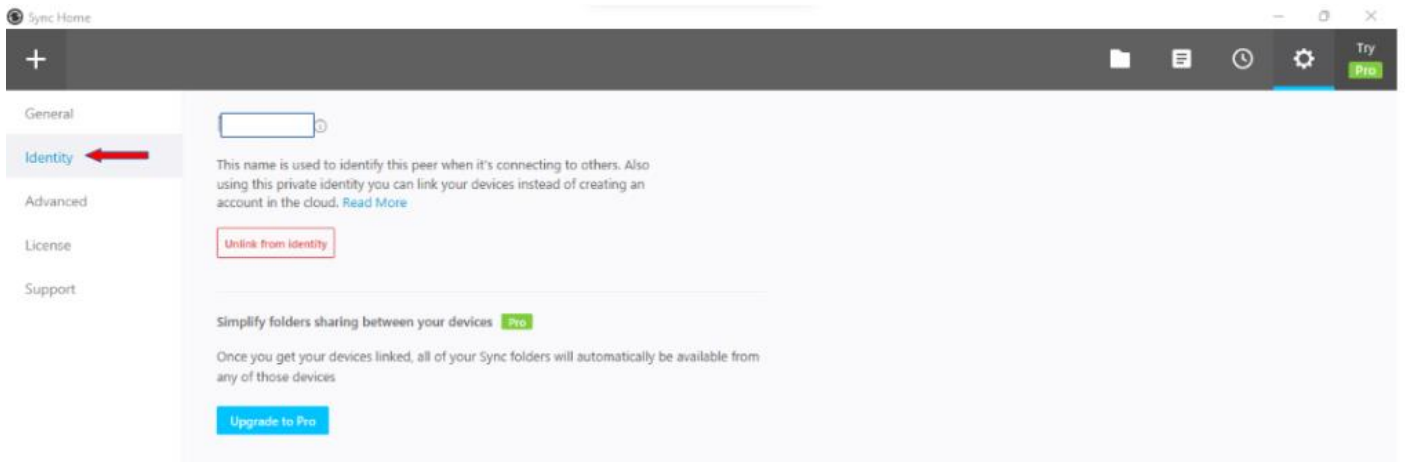
Version: 2.7.2 (1375) - © 2020 Resilio, Inc. Your Sync version and Date /Time

|| Last synced: May 20, 2021 1:43 PM

## Identity.

The identity of your Resilio account is linked to the name you set. This is particularly significant for Pro license holders, as it enables you to unify all your devices under a single license. Once linked, all your folders will be visible in your user interface. This allows you to selectively choose which folders to synchronize on each device, giving you control over the synchronization process on a device-by-device basis.

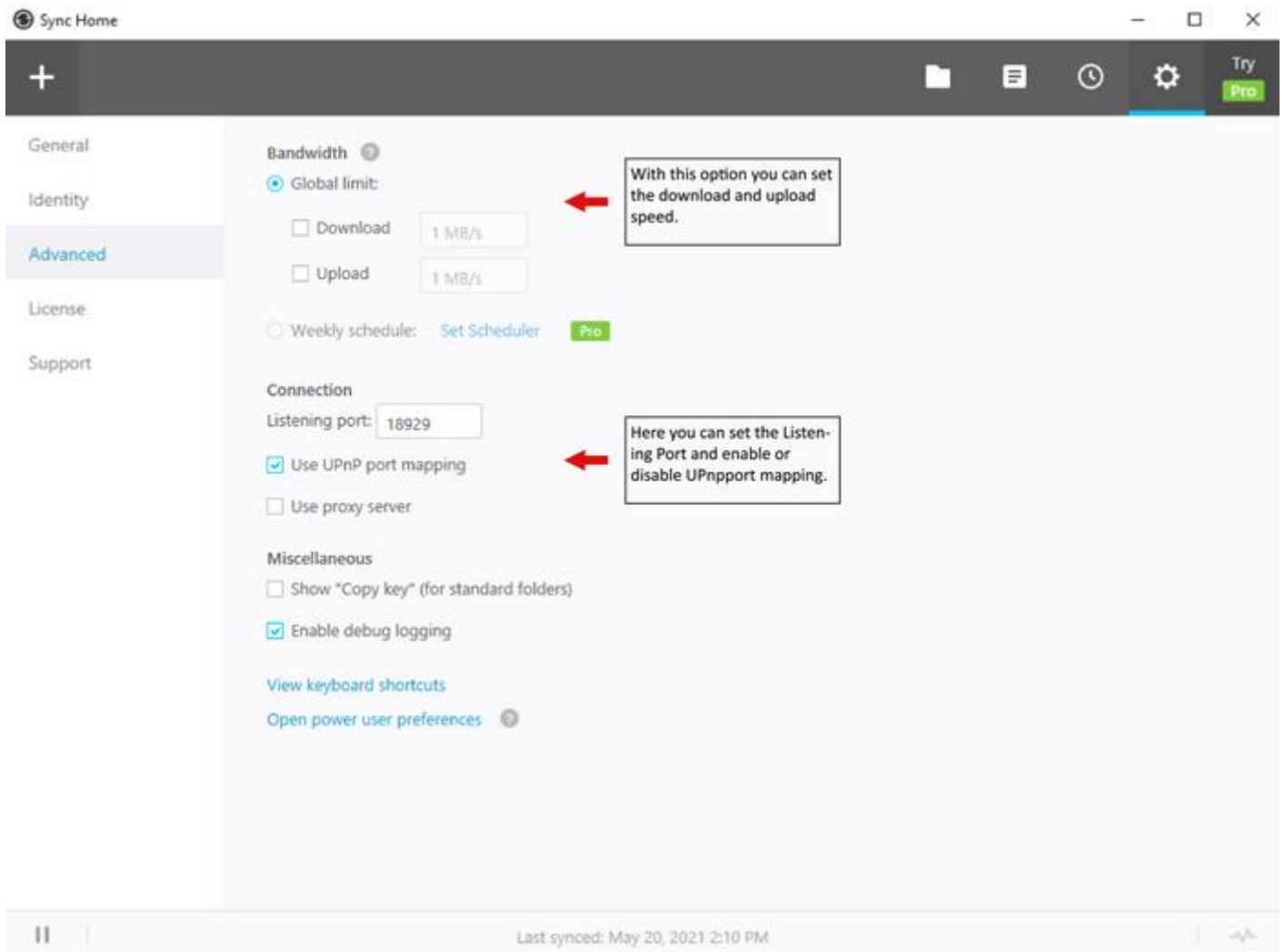
Screenshot: Identity.



## Advanced.

Within the Advanced tab in Resilio Sync, users have the ability to adjust settings such as the sync's bandwidth, connection port, and debug logging. However, unless you have specific knowledge or requirements, it's generally not necessary to modify these settings. Resilio is designed to perform efficiently with its default configuration, so most users find that it works well right out of the box.

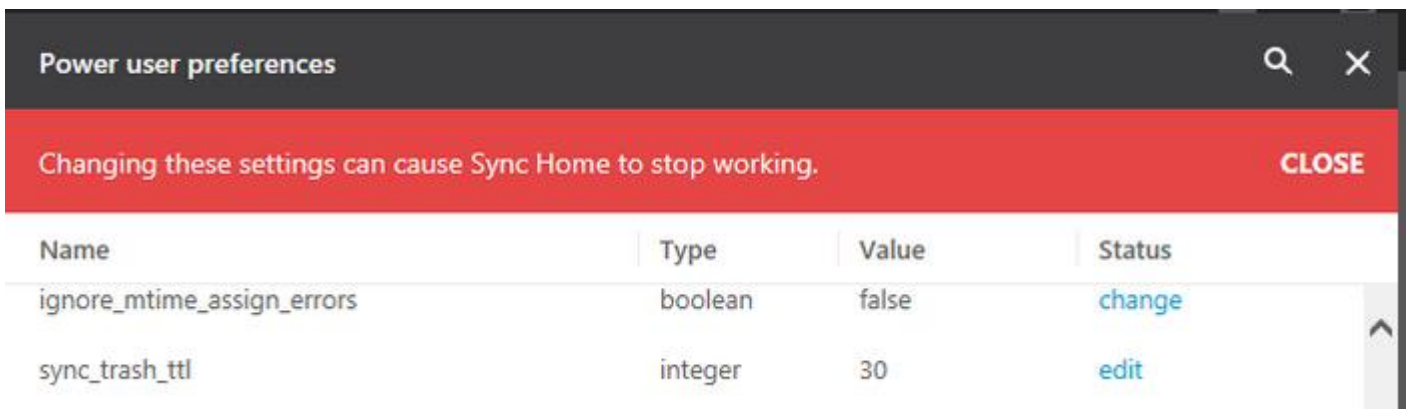
Screenshot: Advanced.



## Trash.

In Resilio Sync's Advanced section, navigate to the "Open power user preferences" option at the bottom. Scroll down until you locate the "sync\_trash\_ttl" setting. Click "edit" and adjust the time from the default 30 days to just 1 day.

This setting controls how long data remains in the ".sync/Archive" sub-folder, essentially Resilio's version of a recycle bin, where deleted files are stored temporarily. By changing this duration from 30 days to 1 day, you actively reduce your digital footprint, ensuring files in your "sync/Archive" sub-folder are automatically cleared after just one day.



Name	Type	Value	Status
ignore_mtime_assign_errors	boolean	false	<a href="#">change</a>
sync_trash_ttl	integer	30	<a href="#">edit</a>

Screenshot: Trash.

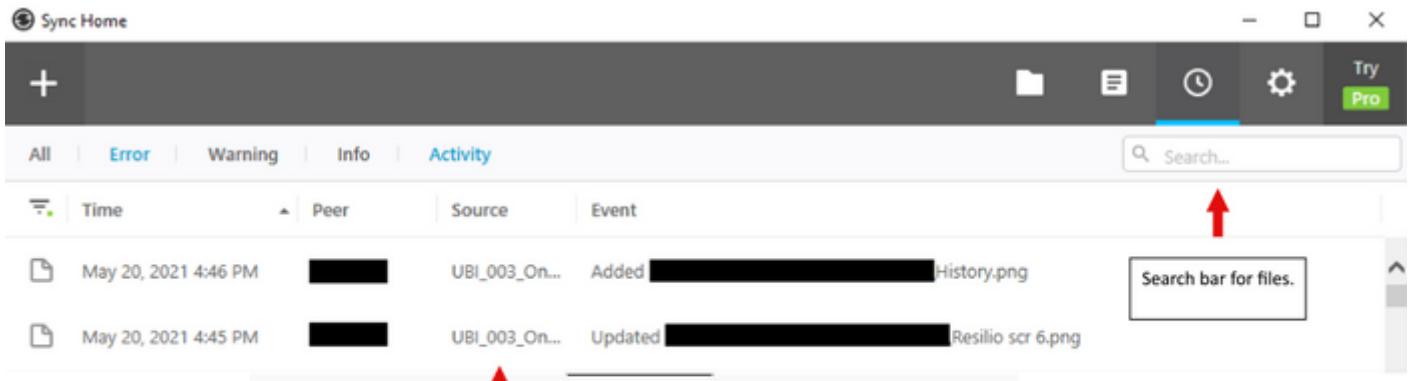
## History.

Users can conveniently search for uploads in Resilio Sync using criteria like errors, warnings, info, and activity. This feature is particularly helpful in ensuring that teammates have received the most recent version of your work or any newly added files, eliminating the need to confirm via messaging apps or email.

When you select a search criterion, the interface displays metadata about previously sent files. Starting from the left, you'll see a timestamp indicating the date and time of the upload. Following this is the peer who shared the file or folder. Next, you'll find the source folder and the event, which includes the file path. If you're looking for a specific file, you can use the search bar located at the top right of the page.

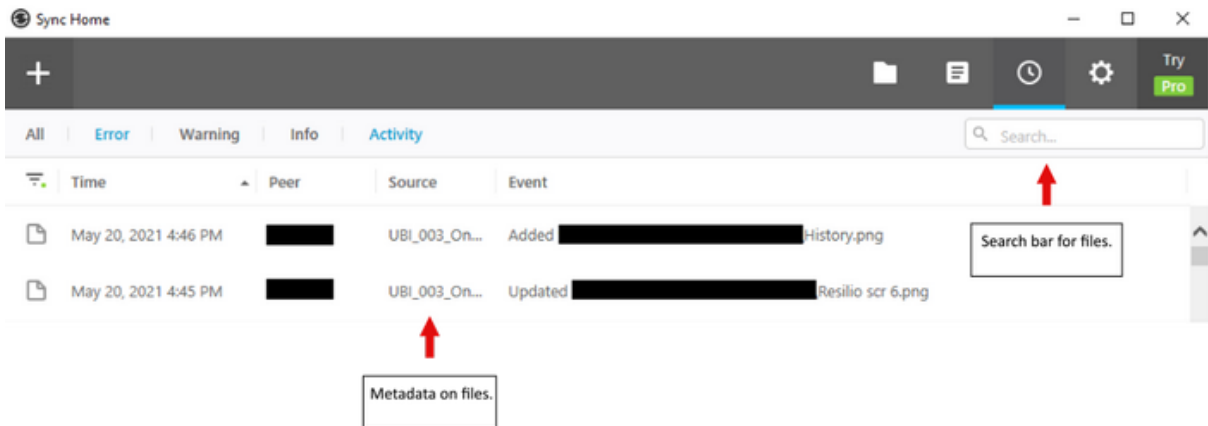
Additionally, at the bottom left of the page, there's an option to pause syncing. This is useful because Resilio continuously updates, allowing you to see when a file is in the process of syncing.

Screenshot: History Tab.



Metadata on files.

The history button is where you are going to find previously synced files.



Screenshot: History View.

## 2.2 Naming Folders

Before adding a folder to Resilio Sync, it must first exist on your computer. Here are the steps to follow:

1. **Create the Folder:** Firstly, create a new folder on your computer in the location appropriate for the data classification you are using.
2. **Name the Folder:** Give this folder a name that is meaningful for teamwork. The name should be clear and descriptive to ensure everyone on the team understands its contents and purpose.
3. **Add Content and Sync:** Once the folder is created and named, you can add the necessary content to it. After this, the folder is ready to be added to Resilio Sync.

In Ubinodes, it's important to prefix each folder name with "UBI" unless you are using Resilio for a different purpose. This practice helps to avoid confusion when handling files. For naming conventions, underscores (\_) and hyphens (-) are used, particularly because some nodes and clients may be using Linux. Underscores are utilized to connect individual characters that are part of the same information set. Hyphens, on the other hand, are used to separate different information groups.

Here's how this works in a folder name:

- **Numbering:** For instance, "UBI\_002\_Onboarding".
- **Confidentiality Level:** Such as, "Level\_1".
- **Purpose:** Like, "Node\_023".

The complete folder name would be "UBI\_002\_Onboarding-Level\_1-Node023". The underscore (\_) connects characters within a group, while the hyphen (-) separates different information groups.

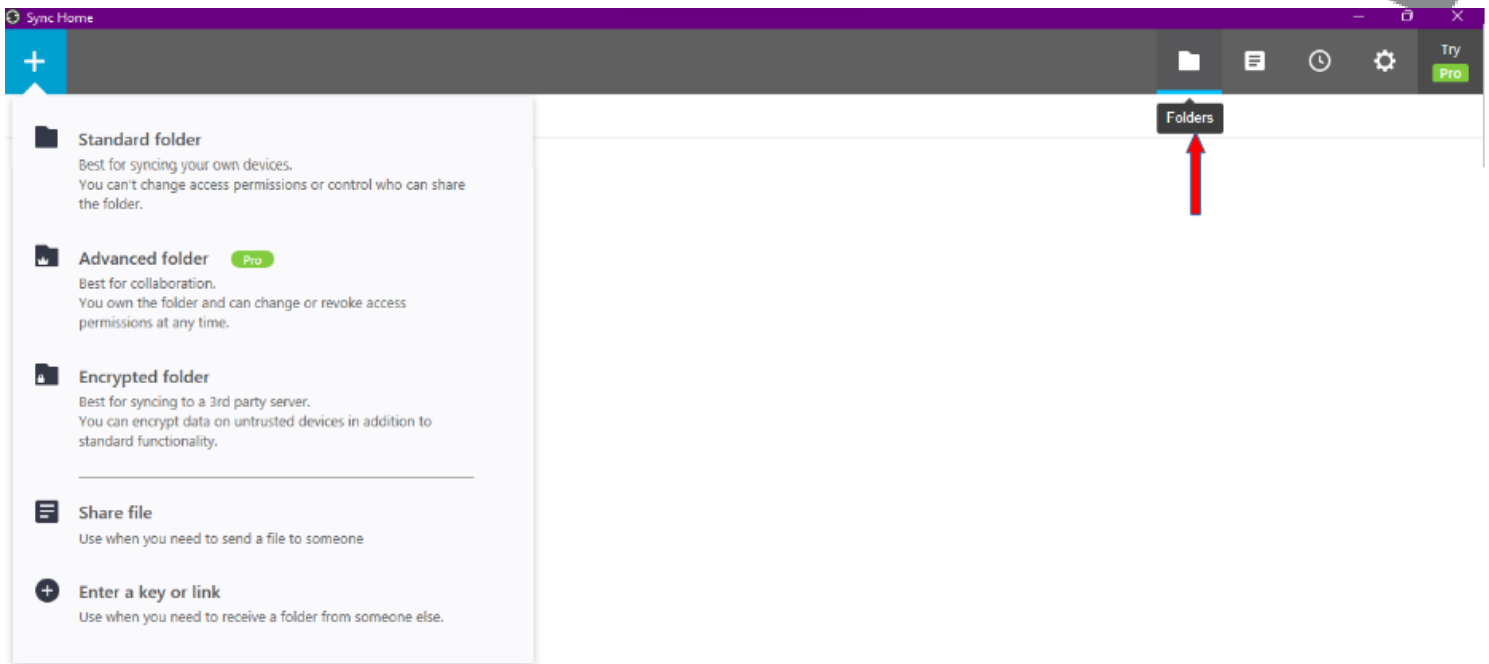
## Privacy

When your Resilio Sync application connects to peers, it retrieves their IP addresses from a server based in Resilio's offices in the United States. During this process, the name of your folder is transmitted in clear text. Therefore, it's crucial to be mindful of how you name your folders. Inappropriate or sensitive names, such as "recipe for cocaine," should be avoided for security and privacy reasons. It's important to note that while the folder names are transmitted as is, the content within these folders is encrypted before being sent to your peers. This ensures the confidentiality and security of the actual data being shared.

## 2.3 Adding Folders

Resilio Sync offers secure and straightforward file sharing with no usage or capacity limitations. Its peer-to-peer sharing mechanism ensures instant file transfers, eliminating the need for cloud uploads. The software provides multiple methods for adding folders to your Resilio account, making them accessible from any of your local machines.

To share folders within Resilio, click on the plus icon located in the top left corner of the application. After clicking this icon, you'll be presented with three folder type options: Standard folder, Advanced folder, and Encrypted folder. Each type caters to different sharing and security needs, allowing you to choose the one best suited for your specific requirements.



Screenshot: Folders.

**Standard Folders:** Ideal for syncing folders across your personal devices, this option allows users to both grant and manage permissions for a folder. It's a straightforward choice for basic file sharing and synchronization needs.

**Advanced Folders:** Suitable for collaborative work involving multiple people. As the owner of an Advanced Folder, you have the flexibility to modify and revoke access permissions whenever necessary. This type of folder is exclusive to the Pro version of Resilio, offering enhanced control for managing collaborative projects.

**Encrypted Folders:** Optimal for syncing to third-party servers where data security is a concern. In addition to the standard functionality, this folder type enables you to encrypt data on trusted devices, ensuring that your sensitive information is not transmitted in plain text. This feature is particularly important when the integrity and confidentiality of the data are paramount.

### **Pros and Cons of Advanced Folders versus Encrypted Folders:**

*Advanced Folders:*

#### **Pros:**

- New peers must be approved, so the notification will help detect MITM attacks.

#### **Cons:**

- Can't use encrypted folders to use untrusted servers as relay.



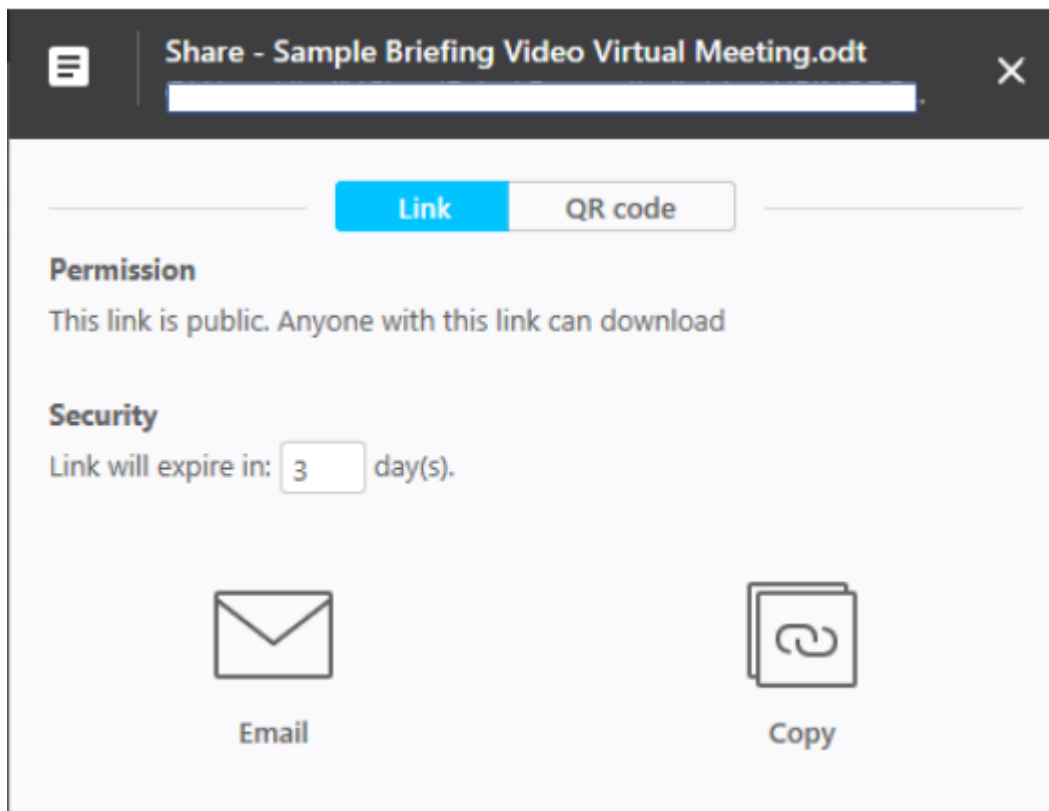
- To give "owner" rights, the peer must have a paid "pro" license.

*Encrypted Folders:*

**Pros:**

- Can use untrusted server as 24/7 running relay.
- Anyone with the read key can receive the files; other peers won't get any notification.

## 2.4 Sharing keys.




Screenshot: Sharing.

### **Shared Links and QR Codes:**

Nodes and clients in Resilio Sync can set expiration times for shared links, as illustrated in the figure. After selecting a time frame, nodes can either automatically email the link to their files or manually copy and paste it into a document, such as a Word file, or onto a storage device like a flash drive.

It's vital to remember that Resilio Sync does not utilize cloud storage for data transfer. Therefore, all devices intended to use the link must have Resilio Sync installed and actively running.



Besides sharing folders via a link, nodes and clients can generate a QR code for scanning by a phone or any QR scanner. Similar to systems like Bitlocker and Wickr, Resilio employs keys for folder sharing. There are distinct keys for Read-Only and Read & Write permissions, allowing precise control over access levels.

When sharing a folder with someone outside your account, you can grant them either read-only or read-write access. This system maintains security as any file sharing must be authorized by you. Even if a shared code is distributed online, access remains restricted to those you have explicitly approved, ensuring that your files remain secure and accessible only to intended recipients.

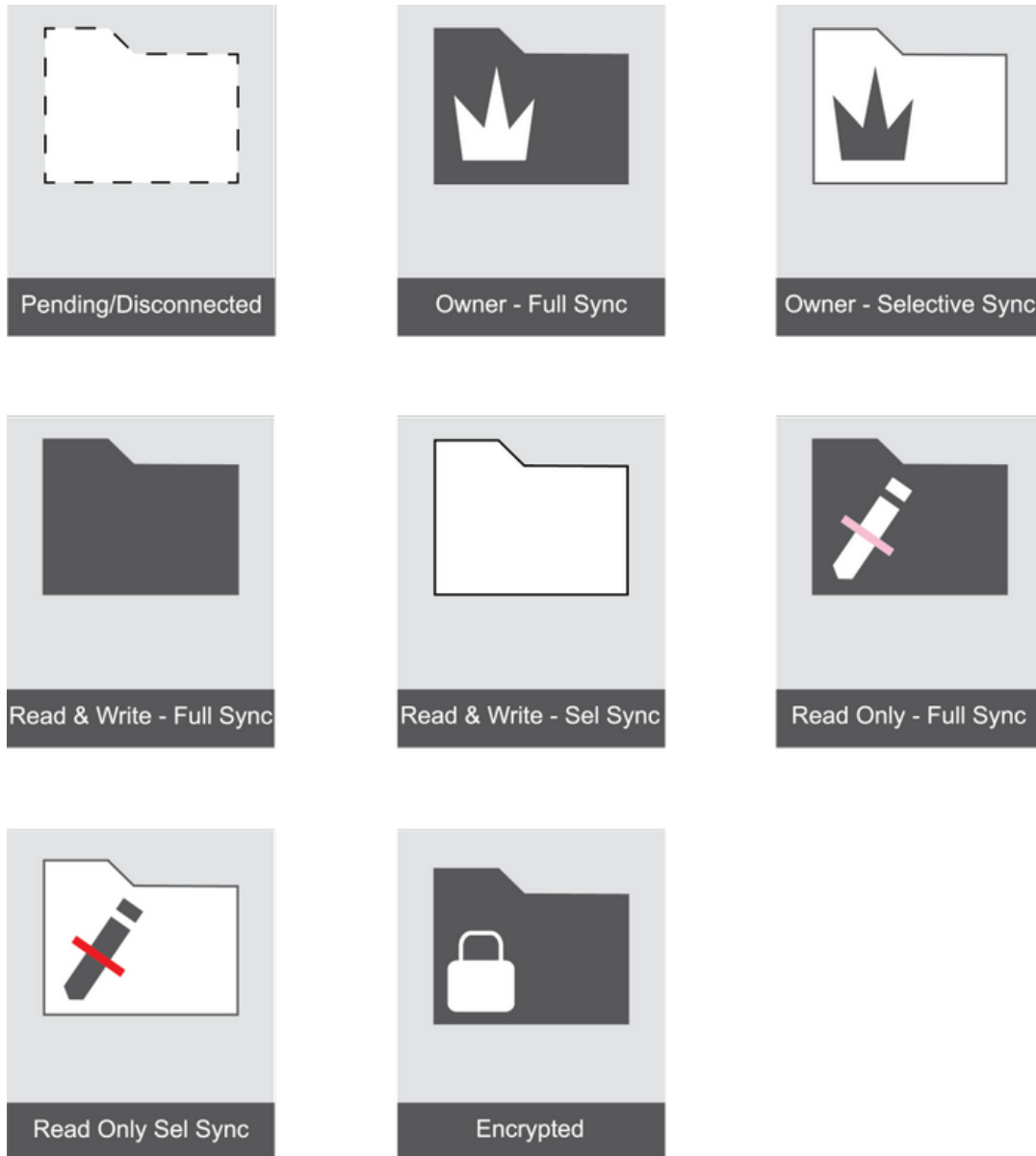
### **Folder States:**

Folder States in Resilio Sync are designed to manage how folders and their contents are accessed and synchronized across devices. Understanding these states is crucial for effective file management:

1. **Pending State:** This state occurs when a folder requires approval from the owner. If you have already been approved by the owner, this state won't activate. Once approved, the folder connects to the online storage device. If you disconnect a pending folder, it will disconnect from all linked devices.
2. **Selective Sync:** In this mode, a folder uses minimal hard drive space. Files within a selectively synced folder are replaced by placeholder files. When a placeholder file is double-clicked, Resilio fetches the full file from the source device. This feature is designed to conserve hard drive space.
3. **Full Sync:** This is when all files in a folder are fully synchronized across all devices. The process happens automatically and overrides selective sync, ensuring that all devices have the same files in real-time.
4. **Read-Only:** Folders set to Read-Only prevent users from making changes, removing, or deleting contents. Local settings might allow changes to your local copy of these files, but such modifications prevent updates on the Read-Only file from being received. The crown symbol indicates ownership, and as the owner, you can grant peers access.
5. **Encrypted:** This state is ideal for backup in untrusted environments, like when adding a folder to a Virtual Private Server (VPS). It helps prevent unauthorized persons from accessing your data.

Each folder state in Resilio Sync offers different levels of access and synchronization, allowing you to tailor the functionality to your specific needs and security requirements.

Screenshot: Folder State.



## 2.5 Updating Files in Folders.

When updating files on Resilio, especially files created and shared by other nodes or clients, the name of the files should not be changed as it can cause confusion between other nodes and clients connected to the file.

If anything must be changed, it should be the date which would usually be the first thing on the name of the file. That way, nodes and clients can be informed if a file is freshly updated or old.

Another thing to be careful of when updating files or folders are duplicating. Duplicating files or folders that are synced with other nodes or clients can cause discomposure. It is important to understand that folders are created for specific tasks and once the task in question is completed, folders should be permanently deleted so as to not be recovered. Hence, nodes or clients should never make duplicates or backups. Not only does it confuse other nodes and clients, but, more importantly, it creates security breaches.

When working on a shared document, do not save it under a new name, like "xxx updated". This would just add to the confusion. Realize that your fellow workmates are working on other projects and are dealing with dozens of files every day.

Before opening a file, you are expected to ensure that no one else is already on it. Resilio sync doesn't allow working simultaneously on a file, so if two people have opened the same file at the same time, the last one to close it will overwrite the previous version, meaning that one person will lose its work.

You can use chat apps like Wickr or simply see in Resilio if you're the only one online. Through chat apps, you can let others know when you have made changes to a file.

Lastly, when working in Resilio, it is important to make sure that you are connected with a Relay to ensure that your updates are being broadcast to other nodes when they are online. You can find out if you are connected to a relay on Resilio by clicking on the "peers online" tab where folders are located.

Once there, you can find which relays are online or offline at that moment. Make sure you're online and connected to a 24/7 ResilioRelay peer to make sure your updates will broadcast to other peers. While working on a file, once you close it, it will synchronize, provided you are connected to the internet. We have servers called "Resilio Relay" running constantly (24/7).

Your file syncs with them, once other peers switch on their PCs and start Resilio, the file would update from a central server "Resilio Relay" or any other node that is up to date. You get a notification that Resilio is syncing and updating its internal database, this can be found in the hidden .sync folder.

In a situation where you force a shutdown of PC, this process may not complete and you'd get a corrupt database error from the app. In a situation where this error occurs, there's no other option than to recreate the folder from scratch.

## 2.6 Removing a Folder:

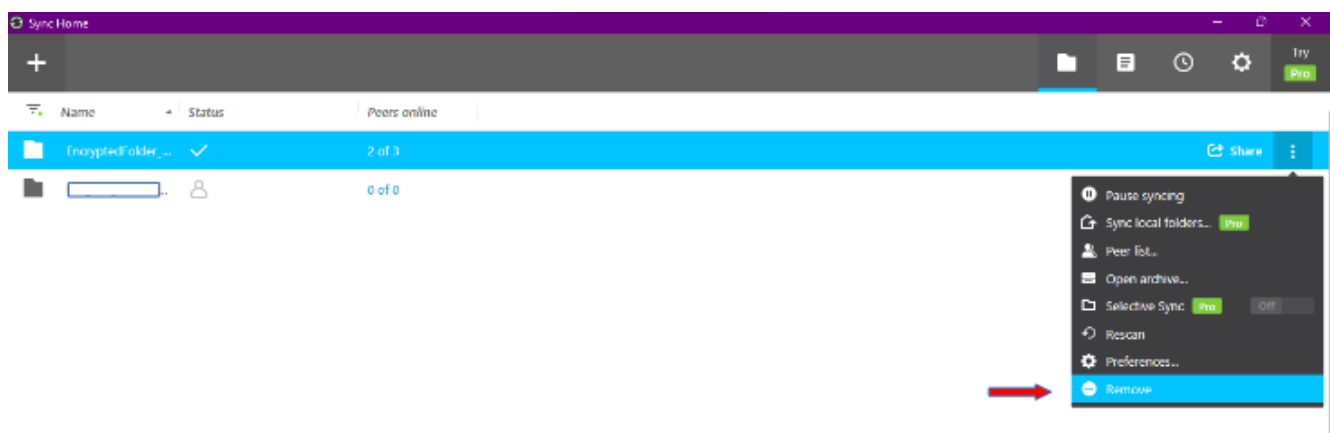
To remove a folder from Resilio Sync, follow these steps:

Navigate to the folder icon on the navigation bar and left-click it.

Find the folder you wish to remove. Once located, hover over the sub-menu icon next to it and left-click to reveal the dropdown menu.

Select the "remove" option. This action will delete the folder from Resilio Sync, but it will not affect the folder on your local machine.

It's important to delete obsolete files to ensure that the content of your folders remains intuitive and up-to-date. Regularly managing and removing unnecessary files helps maintain an organized and efficient syncing environment.



Screenshot: Removing.

## 2.7 Mobile Device:

In this guide, we'll explore the Sync settings available on major mobile devices, including Android and iOS. To begin using the mobile version of Resilio Sync, follow these steps:

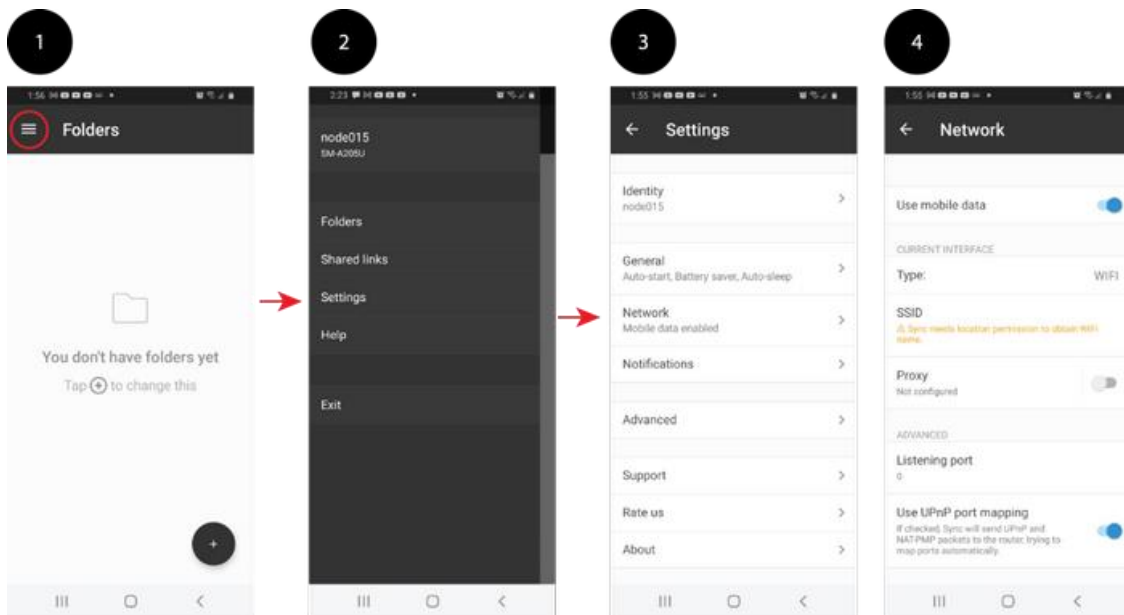
1. **Download the App:** Go to the app store on your phone (Google Play Store for Android or Apple App Store for iOS) and download the Resilio Sync app.
2. **Create and Link a Test Folder:** To familiarize yourself with the mobile application and its various settings, we'll start by creating and linking a test folder.


a. **Create a New Folder:** Tap the "+" button to create a new folder. You'll then choose the type of folder you want (Standard, Advanced, or Encrypted).

b. **Link to a Computer:** To link this folder to a computer, use the key provided in the folder's details window. For this demonstration, we're creating a new folder, but you can also link an existing folder using a QR code or a key.

By following these steps, you can effectively set up and manage folders in Resilio Sync on your mobile device, ensuring seamless file synchronization between your phone and other devices.

Screenshot: Mobile Device Folder.

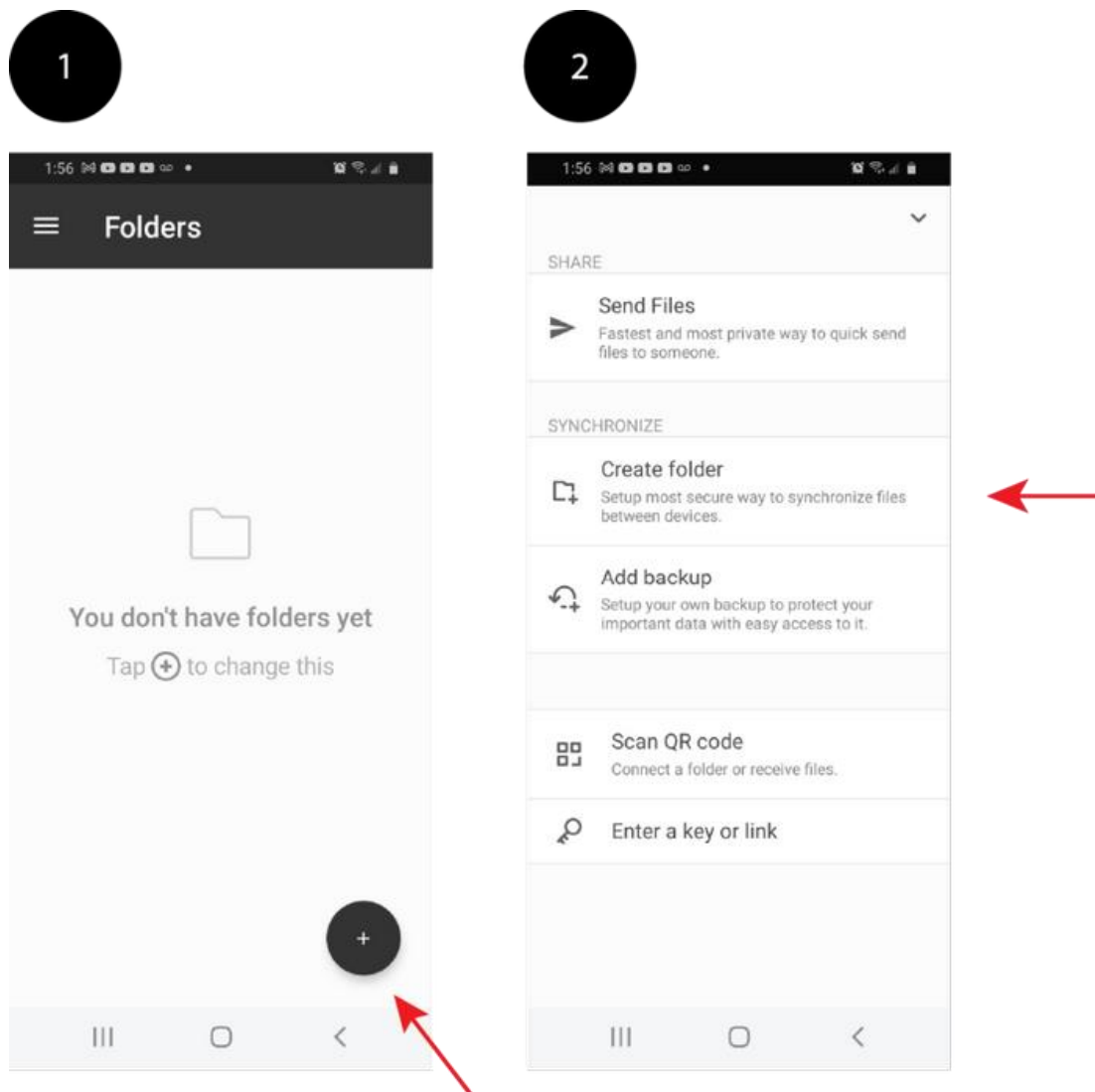




Once you've created a folder in the Resilio Sync app on your mobile device, you can start utilizing its features:

1. **Creating and Sharing Sub-Folders:** You can create sub-folders within the main folder and share files directly from your phone with peers.
2. **Managing Rights and Permissions:** The mobile app allows you to manage connected folder rights and permissions, giving you control over who can access and edit the contents.
3. **Mobile-Specific Features:** The mobile version includes almost all the options available on the desktop version, with the addition of an "Add Backup" feature. This unique mobile function enables you to backup files and folders from your mobile device to a desktop.
4. **Sub-Menu Options:** The sub-menu offers access to view connected devices, settings, and shared links. Among these, the settings tab is particularly crucial.
5. **Settings Tab Functions:**
  - **Set Permissions:** You can set permissions for folders, determining who can view or edit the contents.
  - **Pause and Disconnect Folders:** This function allows you to temporarily halt synchronization or completely disconnect folders as needed.
  - **Network Settings:** The settings tab also provides options to tweak the application's network settings. This includes adding hosts, using a relay server, or searching for a Local Area Network (LAN).

These features make the mobile version of Resilio Sync a powerful tool for managing file synchronization and sharing, offering a high degree of flexibility and control, similar to its desktop counterpart.



Screenshot: Mobile Device Settings.



## Part 3: Research.



## Part 3: Research.

### 3.1 Protocols

Resilio Sync employs a variety of ports and protocols to establish connections between peers, predominantly using TCP and UDP for communications outside the network. The process involves several key steps:

1. **Route Learning:** Initially, Sync needs to determine the route to the relay servers that facilitate connections between peers and clients. An example of this is Resilio sending a SYN request from a local machine to the service provider's gateway server.
2. **Route Information Saving:** After determining the path to the relay server, this information is downloaded and stored in the sync.conf file.
3. **Listening Port:** The listening port used by Sync is indicated in the settings section of the application. This port is subject to the user's firewall settings or port forwarding configurations. For instance, in the given example, the application uses TCP source port 51262 to communicate with the relay server.
4. **Network Coordination:** Resilio coordinates its networking to identify the most efficient route for data transfer. This ensures instant synchronization and keeps peers informed about the status of files.
5. **Security:** A critical aspect of Resilio Sync is its commitment to security. It encrypts packets sent over the network/Internet using AES256 PKI-based encryption over TLS 1.2, making it a secure choice for file transfers.
6. **Comparative Advantage:** When compared to other file-sharing programs like FileZilla and WinSCP, Resilio stands out, particularly in addressing security concerns associated with FTP. Its robust security measures ensure that files and connections are safeguarded against interception by threat actors, maintaining the integrity and confidentiality of data transfers.

## Screenshot: Protocols.

### TCP Packet

```
-----  
###[ Ethernet ]###  
  dst      = 15:5d:36:05:00:84  
  src      = 28:77:6e:ce:0a:20  
  type     = IPv4  
###[ IP ]###  
  version  = 4  
  ihl      = 5  
  tos      = 0x0  
  len      = 52  
  id       = 1012  
  flags    = DF  
  frag     = 0  
  ttl      = 128  
  proto    = tcp  
  chksum   = 0x246e  
  src      = 192.168.1.153  
  dst      = 45.132.226.156  
  \options \  
###[ TCP ]###  
  sport    = 51262  
  dport    = 5729  
  seq      = 4056050198  
  ack      = 0  
  dataofs  = 8  
  reserved = 0  
  flags    = S  
  window   = 64240  
  chksum   = 0x6744  
  urgptr   = 0  
  options  = [('MSS', 1460), ('NOP', None), ('WScale', 8), ('NOP', None), ('NOP', None), ('SAckOK', b'')]
```

## 3.2 Sources.

Resilio Sync. (n.d.). *Universal file delivery for data intensive environments: Resilio Connect*. Resilio File Sync Software | Unify, Control, and Accelerate Global Enterprise File Workflows. Retrieved from <https://www.resilio.com/>

Resilio Sync. (n.d.). *Universal file delivery for data intensive environments: Resilio Connect*. Learn how to get the most out of Resilio's powerful features. Retrieved from <https://www.resilio.com/tech/sync-tutorials-and-howto/>