



BitcoinAfter.Life

BAL PROTOCOL 1.0

USER MANUAL (revB)

Welcome to using BAL, the open-source plugin for Electrum Wallet, dedicated to managing bitcoin digital inheritance.

An open-source plugin is a software extension that adds functionality to an existing program, and whose source code is publicly available. This means that anyone can view, modify, and distribute the plugin code.

The plugin was designed for Electrum, the Gold standard of Bitcoin wallets.

It was not considered reasonable to proceed with the development of a new wallet or a fork of a wallet (a bifurcation of Electrum's code) so as not to put funds at risk. Instead, we thought it prudent to lean as a plugin on the most tested and therefore secure open-source Bitcoin wallet (ELECTRUM) trusting that in the future the plugin will be placed directly on Electrum by default.

The steps for installing the BAL plugin are very simple:

1. Install the latest version of Electrum (Bitcoin wallet).
2. Install the BAL plugin, (find the files on the Bitcoin-after.life site or links on the Bitcointalk forum), copying it to the Electrum plugins folder.
3. Activate the plugin from the Electrum menu (TOOL --> PLUGIN --> BAL).
4. Restart Electrum.

Now you are ready to leave your digital legacy to your heirs !

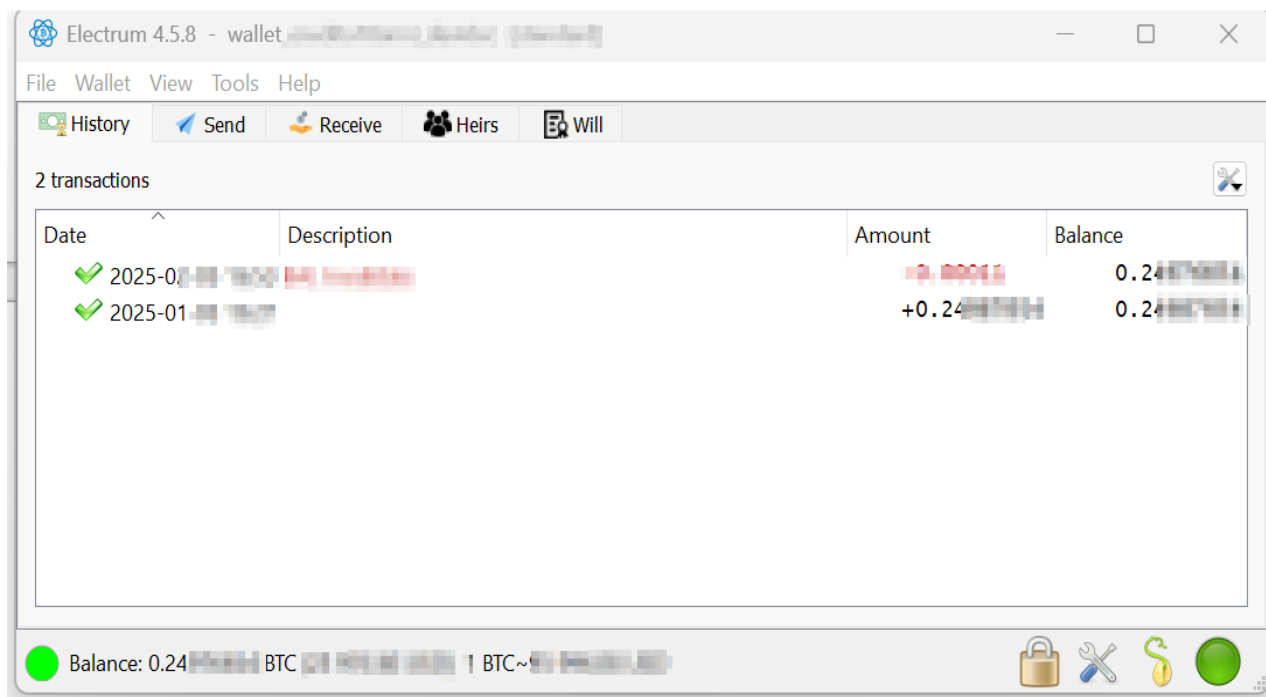


Fig.1

Here is the FIGURE 1 screen that will appear to you after starting Electrum, with the BAL plugin installed

As you see there are now two new tabs (HEIRS and WILL) on the Electrum interface.

HEIRS = The screen of heirs to whom you want to leave your inheritance.

WILL = the screen that shows you the technical details of your inheritance:

- locktime
- creation time
- transaction fees for miners
- status
- heirs
- will executor with associates fees

NB : Inheritance with the BAL plugin can also be set on a Wallet that is still receiving incoming transactions not yet confirmed on the blockchain.

You can leave the default plugin parameters, they are more than fine for 99% of inheritance cases.

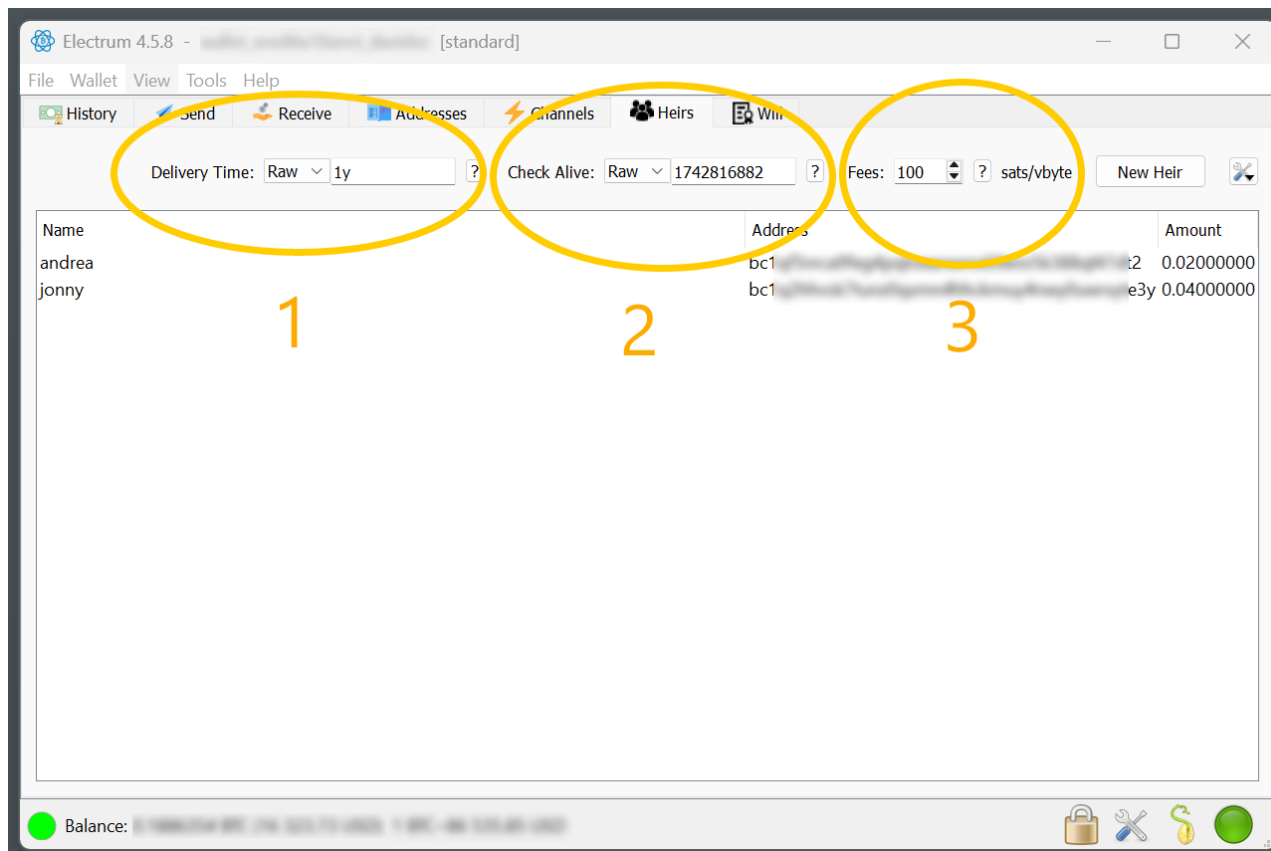


Fig 2

The parameters you see above on the HEIRS tab/window are: (Fig 2)

1- DELIVERY TIME (Locktime):

Indicates the date on which the inheritance of your Wallet on the blockchain will be transferred to the recipient.

(The inheritance date you can enter it either as Relative (example 1 year from today (RAW = 1y) , or as Precise Date. (Date)

if you choose Raw, you can insert various options based on suffix:

- **d**: number of days after current day(ex: 1d means tomorrow)
- **y**: number of years after current day(ex: 1y means one year from today)

* locktime can be anticipated to update will

2- CHECK ALIVE (Threshold): (i.e.: Check if you are still alive, and then postpone the inheritance)

this parameter* that can be set in relative (RAW) or absolute (DATE) value indicates the set time by which the inheritance will not be CHANGED by POSTPONING IT.

(*NB if you set it negative (i.e. back in time) it is as if it were not there. This can be useful for doing quick inheritance tests).

Example:

if you set the inheritance to one year from today, and in addition the CHECK ALIVE (threshold) parameter to 6 months, in 8 months if you open Electrum , the BAL plugging will ask you if you want to update the inheritance date .

Why does it do this?

Because it assumes that if you open the electrum wallet with the plug-in, you are still alive, and therefore estimate that you will still live a certain amount of time, so you probably want to postpone the inheritance, so as not to transfer it too soon, while you are still alive.

Let's take a practical example:

Today is January 1, 2025.

I set the inheritance for the date December 1, 2025 (11 months from now) and the Check-Alive (threshold) at 6 months (so June 1, 2025):

FUTURE CASE HISTORIES:

Case 1 - I no longer access the Electrum Wallet : Inheritance on December 1, 2025 will be transferred to the Heir (as Sent to Bitcoin Nodes by Will-Executors)

Case 2 - I access the wallet in 4 months (thus date earlier (lesser) than the set 6 months of the Check-Alive threshold (threshold); the inheritance will remain set for December 1, 2025.

Case 3 - I access the wallet in 7 months , thus greater than the 6 months set;
The plugin will ask me if I want to postpone the date of the inheritance , because it assumes that I am still alive, and so maybe I want to postpone the inheritance, not to transfer it while I am still alive.

3- Fees: denoted in Satoshi/vbytes.

This parameter indicates the Fees that go to the Miners, to have the transaction validated on the blockchain at the time of inheritance.

It is the classic fee/commission you pay every time you send bitcoin to another wallet.

We recommend leaving the default value set at 100 satoshi/vbyte, this way you will be sure that the inheritance will be accepted by the miners, even in the days when the blockchain is saturated and thus has high network costs.
Right now (January 2025) the fee is about \$25 USD for a wallet without too many UTXOs. A commission value that allows even on days of clogged blockchain, to be successfully placed on a blockchain.

IMPORTANT:

Sizing Inheritance Transaction Amounts .

Sizing Inheritance Transactions - (Automatic SIZING to 100% of the wallet)

The plugin always makes sure that ALL the value of the Wallet is delivered to the heirs.

For example if I have a wallet with 3 bitcoins, and I write as inheritance 1 bitcoin to JONNY, and 10% to ANDREA, then the B.A.L. plugin sends as inheritance 1 bitcoin to Jonny, and all the rest (2bitcoins) to ANDREA.

or,

I set to send 5% to JONNY, and 80% to ANDREA, The plugin recalculates the percentages with a proportion, to make sure that the wallet at the time of inheritance is completely emptied.

If the plugin did not do the recalculation there would be 15% left in the wallet.

Instead in this case the plugin does a proportion, and so instead of 5% it will send 5.9% TO JONNY, and instead of 80%, it will send 94.1% to ANDREA, for a total of 100%

(NB. If I wanted to send only 80% of the contents of the wallet to the heirs, and 20% make it inaccessible forever, (i.e. bitcoins lost forever) , this would increase digital scarcity and consequently give wealth to ALL participants in the bitcoin network,

to do this just set up ME as heir, setting up a Percentage ad esempio of 20%, to an internal wallet address of mine where I am setting up the inheritance.

This use of the example also improves the privacy of the transaction as it is difficult to understand the destination wallets.

Other example:

(I own 10 bitcoins, I have to give Jonny 4 exact bitcoins, while I want to give Andrea 2 exact bitcoins . The 4 that are missing ??
Again, the plugin recalculates to transfer 100% inheritance. The only way to give Jonny and Andrea the exact Btc is to transfer the 4 that are missing to another wallet by designating a third heir.

STAGGERED INHERITANCE OVER TIME.

Currently B.A.L. version 1.0 does not support this possibility. But it is already in development for version 2 of the Protocol. In version 2 it will be possible, for example, to stagger the inheritance 10% per year, until the tenth year is reached, or even for example a 1% per month, month by month for 10 years.

As if it were a kind of annuity, but without the need for third parties and intermediaries.

[NEW HEIR] button - Figure 3

After setting steps 1,2,3, now press the [New HEIR] button and the following window will appear: **BAL New heirs:**

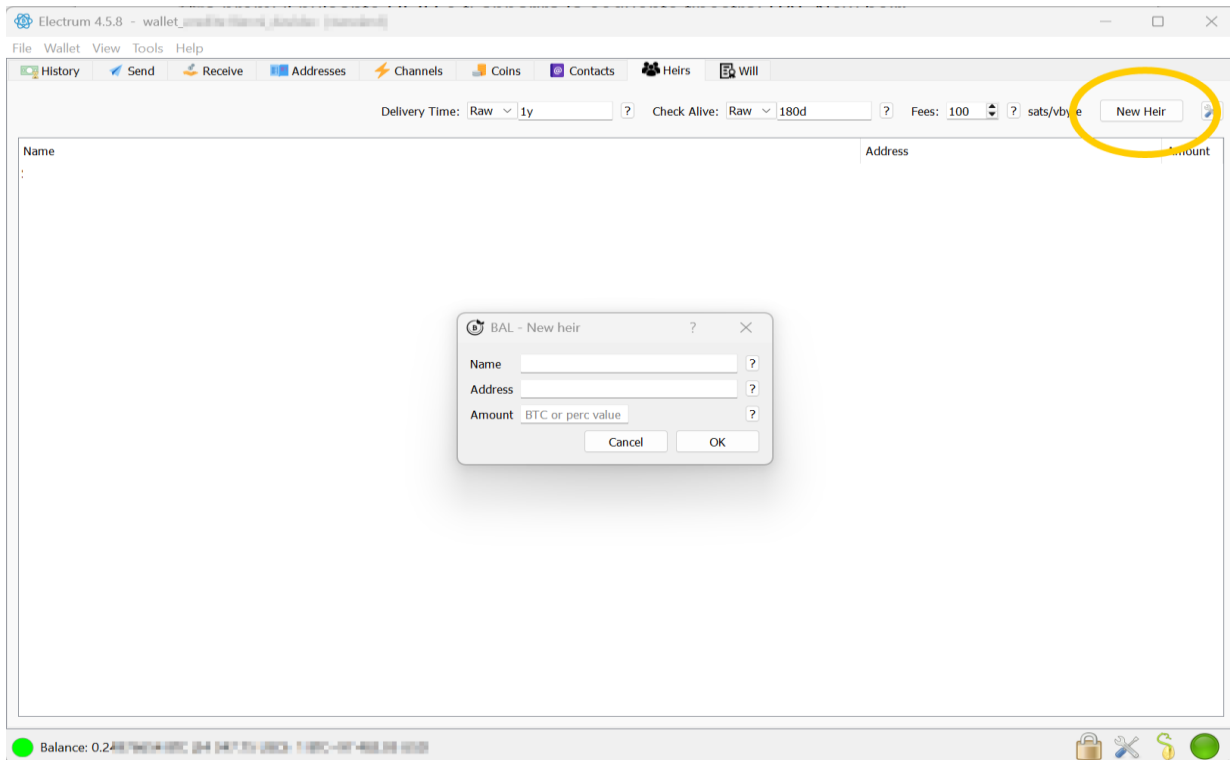


Fig. 3

Here you need to enter the following parameters:

Name: Name of the heir with the various details you prefer.

Address: Bitcoin wallet address where the inheritance will be sent.

Amount: How much you want to send to this heir.

(You can enter the value as a percentage or as a fixed value). The plugin always makes sure that 100% of the inheritance is given to the heirs, (see section Sizing Inheritance Transactions)

NB. You can add several heirs, even 10 or more.

See screenshot below with example of two heirs.

DELIVERY TIME CHANGES.

If you change the DELIVERY TIME of a will, when Electrum closes, the BAL plugin will notify you that you need to update the inheritance.

If you have postponed the DELIVERY TIME: The plugin will take charge of creating a transaction to invalidate the current inheritance and create a new postponed one.

To do this in a certain way, the BAL plugin creates a transaction that it sends to the miners, which you will have to sign, which costs 100sats/vbyte.

If, on the other hand, you have anticipated Delivery Time: the plugin simply sends a new inheritance transaction to the Will-Executor Servers, which anticipates and thus invalidates the transactions already sent to them.

RAW settings:

If you set, for example, RAW-1d , and it is, for example, 5 p.m. in the afternoon, the plugin will not execute the inheritance precisely after 24 hours, i.e., 5 p.m. the next day, but it will roughly estimate the blockchain block number that corresponds to that time, so with tolerance of a few hours.

NB. Inheritance is executed on nodes on average with a tolerance of about 1 hour after the date and time set on the BAL Plugin (this is because of the 11-block Bitcoin median).

HEIRS SHEET.

If you want to do a trial run to quickly test the BAL Plugin, you can enter an upcoming legacy date and time (e.g., 18 hours later),

In this case of a few hours, the CHECK ALIVE could create problems, so to avoid this, just set the Check Alive parameter in the past (i.e., with a date before today). Example by entering a date to a previous month.

PRACTICAL EXAMPLES.

I have 2 children, PETER age 12 and ARNOLD age 16.

I own 10 bitcoins and want them to go 5 bitcoins each, for their respective 18 years.

In the current version of the BAL Plugin (1.0), it is not possible to set different digital inheritance delivery dates. The inheritance date is unique.

So in this case I will have to prepare two wallets of 5 bitcoins each, and set the respective inheritance with the BAL plugin .

Electrum helps us with this because it allows us to easily create and manage multiple Wallets.

BAL PLUGIN PARAMETERS

Accessible from the menu button **TOOL → Plugin**

Parameter: BACKUP TRANSACTION

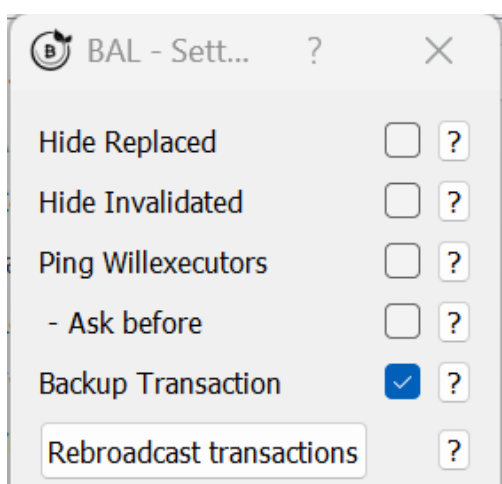


Fig. 4

BACKUP TRANSACTION (default Disabled), FIG (4) - is used to manage the inheritance transaction (locktime tx) even without the need for the BAL plugin automations that rely on the Will-Executor online servers.

By enabling this option in the plugin parameters, **we will also have an offline BACKUP of the signed legacy transaction, which is useful in case all Will-Executor online servers are destroyed.** (a highly unrealistic event).

The Backup transaction is saved locally, on a USB stick, or wherever you prefer; for example, it can be delivered through a notary, trusted persons, or even directly to the heir.

In the latter case, however, the heir is aware that he or she will receive an inheritance on a specific date and in a specific amount, and this could be imprudent.

The Backup transaction, once delivered to the heir, can (at a later date than the inheritance(Delivery time) be sent to the nodes via Electrum, to receive the funds in the inheritance wallet.

The difficulties and risks of using only the Backup transaction versus trusting the automation of Will-Executor servers is that:

1. There is the risk of the transaction being invalidated later if I accidentally spent even one Satoshi from one of my wallets from which I pre-signed the legacy transaction.
2. There is the difficulty of the delivery of the signed transaction to the heir since the heir would learn about the Bitcoin Inheritance and its value.
3. That each step must be handled by hand, with the risk of errors.

IN case you have activated "Backup Transactions" in the parameters, this will be visible in the [WILL] screen, with the status "NONE" in the Will-Executor column. (See figure 5)

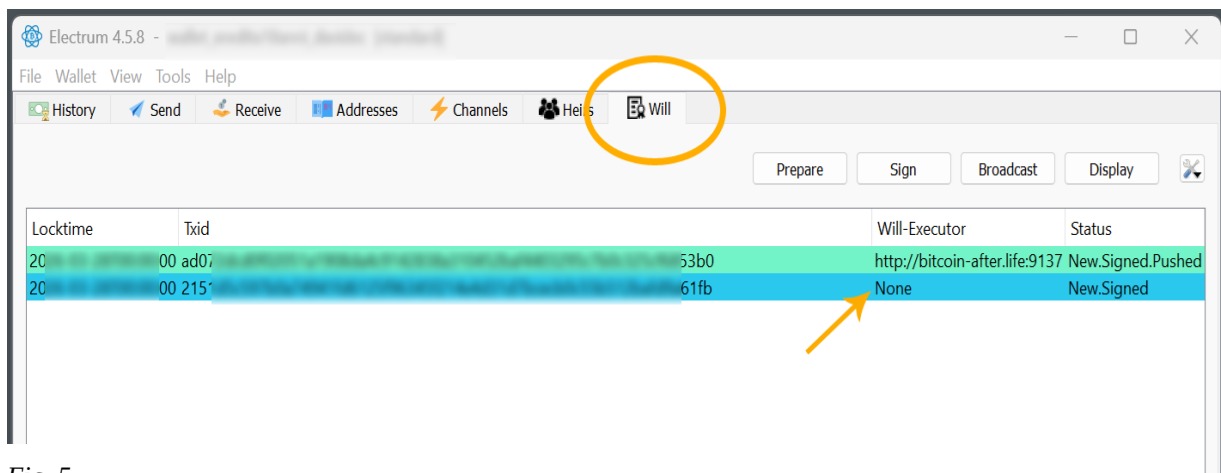


Fig. 5

Then by clicking on it with the Right Mouse button, select [Details] (Figure 6) and this screen will appear. And you can save your transaction to your preferred medium. (USB flash drive, Cloud, NAS, etc.)

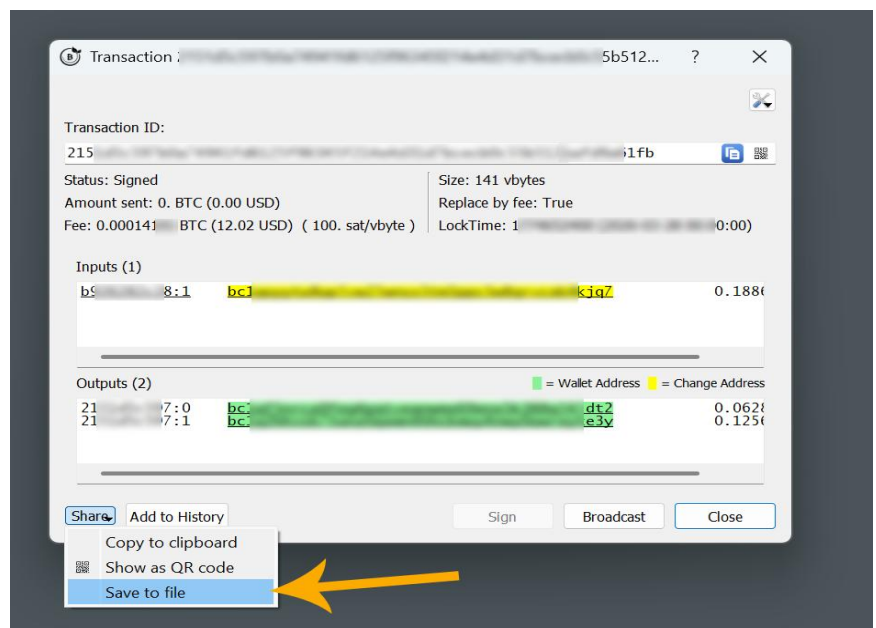


Fig. 6

WALLET SECURITY SAVING WITH INHERITANCE SET WITH BAL.

To have a copy of your will, simply save the wallet/wallet from electrum, (FILE COMMAND, (SAVE BACKUP)

in case, for example, my notebook is stolen, breaks down, etc., just install electrum on a new computer along with the BAL plugin, and open the previously saved wallet/wallet.

REMEMBER not to lose and save your Wallet password on Electrum, or you will no longer be able to access all the inheritance data saved along with the Wallet saved from electrum in case you have to reinstall it on another PC. In fact, if you access your Electrum Wallet from SEED, you will yes have access to your bitcoin funds, but you will lose the BAL inheritance data saved along with the wallet file

You can also export the heir list to have a printable copy of your inheritance.
See fig.7

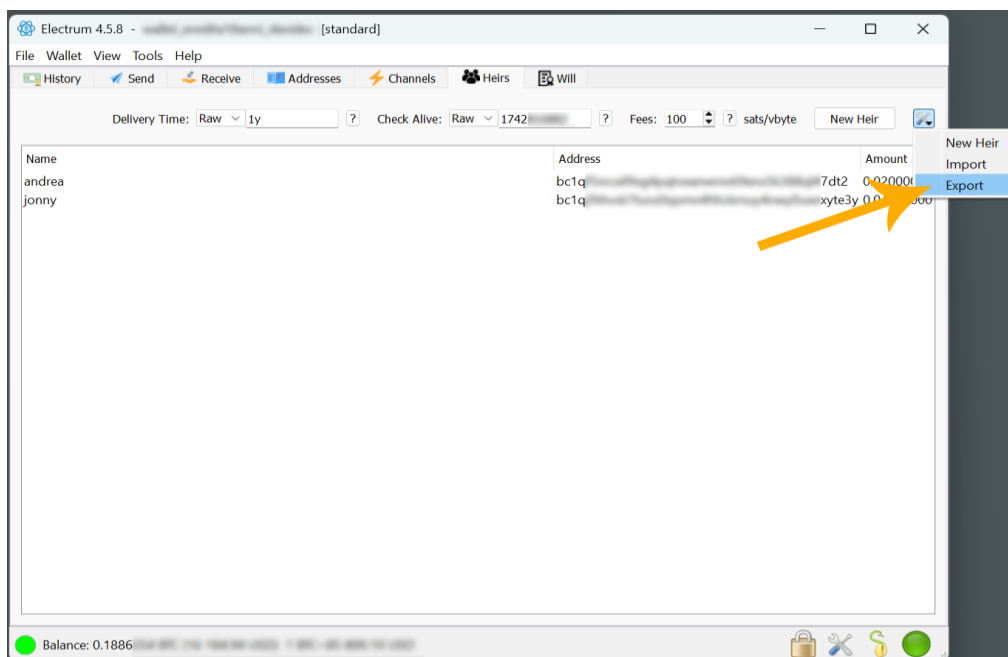


Fig. 7

WILL EXECUTOR SERVICE LIST

WILL-EXECUTOR SERVICE LIST.

This window opens from the Electrum menu, TOOLS (tools), → Will-executor, and shows the official list of will-executor servers.(Fig. 9)

If you want to make changes, such as adding an additional will-executor server, you can enter it manually, or by importing a list of will-executor servers, which you will find on the bitcointalk.org forum, or on the official BAL website.

COMMANDS IN THE WINDOW:

PING: (is used to check which of the servers in the will-executor list are online) - A green dot indicates active status.

IMPORT: Used to import a will-executor list other than the default list.

EXPORT: Exports the list of will-executor servers entered in your plugin. This can be useful if you need to move it and use it on another Electrum installation with BAL.

ADD: This command adds a Will-Esecutor server manually.

Description Fields List Columns.

01- URL: The URL address of the will-executor.

02 -Base Fee (Indicates the commission/reward for the will-executor.

This rewards allows the will-executor to meet the costs of keeping the server online.

The will-executor will earn only on the date of inheritance the set base fee, and only if it is the first to send the nodes the transaction.

This sets in motion a competition among the will-executors to earn the BASE FEE.

example:

i set up an inheritance with BAL that will happen in 4 years,
in this case the will-executor will only earn the fee in 4 years.

03- INFO: server description or website link.

04- DEFAULT ADDRESS: The address of the bitcoin wallet where the BASE FEE will be sent.

05- S: Server status. Green dot = Server online.

RIGHT MOUSE KEY above the server line. (Fig 8)

4 subcommands open:

1. SELECT command: accessed by right-clicking on the server in the list, selecting add the green check mark on the left , and then this will executor will be used in your inheritance.

2: Edit (edit) the relevant Column Field. See below.

3: Ping: Verify that the server is online.

4: Delete: Delete the server from the list.

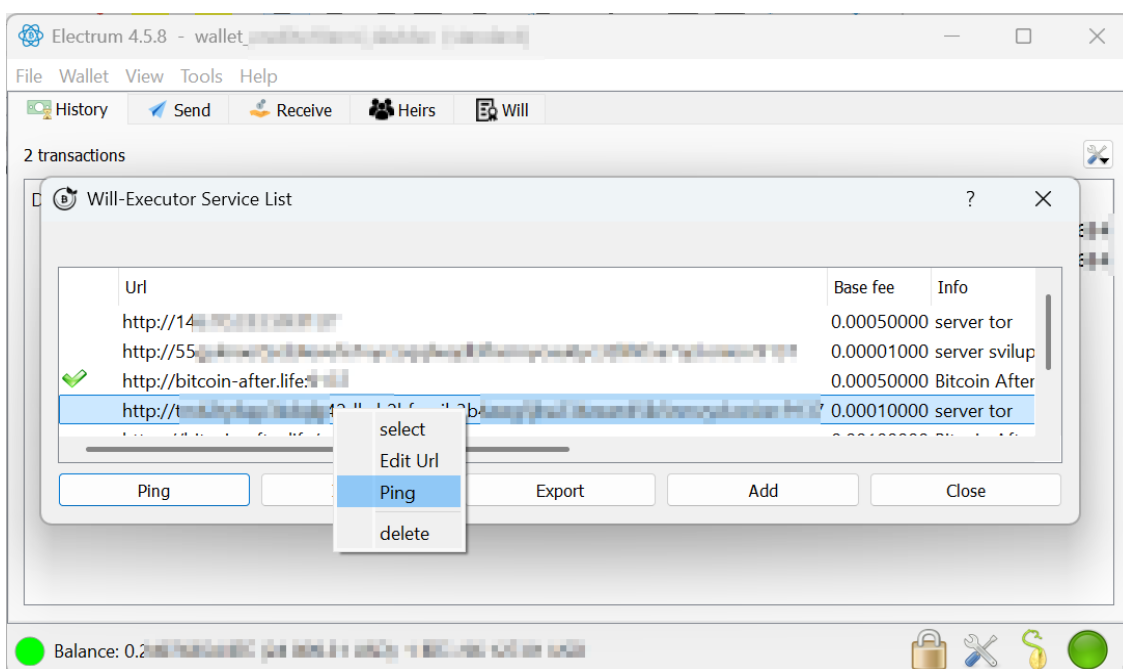


Fig. 8

PRIVACY of WILL-EXECUTORS (online will-executors).

Transactions sent to will-executor servers (pushed) by the BAL plugin are stored on the servers.

They are not publicly accessible as a matter of privacy, but from my BAL plugin I can check at any time whether the transaction is properly stored on the servers by right-clicking over the relevant inheritance transaction in the WILL tab, right-clicking CHECK.

The transaction will be tagged in the STATUS column as Checked if it is indeed online on the server.

Description Columns tab [WILL] Fig 10.

- a) Locktime (represents the date of inheritance).
- b) Txid - Identification of the bitcoin transaction.
- c) Will-Executor : Address of the will executor.
- d) Status : See table below

COLOR PROGRESSION OF TRANSACTION STATUSES

Transactions on the WILL page are colored to more conveniently display their STATUS of progress.

Here you can see the color progress states that your legacy transactions can have in the WILL tab, on each will executor that is online.

CHROMATIC PROGRESSION TABLE

#	Progress status	Meaning of the status	Color	HEX color code	Text preview (Light mode)	Text preview (Dark mode)
1	New:	TX new inheritance	White (transparent)	#FFFFFF	Test text	
2	Signed:	Tx inheritance Signed into the wallet	Azure	#2BC8ED	Test text	Test text
3	Pushed:	TX Sent to will executor	Azure-green	#73F3C8	Test text	Test text
4	Checked:	TX actually present in the will executor	Bright green	#8AFA6C	Test text	Test text
5	Confirmed:	TX Confirmed in the blockchain	Gray	#BFBFBF	Test text	Test text
6	Pending:	TX Awaiting confirmation on blockchain	Yellow	#FFCE30	Test text	Test text
7	Failed:	Communication failure with will-executor	Red	#E83845	Test text	Test text
8	Invalidated:	utxo input is no longer available	Orange	#F87838	Test text	Test text
9	Replaced	there is a backdated locktime transaction, which spends same input.	Violet	#FF97E9	Test text	Test text

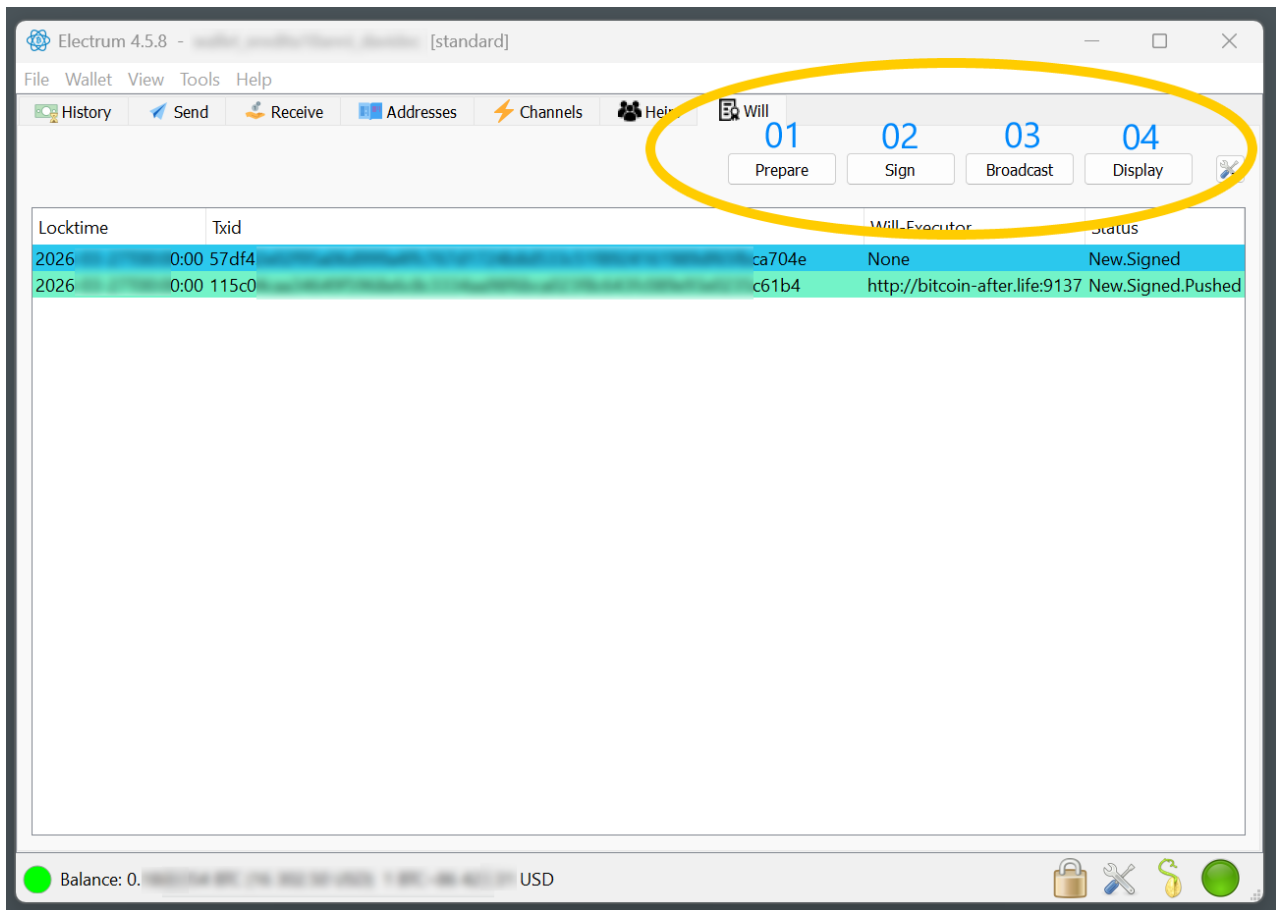


Figure 9

01. PREPARE, (prepares the inheritance and puts it on the list)

02. SIGN (SIGN). Sign your Legacy Transaction with your private key (using your wallet password, or hardware key).

03. Broadcast (broadcast)- Sends the Inheritance Transaction to the online Will-executor servers, which are on your WILL EXECUTOR SERVICE LIST

04. Display: (figure 11)

Pressing DISPLAY brings up the Will-Details window, where you can get a better look at the transactions with all available data.

- Locktime (date of inheritance)
- Creation time (creation date)
- transaction fee (the fee that goes to the Miners)
- Status (see table)
- Heirs (heirs)
- Will executor (server address)
- Commission(Base fee) reward for Will executor.

NB: When you close Electrum, the plugin takes care to automatically proceed to execute the following commands,

- 01.PREPARE.
- 02.SIGN.)
- 03.BROADCAST

if they have not already been completed, to ensure that the inheritance is correctly executed.

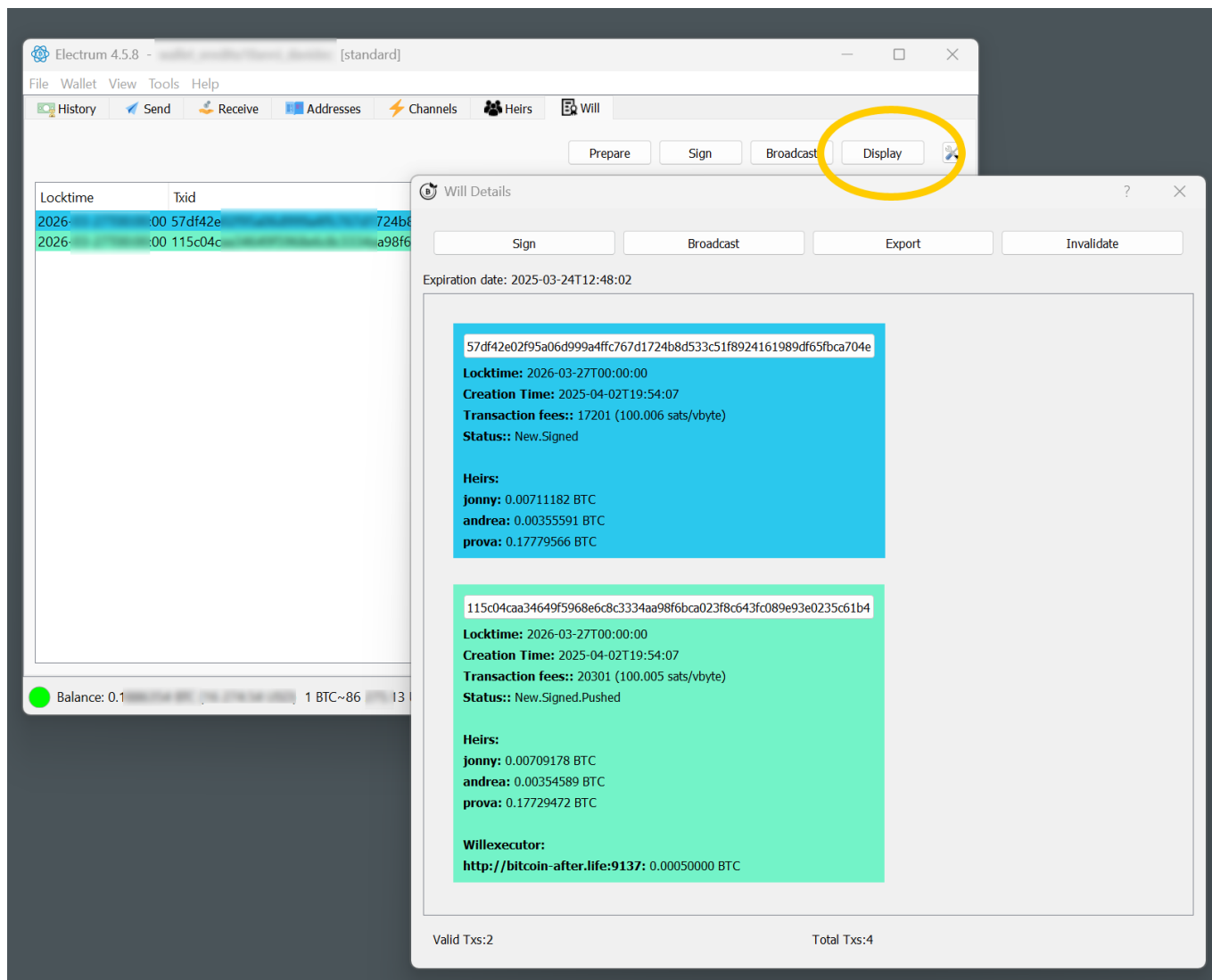


Fig. 9

Using HARDWARE KEYS.

Ledger, Bitbox2, etc.

All hardware keys that are compatible and recognized in Electrum, are compatible with BAL PLUGIN.

INSIGHTS (PRIVACY)

CAUTION TO CONSOLIDATION OF UTXOs.

When you send the entire contents of a wallet you risk losing the privacy of UTXOs.

It might therefore be a good rule of thumb to execute the inheritance by leaving a small remainder to another wallet, to improve the privacy of the transaction in case especially there is only one heir.

example, 99.7 percent inheritance to the heir, and 0.3 percent to a random bitcoin address, e.g. taking it randomly from a block-explorer.)

WALLET INHERITANCE BEHAVIOR IN CASE OF CHANGES IN THE BALANCE OR UTXO OF YOUR WALLET.

If your Wallet managed with the BAL Plugin changes in balance, such as you send additional funds or spend some of them, the inheritance must be updated.

The BAL Plugin takes care when closing Electrum to check if there has been any of these changes (balance or UTXO) and then update the inheritance automatically.

Thanks to this you can use a Inheritance Ready Wallet on Electrum also for even everyday Bitcoin transactions, (possibly with a hardware key to sign transactions), knowing that in case of Death the entire contents of the Wallet (inheritance) will be sent to your heirs.

In case you use your Read-Only wallet on other devices than your Electrum, (using the public key Zpub or Xpub, for example to control funds remotely), any funds sent directly into the wallet will not be added to the inheritance already set up. To work around this, you must open your wallet on Electrum so that the plugin can update the UTXOs of the inheritance and send it back to the Will Executors, updated with the new value.

WARNING: If you use the same SEED of your Wallet on multiple electronic devices, (a behavior that is always strongly discouraged in any case), in case you spend even one transaction of even one Satoshi, you invalidate the inheritance, as it changes the UTXO structure of the Wallet, and therefore the nodes discard the inheritance transaction).

Signed
Svātantrya