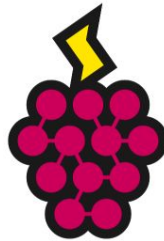


Lightning Vouchers & Merchant Onboarding

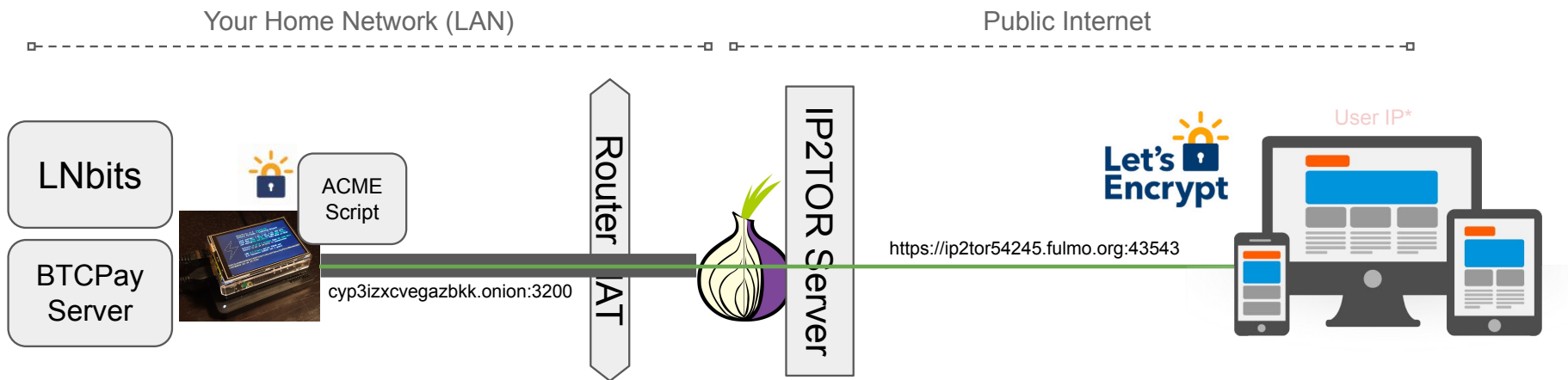


RASPI BLITZ



Part of RaspiBlitz v1.6

IP2TOR with LetsEncrypt Cert



- HTTPS is needed for transport security (last mile after IP2TOR & also LNBits needs HTTPS to use cam)
 - Bad User Experience & MiM with self signed HTTPS cert → use free Let's Encrypt Certs
 - Port 80 on public IP cannot be rented → Domain is needed to get Cert (Domain API for renew)
- **You can run web services anon & secure from your RaspiBlitz for normal people**

** = you run anon behind TOR, but keep in mind that people using your service may leak their IP to the IP2TOR server*

1/6 LNbits Setup

- RaspiBlitz v1.6 running behind Tor, funded & good channel setup (good connected & balanced)
- MAINMENU > SERVICES > Install LNbits
- MAINMENU > LNbits → check that you can reach LNbits locally

```
LNbits

Local Webbrowser: https://192.168.178.94:5001
SHA1 E2:54:78:90:65:E7:10:17:BE:CE:F4:6F:34:55:9A:A1:57:53:8A:B5

TOR Browser Hidden Service address (QR see LCD):
4m3v3i3bbix4aekoh5h2orlvtzwe1nv4jqegocsjvyl46mwk4rfzpcqd.onion

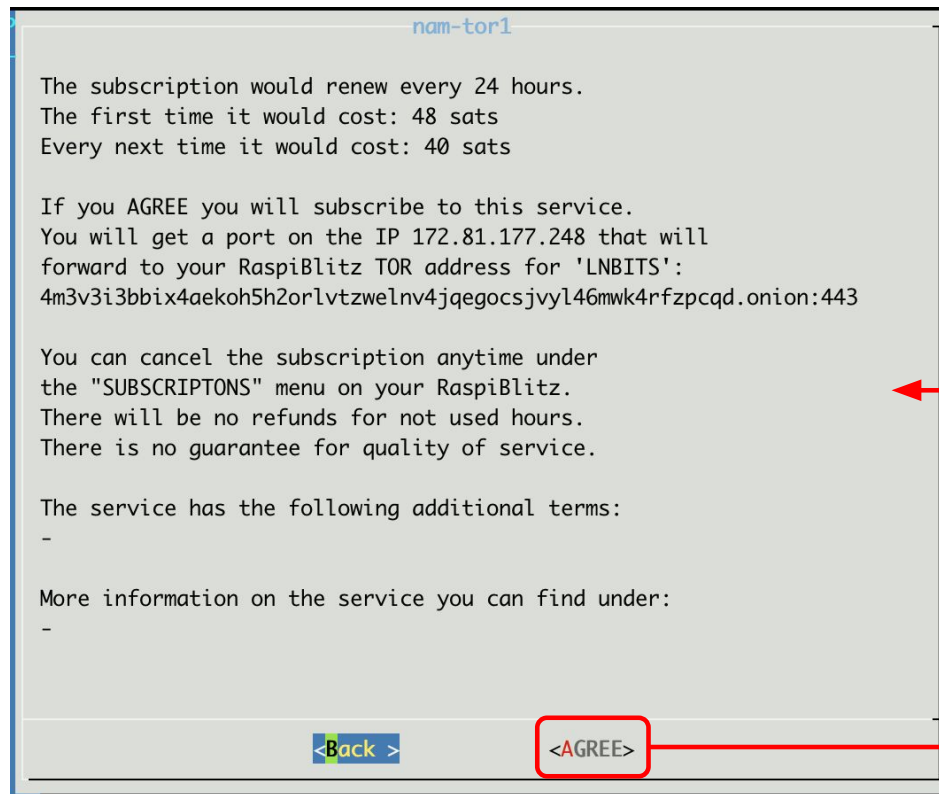
To enable easy reachability with normal browser from the outside
consider adding a IP2TOR Bridge (MAINMENU > SUBSCRIBE).

<Ok>
```

Try this one in your local browser.
If you get a self-signed certificate or a security warning that's fine - that confirms you can reach the service.

2/6 LNbits over IP2TOR Setup

- SUBSCRIBE > + IP2TOR Bridge → **Select Service:** LNbits Webinterface
- **Shop Address:** just press OK to choose default. **Available Subscriptions:** pick one with OK & Agree

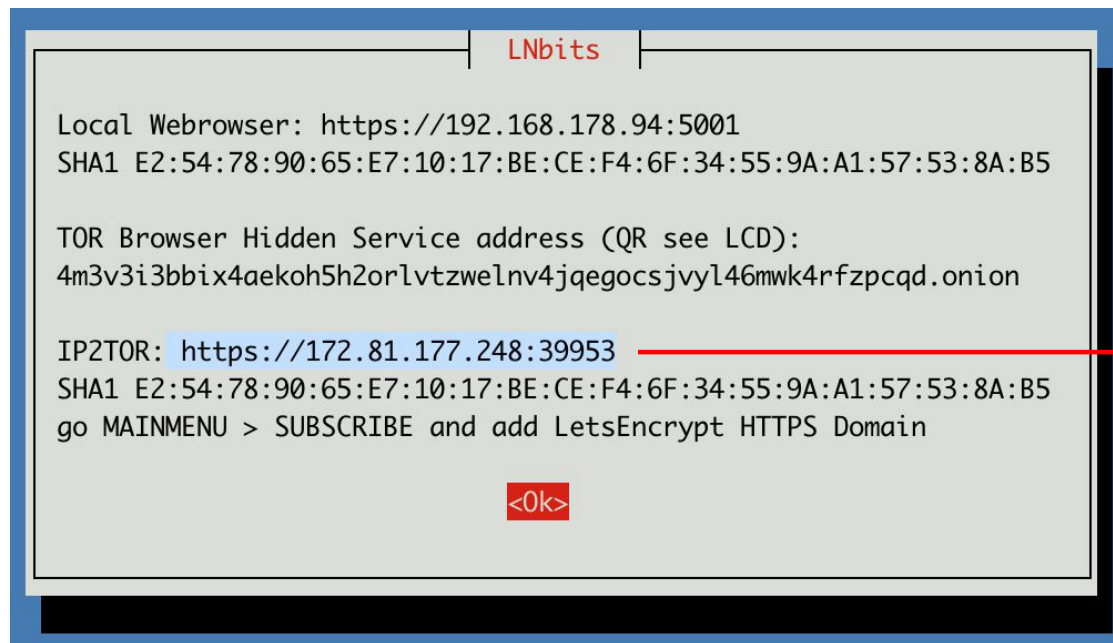


This is what a IP2TOR
subscription looks like

finally you need to agree here to activate ...

3/6 LNbits over IP2TOR Setup

- You should get a “Subscription Active” - press OK
- MAINMENU > LNbits → check that you can reach LNbits thru IP2TOR



```
LNbits

Local Webbrowser: https://192.168.178.94:5001
SHA1 E2:54:78:90:65:E7:10:17:BE:CE:F4:6F:34:55:9A:A1:57:53:8A:B5

TOR Browser Hidden Service address (QR see LCD):
4m3v3i3bbix4aekoh5h2orlvtzweInV4jqegocsjvyl46mwk4rfzpcqd.onion

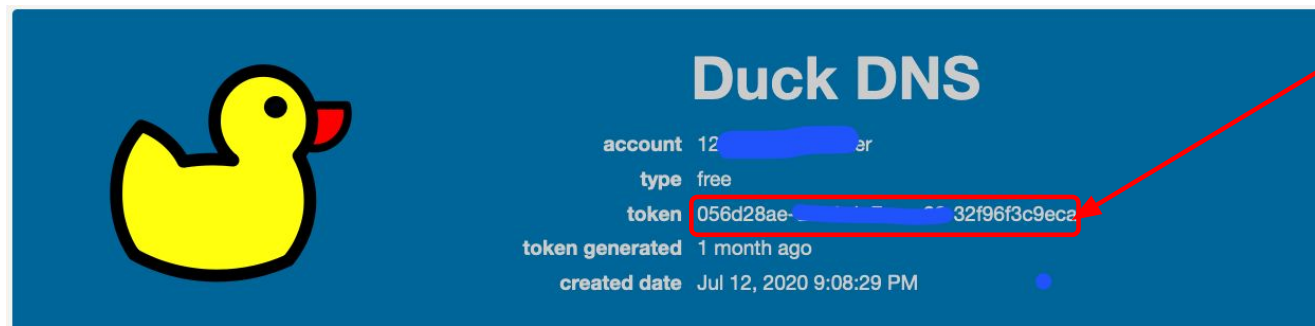
IP2TOR: https://172.81.177.248:39953
SHA1 E2:54:78:90:65:E7:10:17:BE:CE:F4:6F:34:55:9A:A1:57:53:8A:B5
go MAINMENU > SUBSCRIBE and add LetsEncrypt HTTPS Domain

<Ok>
```

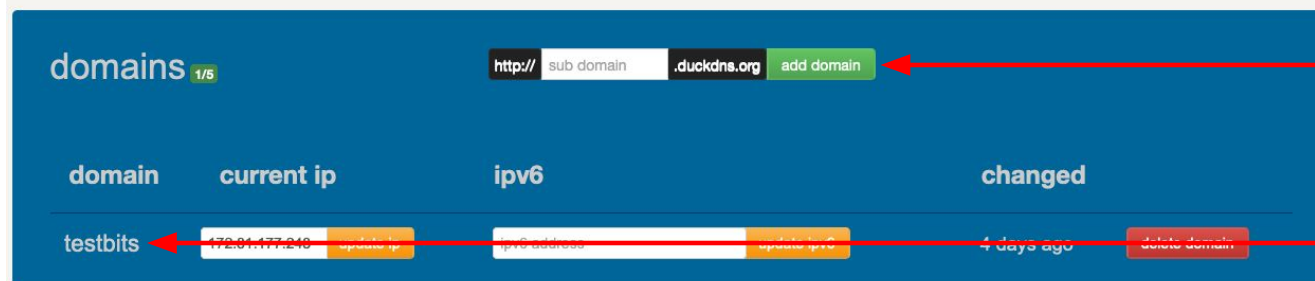
Try this one in your browser.
If you get a self-signed certificate or
a security warning thats fine - that
confirms you can reach the service.

4/6 LNbits over IP2TOR with LetsEncrypt Setup

- SUBSCRIBE > + LetsEncrypt HTTPS Domain → **Select Service: DUCKDNS**
- Go to www.duckdns.org (use Tor Browser) & sign in (might need google/twitter/github anon account)
- Add a subdomain that is still available within your DuckDNS account
- On RaspiBlitz: press OK, **enter the subdomain** you created & then **your DuckDNS Token**



The screenshot shows the Duck DNS account page. On the left is a yellow duck icon. On the right, the text reads "Duck DNS" followed by account details: "account 12 [redacted] ar", "type free", "token 056d28ae-[redacted]-32f96f3c9eca" (the token is highlighted with a red box), "token generated 1 month ago", and "created date Jul 12, 2020 9:08:29 PM". A red arrow points from the text "your DuckDNS Token" in the list above to the highlighted token.



The screenshot shows the "domains" page with a "1/5" indicator. At the top right, there is a form with "http://" and "sub domain" in a text box, ".duckdns.org" in a dropdown, and an "add domain" button. A red arrow points from the text "create the subdomain here" to the "add domain" button. Below the form is a table with columns: "domain", "current ip", "ipv6", and "changed". The first row shows "testbits" in the "domain" column, "172.01.177.240" in "current ip", "ip6 address" in "ipv6", and "4 days ago" in "changed". A red arrow points from the text "here is your subdomain listed then" to the "testbits" entry in the table.

create the subdomain here

here is your subdomain listed then

5/6 LNbits over IP2TOR with LetsEncrypt Setup

- **Select Service:** HTTPS for a IP2TOR Bridge
- **Choose the IP2TOR Subscription:** IP2TOR LNBITS
- If everything worked you should get a “OK LetsEncrypt Created” message
- MAINMENU > LNbits → check that you can reach LNbits thru IP2TOR+LetsEncrypt

```
LNbits

Local Webbrowser: https://192.168.178.94:5001
SHA1 E2:54:78:90:65:E7:10:17:BE:CE:F4:6F:34:55:9A:A1:57:53:8A:B5

TOR Browser Hidden Service address (QR see LCD):
4m3v3i3bbix4aekoh5h2orlvtzweInV4jqegocsjvyl46mwk4rfzpcqd.onion

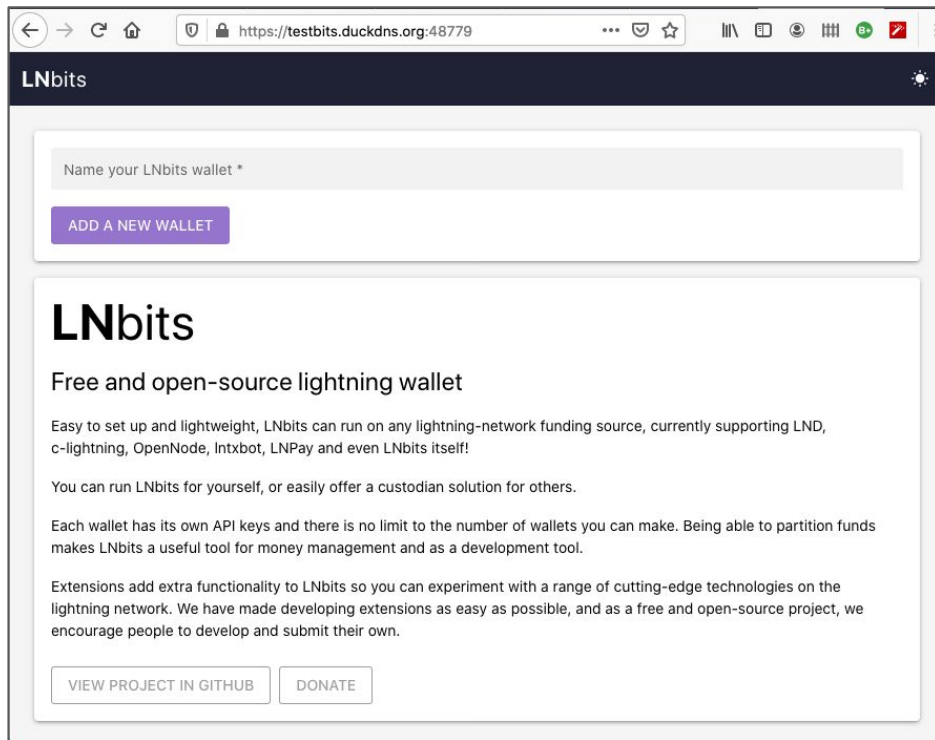
IP2TOR+LetsEncrypt: https://testbits.duckdns.org:48779
SHA1 38:57:1E:29:35:96:4E:6A:B4:18:DE:CC:EB:2F:5A:EB:87:BE:13:02

<Ok>
```

Try this one in your browser
and from another device that is
not part of your local network.

6/6 LNbits over IP2TOR with LetsEncrypt Setup

Congrats! Now your RaspiBlitz is running behind TOR but your LNbits can be called by any Smartphone or Laptop on the public Internet - securely over HTTPS without any security Warnings.



<https://creativecommons.org/licenses/by/4.0/> Author: Vincent Le Moign

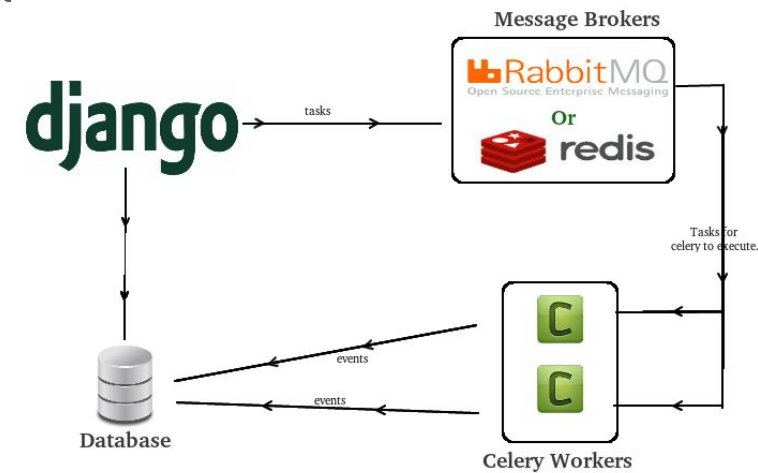
IP2TOR

If you have problems with IP2TOR Subscriptions from RaspiBlitz:

<https://github.com/rootzoll/raspiblitiz/issues>

If you want to look at or improve the IP2TOR “shop” software:

<https://github.com/frennie/django-ip2tor>



<https://bhavaniravi.com/blog/asynchronous-task-execution-in-python/>

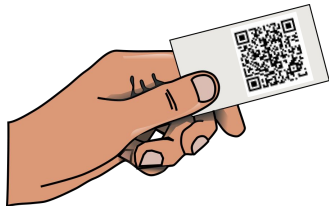


RaspiBlitz v1.6

RaspiBlitz 4 Local Community

There are now 2 actions you can do with a public available LNbits”:

- “Lightning Vouchers” → Local Users first Experience



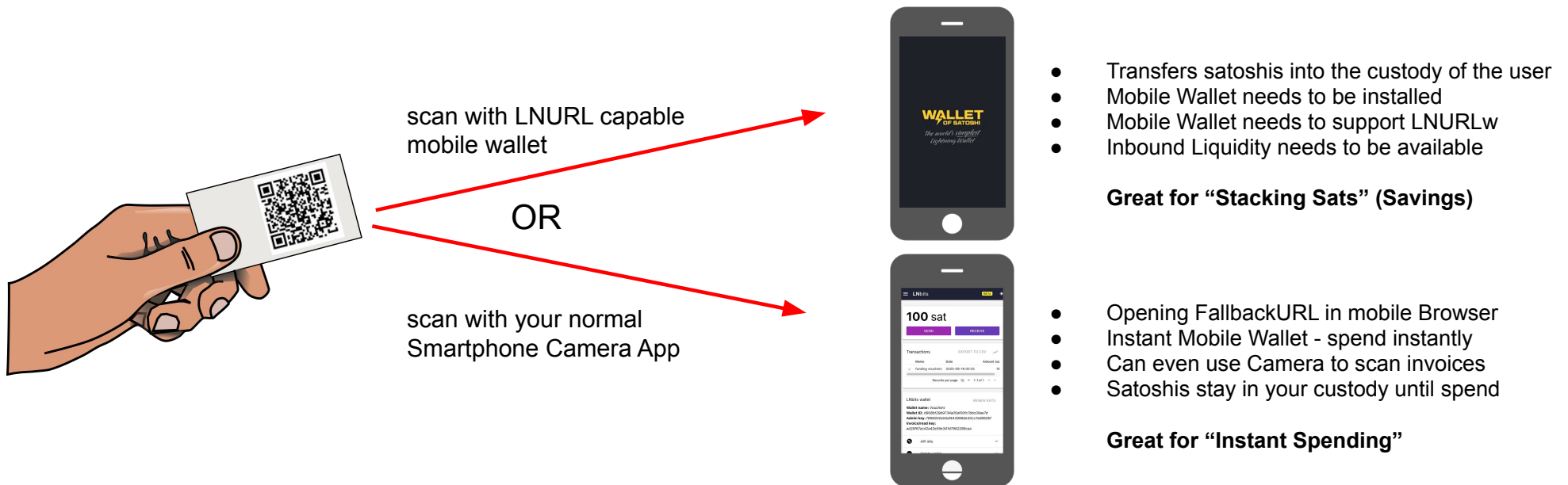
- “Cash in the Bag” → Local Merchants Onboarding



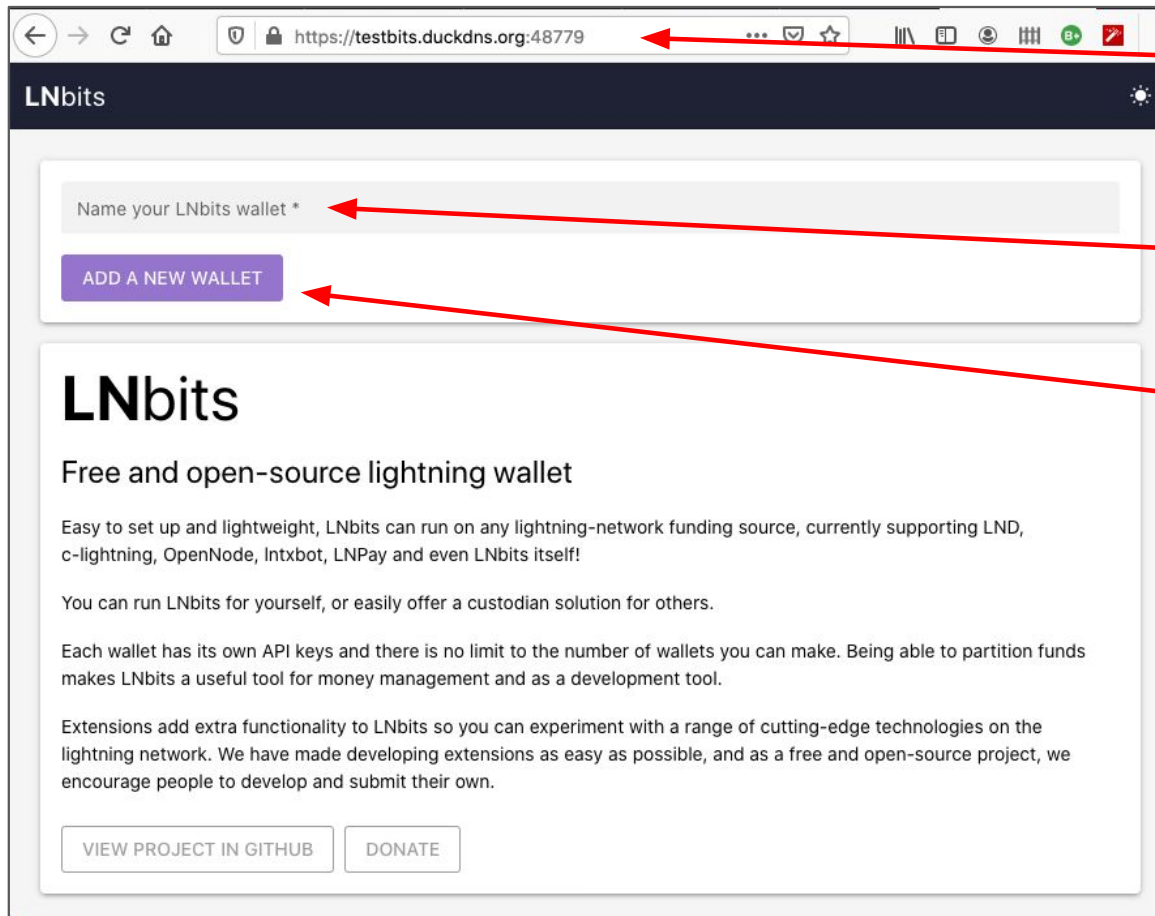
Lightning Vouchers

- Its a bit like Bitcoin-Paperwallets - but this time with Satoshis on Lightning.
- Goal is to give people their first satoshis for free for onboarding and education.

There are two ways to use the “Lightning Voucher”:



Creating “Lightning Vouchers” with LNbits



- Be sure to call your LNbits over the public IP2TOR address shown in MAINMENU > LNbits

- Enter a name for a new Wallet for example “VoucherWallet”

- Press “ADD NEW WALLET”

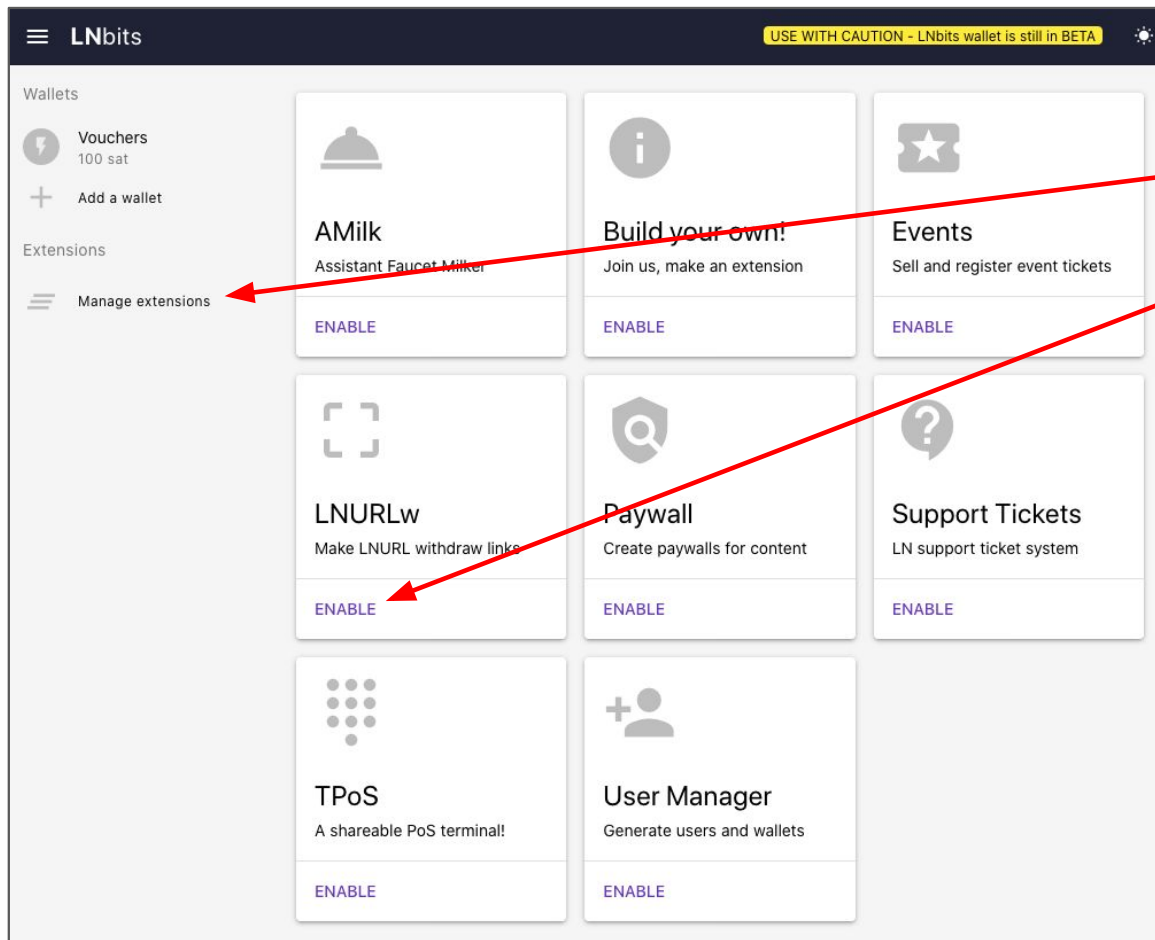
- Bookmark the resulting Wallet Page so that you easily can return to that wallet later if needed

Creating “Lightning Vouchers” with LNbits

The screenshot shows the LNbits interface. On the left, there's a sidebar with 'Vouchers' (0 sat) and 'Add a wallet'. The main area shows a balance of '0 sat' with 'SEND' and 'RECEIVE' buttons. Below that is a 'Transactions' section with 'No data available'. At the bottom, there's an 'LNbits wallet' section with 'Wallet name: Vouchers', 'Wallet ID: d9080f29b9734a05af00fc7bbc09ae7...', and 'Admin key: f866930a55af443998de30cc15d66...'. A modal form for creating an invoice is open, showing 'Amount (sat) * 100' and 'Memo funding vouchers'. A QR code for the invoice is also shown.

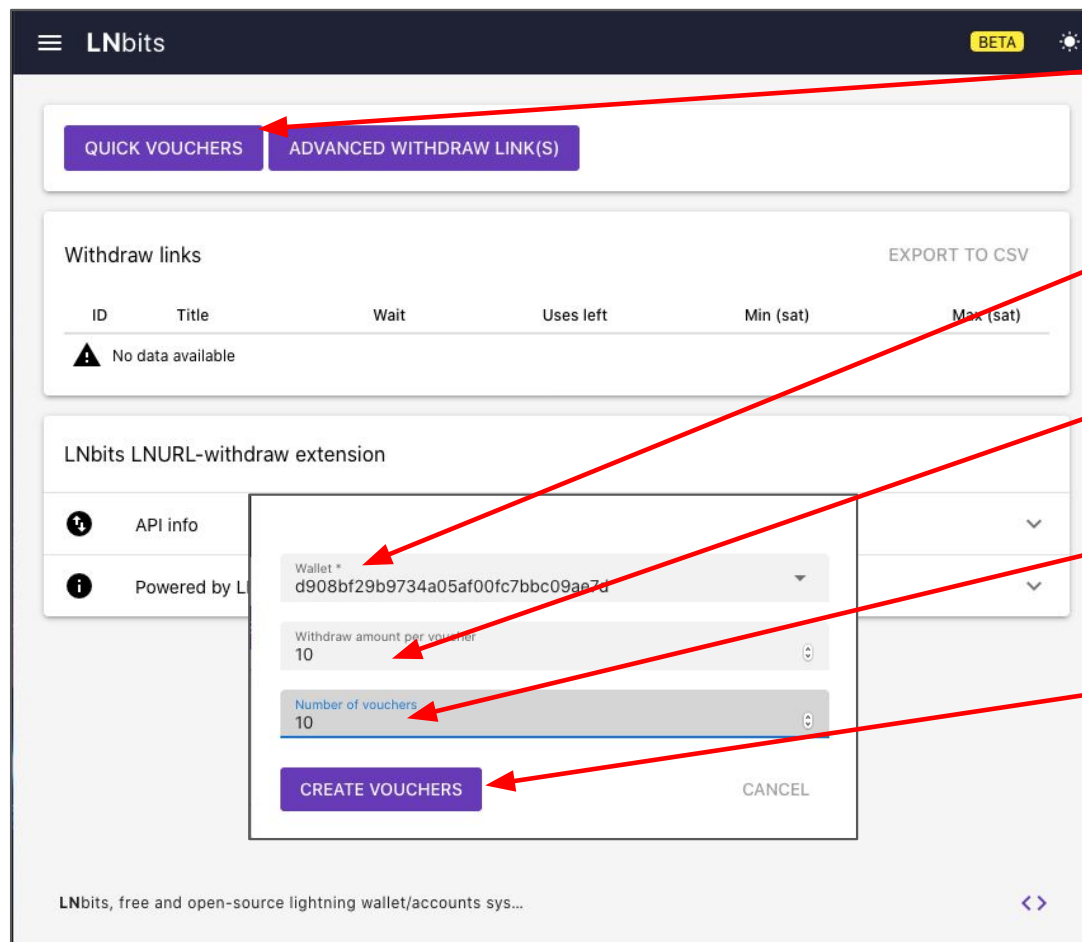
- Now you need to fund that wallet
- At the moment you need to send sats from an external wallet. For example use “Wallet of Satoshi”
- Press “Receive” and fill out the amount (e.g. 100 sats) and give it a description like “funding vouchers”
- Now pay the created invoice with your external wallet
- Make sure your RaspiBlitz has enough “Inbound Liquidity”

Creating “Lightning Vouchers” with LNbits



- Now you have a funded wallet
- Press “Manage Extensions”
- And “ENABLE” the “LNURLw” Extension
- Then click on the “OPEN” of the “LNURLw” extension that is now available where the ENABLE button was

Creating “Lightning Vouchers” with LNbits



In the “LNURLw” extension
Click in the “Quick Vouchers”

Select the your previously created
Voucher Wallet here

Set how many satohis every
voucher should have

Set how many vouchers you want
to create

Now click “CREATE VOUCHERS”

Make sure that sats per vouchers
by number of vouchers does not
exceed the funding of your wallet

Creating “Lightning Vouchers” with LNbits

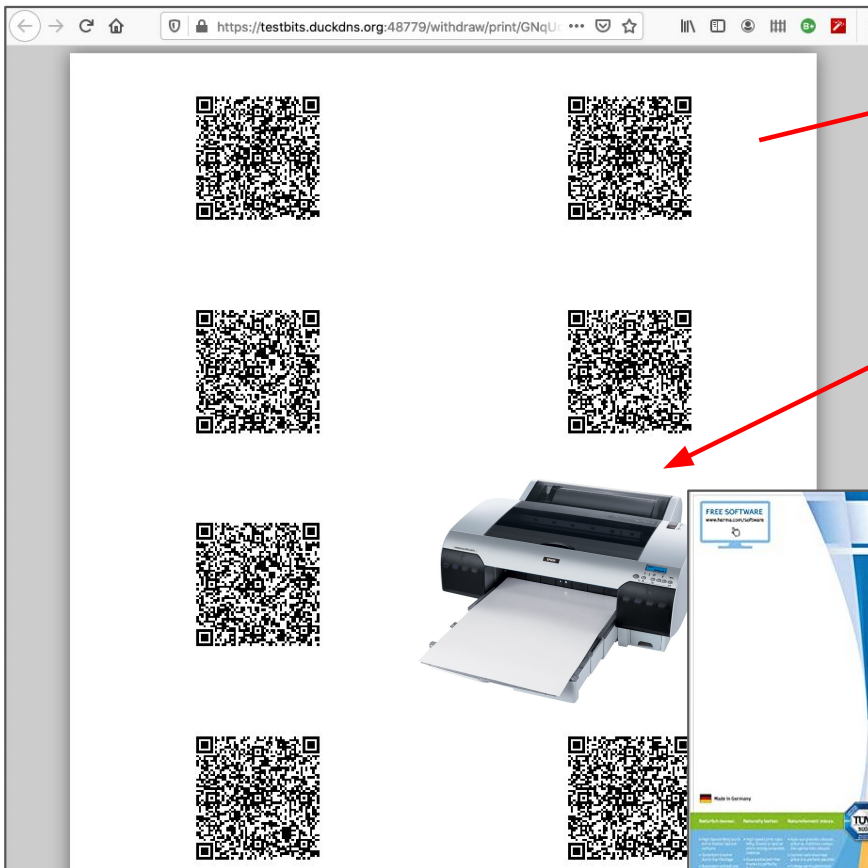
The screenshot shows the LNbits web interface. At the top, there is a navigation bar with the LNbits logo and a 'BETA' badge. Below this, there are two tabs: 'QUICK VOUCHERS' and 'ADVANCED WITHDRAW LINK(S)'. The main content area is titled 'Withdraw links' and features an 'EXPORT TO CSV' button. A table lists the withdraw links with columns for ID, Title, Wait, Uses left, Min (sat), and Max (sat). The first entry has ID 'GNqUd6ABhSjM4FoP2mRhAB', Title 'vouchers', Wait '1', Uses left '10', Min (sat) '10', and Max (sat) '10'. A red arrow points to the 'eye' icon next to this entry. Below the table, there is a section for 'LNbits LNURL-withdraw e' and two information boxes: 'API info' and 'Powered by LNURL'. A modal dialog is open in the foreground, displaying a QR code and the following details: ID: GNqUd6ABhSjM4FoP2mRhAB, Unique: true (QR code will change after each withdrawal), Max. withdrawable: 10 sat, Wait time: 1 seconds, and Withdraws: 0 / 10. At the bottom of the modal, there are buttons for 'COPY LNURL', 'SHAREABLE LINK', a print icon, and 'CLOSE'. A red arrow points to the print icon.

ID	Title	Wait	Uses left	Min (sat)	Max (sat)
GNqUd6ABhSjM4FoP2mRhAB	vouchers	1	10	10	10

Now click on the little “eye” symbol next to the entry that was created

And then in the dialog on the “PRINT” button

Creating “Lightning Vouchers” with LNbits



Now in a new tab of the browser the Printing Template for your Voucher Codes opens

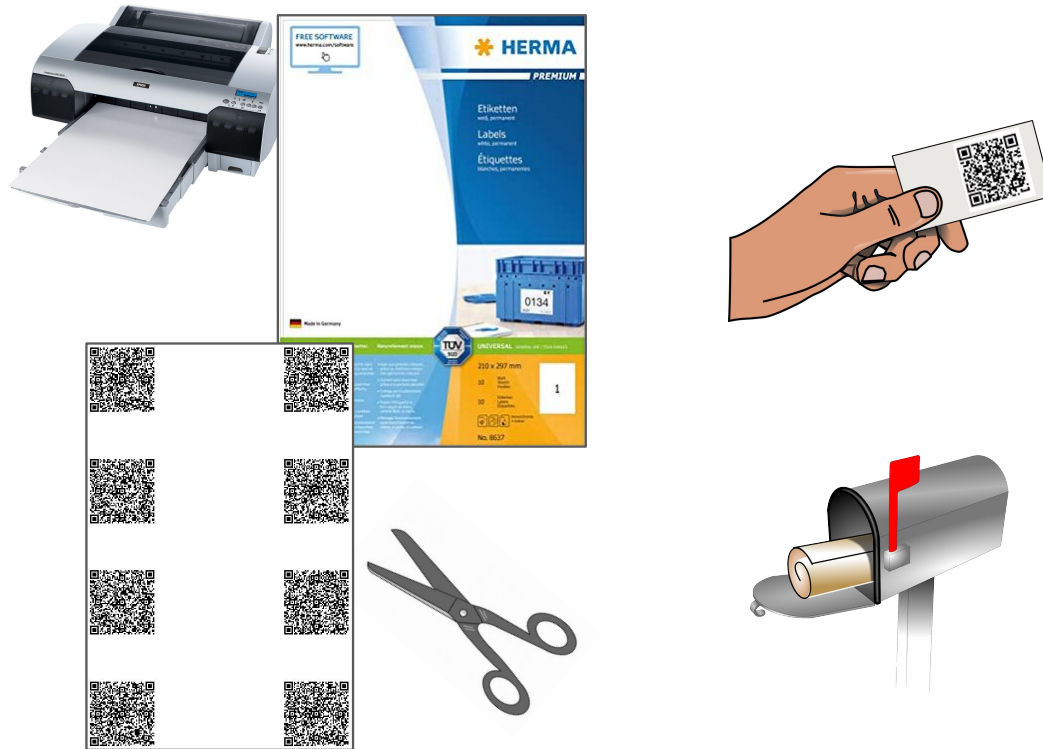
Use the “Print” function of your browser to print those QR codes

Part of the idea is that you now can stick these vouchers on a card, a flyer or a letter that explains a bit more what those vouchers are and how to use them. To make this easier we suggest to print them on a “Sticker Paper” (just one big piece per page) and then cut them out.

Example: HERMA 8637 Universal Etiketten DIN A4

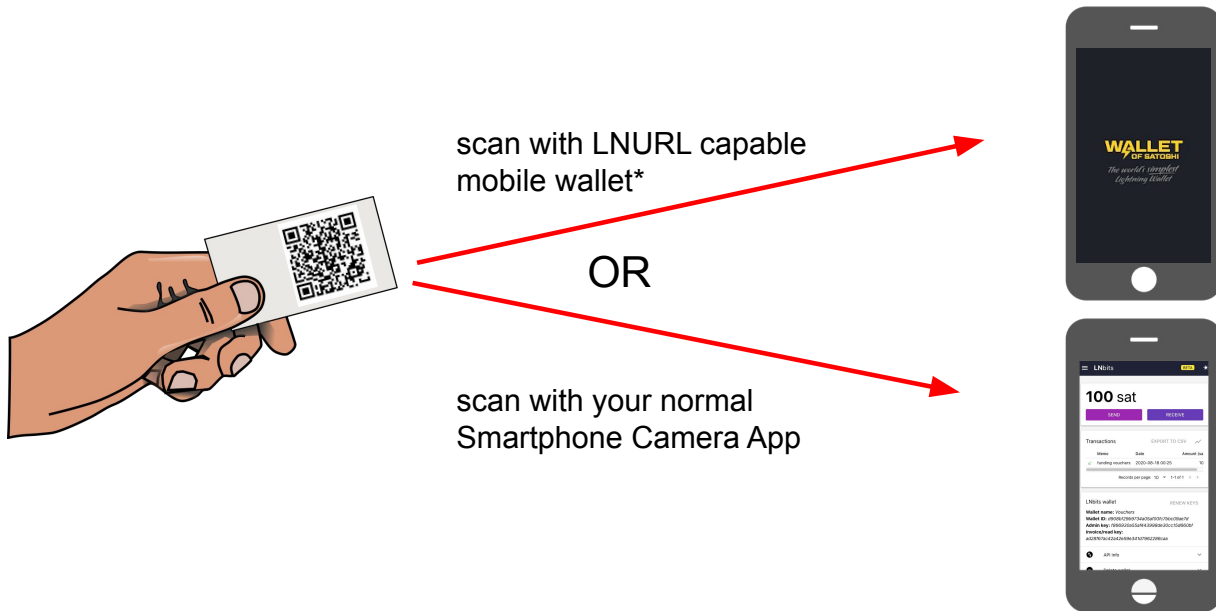


Voucher codes on cards, flyer or letters ...



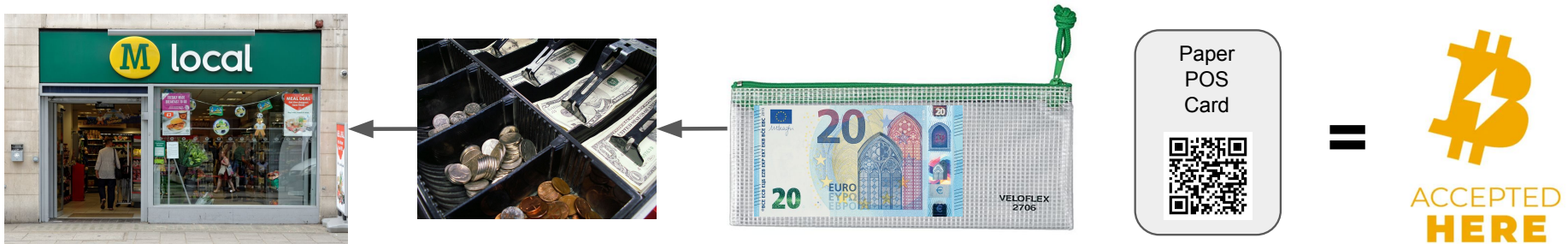
- You can now create with those “Voucher Stickers” any kind of paper voucher form factor that fits best your use case:
 - Small Cards for Meetup
 - Flyers for Events
 - Letters for putting it into neighbors postboxes
- Use your local language
- Best create those templates in a easy editable format (Word, GoogleDocs, ..) and share them back with the RaspiBlitz community so we can build a template archive

Testing “Lightning Vouchers”



- Before giving vouchers away:
Test them with both options
 - Scan with LNURL mobile Wallets check whats best to recommend for your use case
 - Scan with normal camera app and open in standard mobile webbrowser
- * = Push Mobile-Wallets supporting LNURL-FALLBACK-SCHEME
<https://github.com/btcontract/lnurl-rfc#fallback-scheme>
- RaspiBlitz v1.6.1 should have Lightning vouchers over IP2TOR ready for for small group testing.
- Report back issues to the RaspiBlitz GitHub to improve the experience

Onboarding Merchants with “Cash in the Bag”



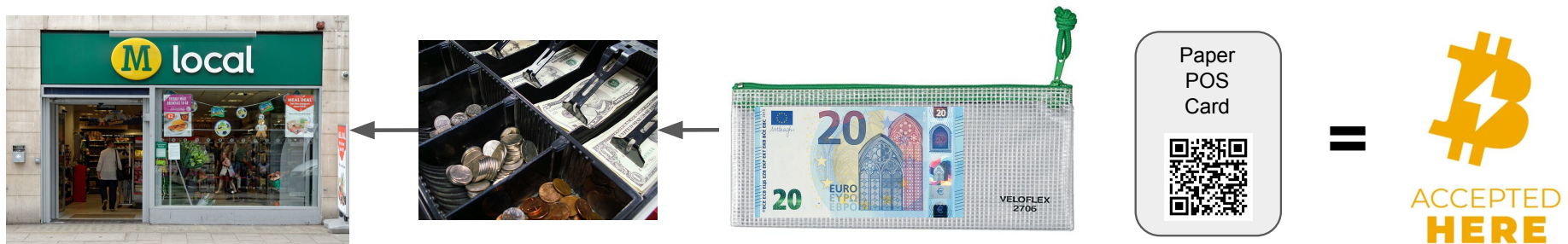
“Cash in the Bag” is the easiest way for a merchant to accept Bitcoin over Lightning:

- No risk for the merchant
- Nothing needs to be changed on the register system or within the bookkeeping process
- There are no costs/investments involved for the merchant

You take the all the risk and manage the Lightning infrastructure with your RaspiBlitz.

You can even onboard multiple merchants with one RaspiBlitz - but for the simple example we just take one.

Onboarding Merchants with “Cash in the Bag”



First find a small local merchant you have a good trust level with.

Decide on your Risk-Level: How much Fiat-Money are you willing to “up front” for that merchant?
You can start with something small like 10 USD & you have to make sure to have same again as “Inbound Liquidity” on your RaspiBlitz.

Beside your RaspiBlitz and that cash you will need:

- A bag to put the “up-front” cash in - that will fit into the cash register of the merchant
- A paper card with “Cashier Instructions” and a QR-Code that you will print out with LNbits and put into that bag

Lets start to put this together ..

Onboarding Merchants with LNbits



Front

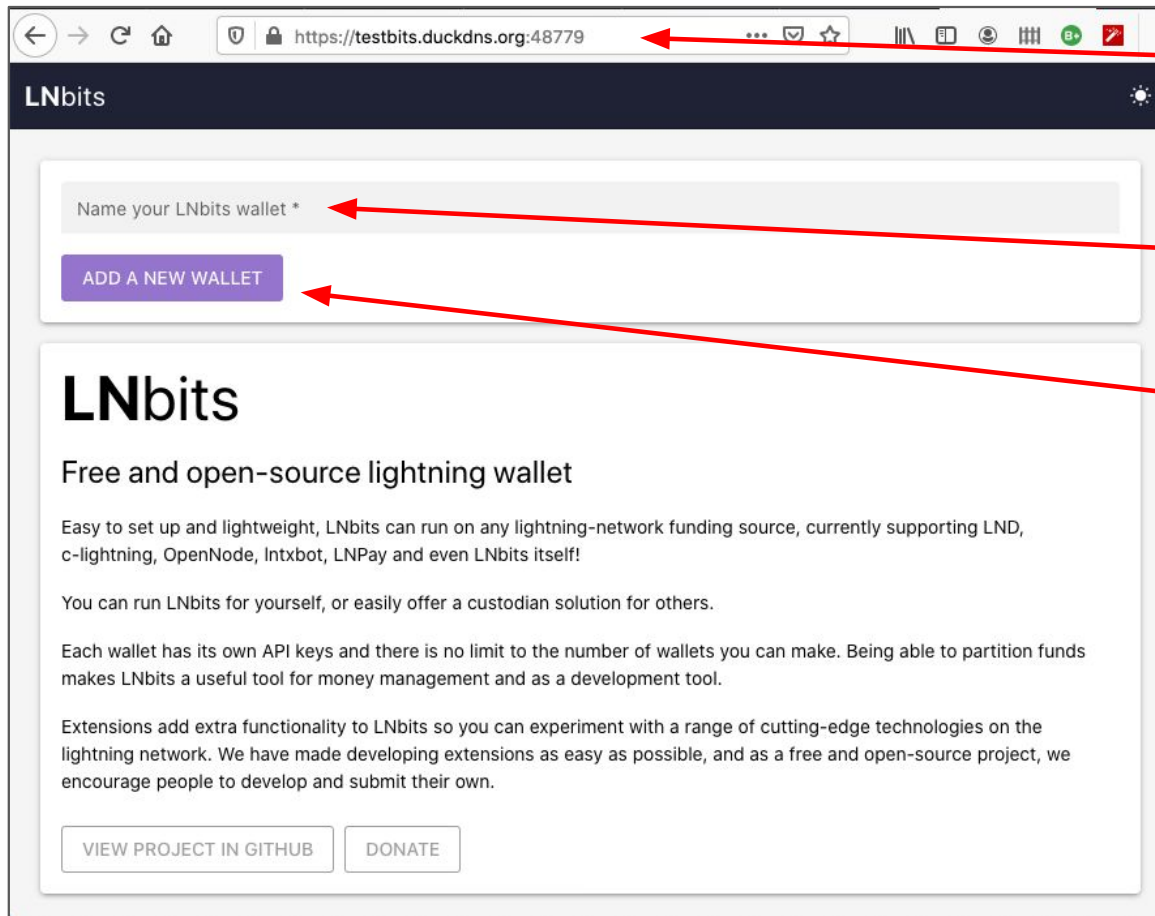


Back



- Print out the “Cashier Guide” card on some thicker paper with matching front & back - you will find it on GitHub repo: </home.admin/assets/cashiersguide.pdf>
- Or make your own similar card. Keep size so that it fits into bag.
- Cut out the card.
- Put it in the bag together with the cash.

Onboarding Merchants with LNbits



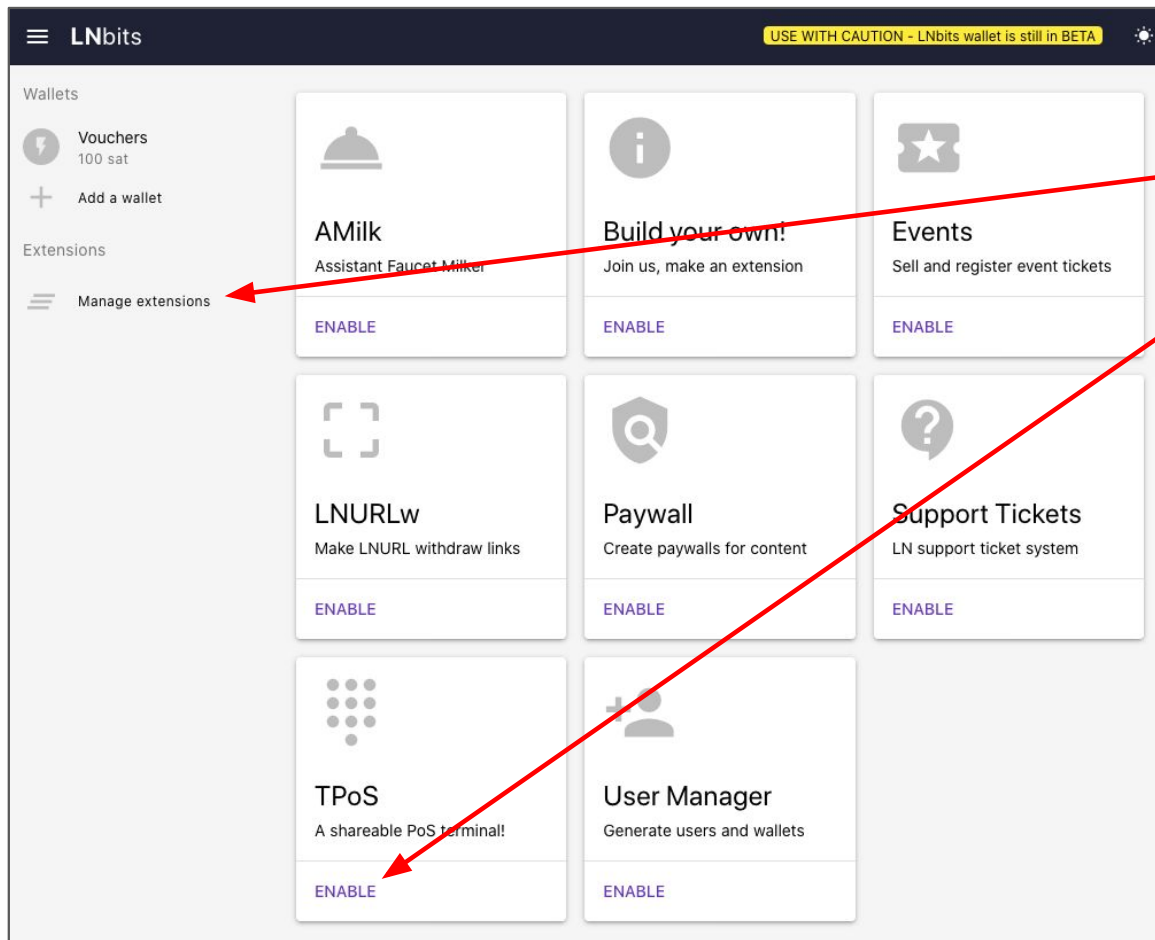
- Be sure to call your LNbits over the public IP2TOR address shown in MAINMENU > LNbits

- Enter a name for a new Wallet for example “MerchantWallet”

- Press “ADD NEW WALLET”

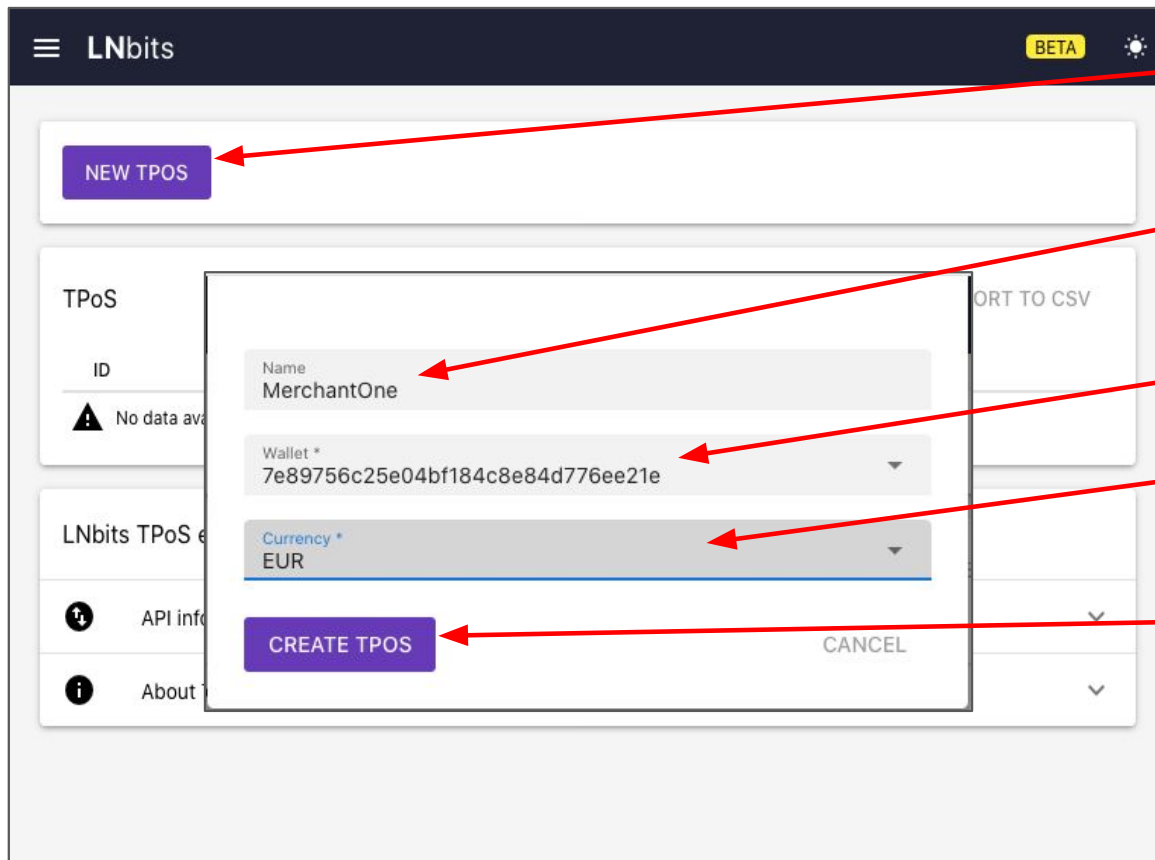
- Bookmark the resulting Wallet Page so that you easily can return to that wallet later if needed

Onboarding Merchants with LNbits



- No funding of wallet is needed
- Just press “Manage Extensions”
- And “ENABLE” the “TPoS” Extension
- Then click on the “OPEN” of the “TPoS” extension that is now available where the ENABLE button was

Onboarding Merchants with LNbits



In "TPoS" extension click "NEW TPOS"

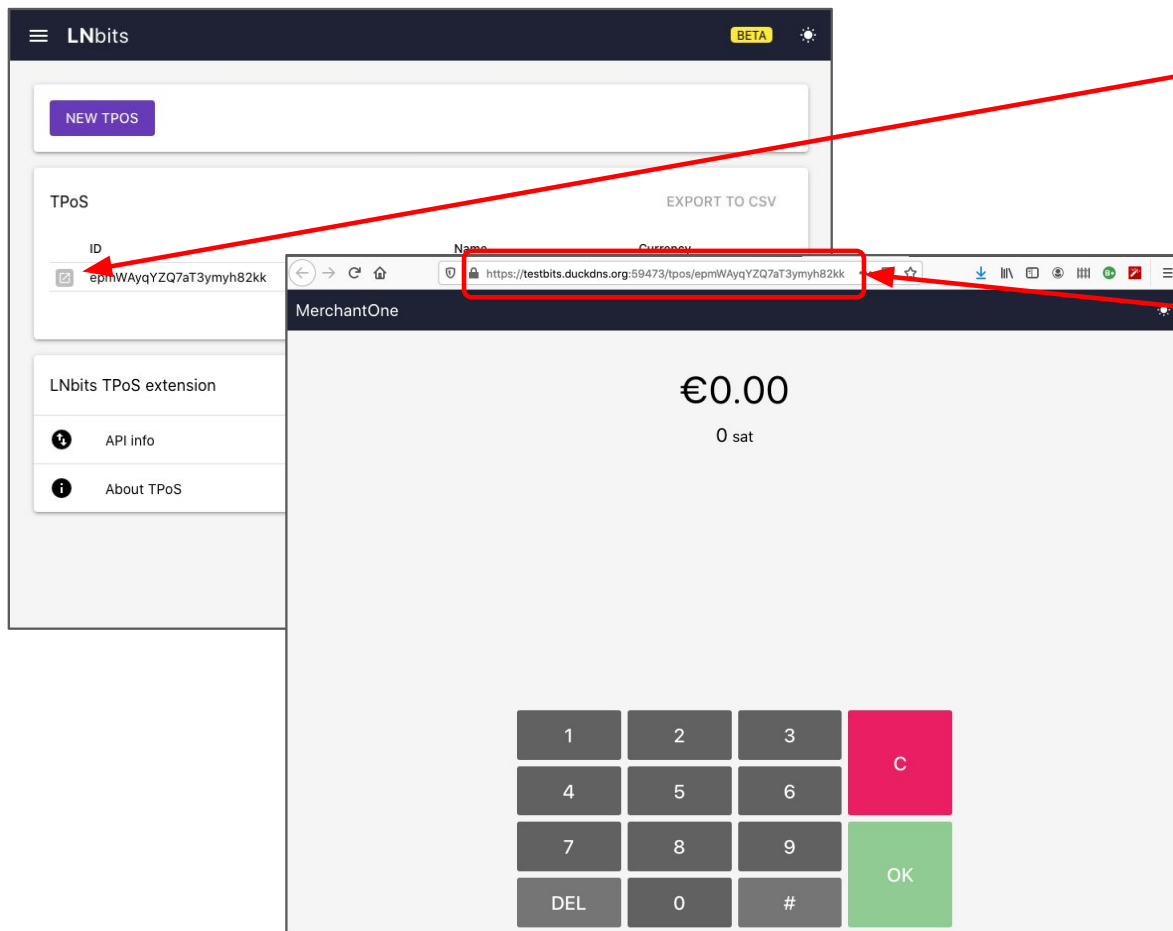
Give it a name - for example "MerchantOne"

Select the wallet you created earlier

Choose the local Fiat Currency of your area

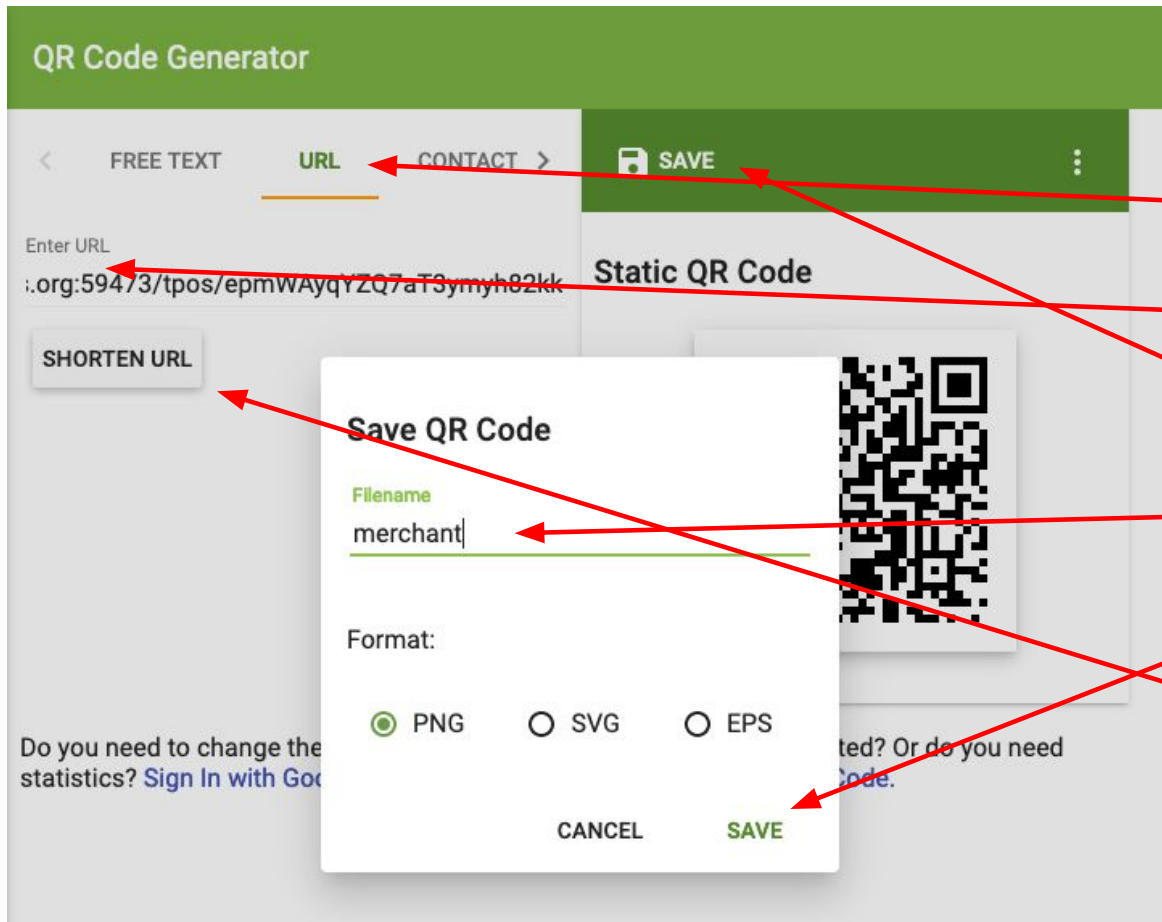
Click "CREATE POS"

Onboarding Merchants with LNbits



- Now click on the little “open” symbol next to the entry that was created
- The TPOS opens in a new browser tab.
- Copy the “URL” of the TPOS browser tab.
- Check that the URL is containing your IP2TOR+LetsEncrypt Domain.
- Next we will do some workaround ..

Onboarding Merchants with LNbits



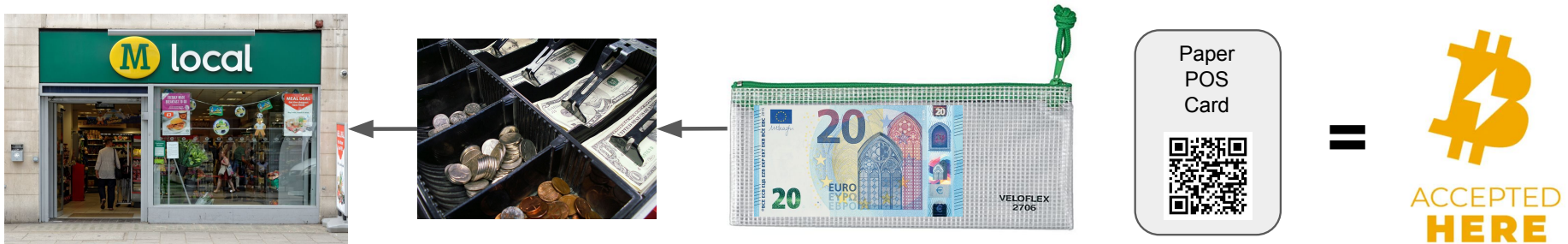
- Use the following third party service: **the-qr-code-generator.com**
- Choose “URL”
- Paste the TPOs URL into the field
- Click “SAVE”
- Set a Name like you want
- Save the image to your desktop
- Now Click “SHORTEN URL” and write down the “Generated Short Link”

Onboarding Merchants with LNbits



- Now take the “Cashiers Guide” card.
- Print out the saved QR code image in a size that it fits white area on the back of the card.
- Cut the QR code out and stick it on the back of the card.
- Write the “Generated Short Link” below the QR code as a backup the cashier can enter into smartphone browser in case not able to scan the QR code
- Put the “Cashiers Guide” card back into the bag.

Onboarding Merchants with “Cash in the Bag”



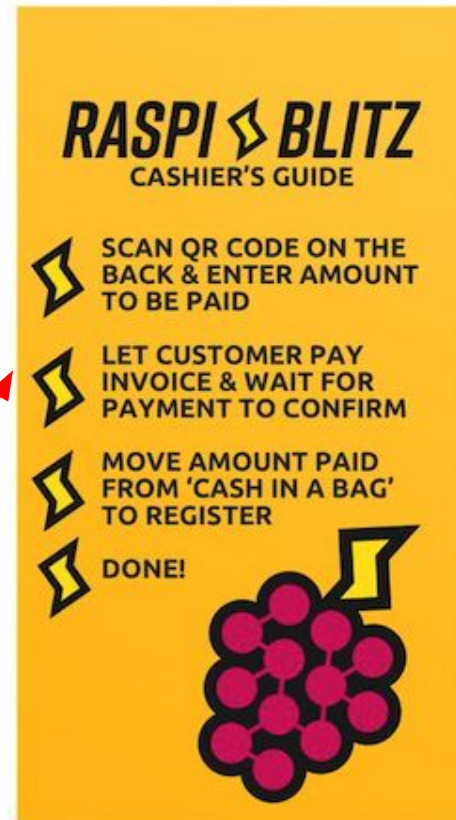
Now your “Cash in the Bag” Setup is ready :)

You can now give the merchant the bag to put into the stores register.

Lets see how it will work if a customer wants to pay at the store ...

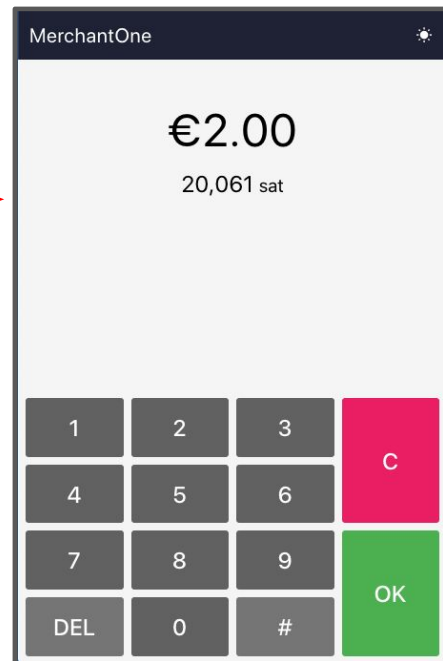


Onboarding Merchants with LNbits



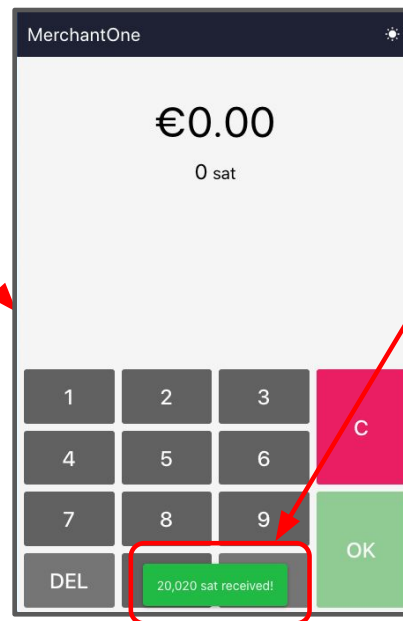
- Customer walks into store and wants to pay something for 2 EUR
- Customer saw the sticker or sign that its possible to pay with Bitcoin over Lightning
- Cashier remembers that what this back in the register is for
- Takes out the bag and follows instructions on the "Cashiers Guide" card

Onboarding Merchants with LNbits



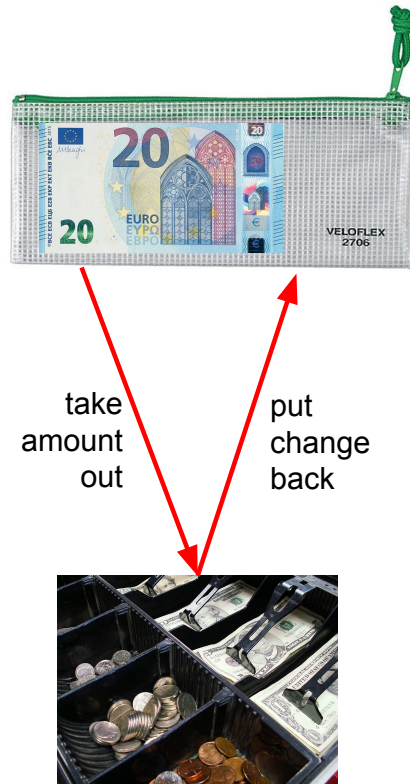
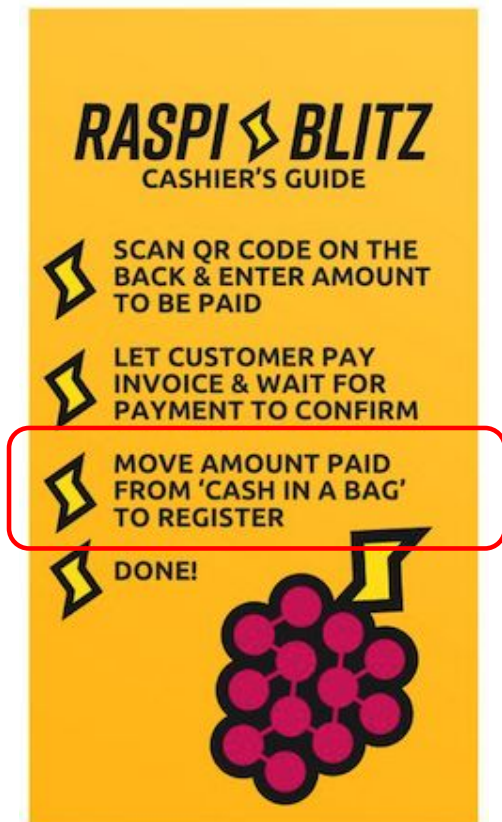
- Cashier uses his smartphone to scan the QR code on the back of the card
Fallback: Types in the URL in local in browser
- The TPOS mobile website for that merchant opens of the smartphone
- Cashier types in: 2,00 and can see that this will be 20.061 satohis
- Cashier presses OK to generate Invoice

Onboarding Merchants with LNbits



- The TPOs shows the lightning invoice
- The customer pays with a mobile wallet
- The Cashier sees the Payment received
- Cashier takes a look at the “Chashier Guide” card again for last step

Onboarding Merchants with LNbits

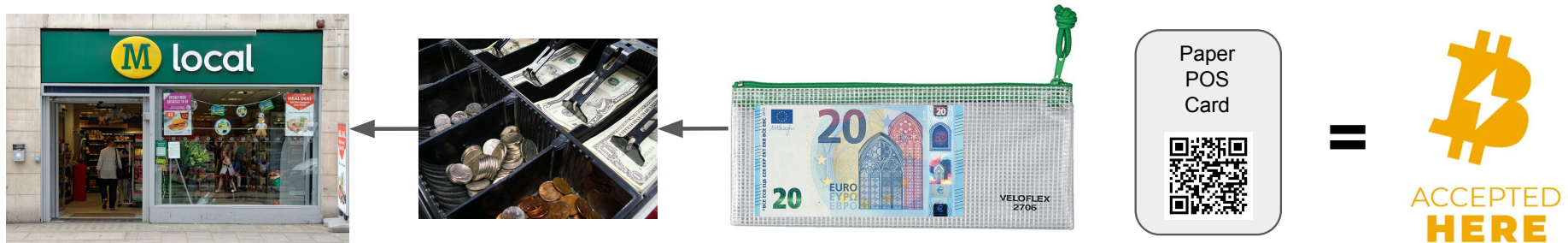


- Like the card says ...
- The Cashier takes the matching cash out of the bag and puts it into the register
- Of course any change will be put back into the bag, together with the card.
- Cashier just punches like with a normal cash payment everything into the register and hands out the item together with the normal receipt to the Customer



DONE - the customer paid with Bitcoin at the store :D Onboarding Complete

Onboarding Merchants with “Cash in the Bag”



- Its the agreement with the merchant that all cash in the bag belongs still to you.
- On the LNbits wallet you created for the merchant you can see the incoming transactions.
- All satoshis earned belong to you - you bought them from the merchant the second of the payment
- You may need to refill the cash in the bag from time to time.

With RaspiBlitz v1.6.1 you will have everything you need to try this out on small scale (early testing).

Help us to test & improve the process. If you can code Python & JS help out on LNbits Plugin dev.