BREEZ SDK - NODELESS

# PLAN ₿ EDITION

# Prerequisites and Course Information

To be able to get the most out of this lecture, you'll need some prior knowledge on the following topics:

Bitcoin and Layer-2 Networks

**[DEMO ONLY]** Git & Open-Source Platforms

**[DEMO ONLY]** Web development (React+TS)

While we don't necessarily **require** Bitcoin knowledge to use our tools, it's always best to know what you're doing!

## COURSE DETAILS

**Lecturer:** Antonio (**hydra-yse**)

**Duration:** 3-4 hours

**Required Software:** Git, NodeJS (+npm), IDE

### NOTICE ON THE RELIABILITY OF THE MATERIAL

These tools are in continuous development and evolution, so do **NOT** expect the material in this course to be consistent with future versions of the software discussed.

A good approximation for the life-expectancy of this course is **6-12 months**.

# Lecture Overview

By the end of the lecture, you will have extensive knowledge on how to integrate Bitcoin payments into any application using the Breez SDK Nodeless - *Liquid Implementation.*

To that extent, the lecture is divided into two parts:

## PART I

### About Us

Introduction to our company and goals
Overview of our SDKs
Preliminaries on the Nodeless implementation

### Step-By-Step

A detailed dive into the SDK interface
How to effortlessly send & receive funds across different networks

## PART II

### Hands-On Experience

You will learn how to add the referenced features to a demo web-application using Typescript, from start to finish

### Comparing Solutions

We will share and compare your different submissions, seeing which one would fare best in a real-world scenario

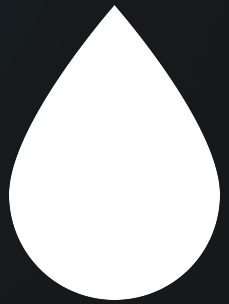
# About Us


**Our Motto -** *“Make Value Move Like Information”*

**Our Objective -** Enabling access to Bitcoin across the globe, in true peer-to-peer fashion

**Our Way -** Providing the necessary tools for a frictionless, complete developer experience

# Our Implementations



## LIQUID

Active since April 2024

Uses the *Liquid* network as L2 to interoperate with Lightning

Leverages **Boltz** to seamlessly trade funds between the multiple networks

Feature-rich, wide platform support, actively maintained

## GREENLIGHT

DEPRECATED

Developed between late-2022 and 2025

Uses cloud-based Lightning nodes to send and receive funds. Keys are stored on-device.

Nodes are hosted on Blockstream's infrastructure, communication occurs via gRPC

## SPARK

NEW

Active since June 2025

Uses the *Spark* network as L2 to interoperate with Lightning

Feature-rich, latest iteration of our software development kits

# Supported Languages

...and more!

# Before Getting Started

The Nodeless implementation, as well as our other SDKs, follow a specific **paradigm**: connect, prepare, execute.
This allows developers with the flexibility to provide different forms of user experiences, catered to different needs and environments.

## Connect

Connects to the SDK, specifying which **configuration options** to use. Background tasks are started, and then the SDK is ready to go.

Available methods are:

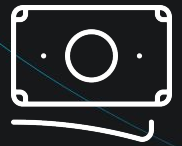
- `connect()`
- `disconnect()`

## Prepare

Provides information such as **fees** and **payer/receiver amounts**, which are fundamental for payment confirmation and UX.

Available methods are:

- `prepare_send_payment()`
- `prepare_receive_payment()`
- `prepare_lnurl_pay()`
- `prepare_refund()`



## Execute

Either generates a payment address to **receive funds** to, or uses the provided destination to **send funds**.

Available methods are:

- `send_payment()`
- `receive_payment()`
- `lnurl_pay()`
- `refund()`

# Step 0 - Installing


Depending on your language of choice, you probably have a specific package manager. The `breez-sdk-liquid` package should be available in most of them.

### Rust

```
cargo add --git https://github.com/breez/breez-sdk-liquid
```

### Golang

```
go get github.com/breez/breez-sdk-liquid-go
```

### JS/TS (WebAssembly)

```
npm install @breeztech/react-native-breez-sdk-liquid
```

### C#

```
dotnet add package Breez.Sdk.Liquid
```

### Python

```
pip install breez_sdk_liquid
```

### Dart/Flutter

```
flutter pub add https://github.com/breez/breez-sdk-liquid-flutter
```

...and more. Check out the docs (icon above) for non-standard installations.

# Step 1 - Connecting

DOCUMENTATION

`connect`ing is the first step when starting to use the SDK. We need to configure the SDK to our needs and bootstrap the necessary services for it to work.

javascript

```javascript
import init, { defaultConfig, connect } from '@breeztech/breez-sdk-liquid'

// Call init when using the SDK in a web environment before calling any other SDK methods.
// This is not needed when using the SDK in a Node.js/Deno environment.
await init()

const mnemonic = '<mnemonics words>'
// Create the default config, providing your Breez API key
const config = defaultConfig('mainnet', '<your-Breez-API-key>')
const sdk = await connect({ mnemonic, config })
```

## Usage Notes

`mnemonic` - A 12 or 24-words long string which will map to the seed of your wallet

`config` - The configuration object for the SDK. You can use `defaultConfig` for some sane defaults, depending on your network.

The Breez API key is **mandatory** on mainnet. Get it **here**.

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# Step 2 - Wallet Information

DOCUMENTATION

The very first thing you'd want to do is to get the wallet information. Luckily that's pretty straightforward, `getInfo` will do the job:

javascript

```javascript
const info = await sdk.getInfo()
const walletInfo = info.walletInfo
const balanceSat = walletInfo.balanceSat
const pendingSendSat = walletInfo.pendingSendSat
const pendingReceiveSat = walletInfo.pendingReceiveSat
```

javascript

```javascript
export interface WalletInfo {
    balanceSat: number;
    pendingSendSat: number;
    pendingReceiveSat: number;
    fingerprint: string;
    pubkey: string;
    assetBalances: AssetBalance[];
}
```

## Usage Notes

The method returns two structures, `walletInfo` and `blockchainInfo`

The pending balance is updated on every new Liquid block is detected

# Step 3 - Parsing Inputs

DOCUMENTATION

Usually throughout the lifetime of an application, you'll want to understand what kind of information the user is inputting, generally from a string. That's why we've created the **parse** method:

javascript

```javascript
const input = 'an input to be parsed ... '
const parsed = await sdk.parse(input)
switch (parsed.type) {
  case 'bitcoinAddress':
  case 'bolt11':
  case 'bolt12Offer':
  case 'lnUrlPay':
  case 'lnUrlWithdraw':
    //  ... do something
    break
  default:
    // Other input types are available
    break
}
```

# Step 4 - Receiving Payments - Prepare

DOCUMENTATION

Now that we have the basics down, let's start receiving some payments! Recalling our **previous slide**, we first prepare:

## LIGHTNING (BOLT11)

javascript

```javascript
// Fetch the Receive lightning limits
const currentLimits = await sdk.fetchLightningLimits()

// Set the amount you wish the payer to send via lightning,
which should be within the above limits
const optionalAmount: ReceiveAmount = {
  type: 'bitcoin',
  payerAmountSat: 5_000
}

const prepareResponse = await sdk.prepareReceivePayment({
  paymentMethod: 'bolt11Invoice',
  amount: optionalAmount
})
```

## BITCOIN

javascript

```javascript
// Fetch the Receive onchain limits
const currentLimits = await sdk.fetchOnchainLimits()

// Set the onchain amount you wish the payer to send, which
should be within the above limits
const optionalAmount: ReceiveAmount = {
  type: 'bitcoin',
  payerAmountSat: 5_000
}

const prepareResponse = await sdk.prepareReceivePayment({
  paymentMethod: 'bitcoinAddress',
  amount: optionalAmount
})
```

When receiving via Lightning or Bitcoin, there is a minimum and maximum amount.
Notice the **differences**:
- The limit fetching changes between `fetchLightningLimits` and `fetchOnchainLimits`
- The `paymentMethod` changes between `'bolt11Invoice'` and `'bitcoinAddress'`

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# Step 4 - Receiving Payments - Execute

DOCUMENTATION

## LIQUID

```javascript
// Note: Not setting the amount will generate a plain Liquid address
const optionalAmount: ReceiveAmount = {
  type: 'bitcoin',
  payerAmountSat: 5_000
}

const prepareResponse = await sdk.prepareReceivePayment({
  paymentMethod: 'liquidAddress',
  amount: optionalAmount
})
```

## LIGHTNING (BOLT12)

```javascript
const prepareResponse = await sdk.prepareReceivePayment({
  paymentMethod: 'bolt12Offer'
})
```

Finally, once we've prepared our request and validated the fees, we proceed with the **execution**:

```javascript
const optionalDescription = '<description>'
const res = await sdk.receivePayment({
  prepareResponse,
  description: optionalDescription
})
const destination = res.destination
```

## Usage Notes

The `destination` returned is a string representing our output. Depending on what `paymentMethod` we chose, we may get a Lightning invoice/offer, or a Liquid/Bitcoin address (BIP21 is supported as well)

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# Step 5 - Sending Payments - Liquid/Lightning

DOCUMENTATION

## Preparing

```javascript
const optionalAmount: PayAmount = {
  type: 'bitcoin',
  receiverAmountSat: 5_000
}
const prepareResponse = await sdk.prepareSendPayment({
  destination: '<offer/invoice/address>',
  amount: optionalAmount
})
// If the fees are acceptable, continue to create the
Send Payment
const sendFeesSat = prepareResponse.feesSat
```

## Executing

```javascript
const optionalPayerNote = '<payer note>'
const sendResponse = await sdk.sendPayment({
  prepareResponse,
  payerNote: optionalPayerNote
})
const payment = sendResponse.payment
```

## Usage Notes

The `destination` passed can be either a BOLT11 invoice, BOLT12 offer or Liquid address/BIP21.
If the destination already includes an amount, the `amount` field becomes redundant and optional. If it doesn't match the embedded destination amount, an error is thrown.

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# Step 5 - Sending Payments - Bitcoin

DOCUMENTATION

## Preparing

javascript

```javascript
const optionalSatPerVbyte = 21
const prepareResponse = await
sdk.preparePayOnchain({
  amount: {
    type: 'bitcoin',
    receiverAmountSat: 5_000
  },
  feeRateSatPerVbyte: optionalSatPerVbyte
})

// Check if the fees are acceptable before
proceeding
const claimFeesSat = prepareResponse.claimFeesSat
const totalFeesSat = prepareResponse.totalFeesSat
```

## Executing

javascript

```javascript
const destinationAddress = 'bc1..'

const payOnchainRes = await
sdk.payOnchain({
  address: destinationAddress,
  prepareResponse
})
```

# Step 6 - Listing Payments

DOCUMENTATION

After having executed our payments, we can then list and filter through them using the `listPayments` method:

javascript

```javascript
const payments = await sdk.listPayments({
    filters: ['send'],
    fromTimestamp: 1696880000,
    toTimestamp: 1696959200,
    offset: 0,
    limit: 50
  })
```

javascript

```javascript
export interface ListPaymentsRequest {
    filters?: PaymentType[];
    states?: PaymentState[];
    fromTimestamp?: number;
    toTimestamp?: number;
    offset?: number;
    limit?: number;
    details?: ListPaymentDetails;
    sortAscending?: boolean;
}
```

# Step 7 - Event Listeners

DOCUMENTATION

User interfaces require a way to **react** to events. Event **listeners** are made specifically for that purpose: they allow us to get nudged by the SDK whenever something important has been completed/needs attention:

javascript

```javascript
class JsEventListener {
  onEvent = (event: SdkEvent) => {
    console.log(`Received event: ${JSON.stringify(event)}`)
  }
}
const eventListener = new JsEventListener()
const listenerId = await
sdk.addEventListener(eventListener)

// Later on ...

await sdk.removeEventListener(listenerId)
```

javascript

```javascript
export type SdkEvent = {
    type: "paymentFailed"; details: Payment
} | {
    type: "paymentPending"; details: Payment
} | {
    type: "paymentRefundable"; details: Payment
} | {
    type: "paymentRefunded"; details: Payment
} | {
    type: "paymentRefundPending"; details: Payment
} | {
    type: "paymentSucceeded"; details: Payment
} | {
    type: "paymentWaitingConfirmation"; details: Payment
} | {
    type: "paymentWaitingFeeAcceptance"; details: Payment
} | {
    type: "synced"
} | {
    type: "syncFailed";error: string
} | {
    type: "dataSynced"; didPullNewRecords: boolean
};
```

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# Step 8 - Logging

DOCUMENTATION

Finally, any production-ready application needs some sort of **logging** to understand what's going on behind the scene. Luckily, the SDK's got you covered.
**Note:** The interface and implementation may differ slightly between languages and platforms.

javascript

```
class JsLogger {
  log = (l: LogEntry) => {
    console.log(`[${l.level}]: ${l.line}`)
  }
}

const logger = new JsLogger()
setLogger(logger)
```

# Hands-On Experience

Has anyone of you played *Space Invaders* as a kid? Well, it's time to reinvoke old times and rewrite the version of our good old game with some Lightning functionality **embedded** in it!

To get started, simply scan the following QR code: