

# Building The Lava Bazaar: A P2P Cross-Chain Asset Checker

The Lava Bazaar is a simple cross-chain asset checker. It works by leveraging the power of LavaSDK's P2P RPC integration with viem ([lava-viem](#)) to provide users with a React frontend to check wallet balances across different blockchains. Under the hood, Lava replaces viem's [PublicClient](#) with its entire decentralized network of RPC providers providing many benefits for dApp developers. The Lava Bazaar is a basic example that can be modified to interact with any blockchain that is supported by both LavaSDK and viem.

tip Check out the complete project on [Github](#) !

## Overview

The tutorial explores how to use [lava-viem](#) to build a fully decentralized cross-chain asset checker which works across all chains mutually supported by LavaSDK and viem. Being able to check balances across multiple chains with a single credential is a building block to many web3 tools including wallets, indexers, and exchanges.

This tutorial will guide you through creating a simple app that can:

- Fetch and display current wallet balances and transaction counts from Ethereum, Arbitrum, FileCoin, Avalanche, Celo, Optimism, and Polygon mainnets.
- Dynamically add/remove support for new blockchains with the simple editing of two arrays!
- Access P2P RPC on viem without a single RPC URL

## Prerequisites

- Basic understanding of [Node.js](#)
- [Express](#)
- , and [React](#)
- .
- Node.js and npm installed.
- Familiarity with using APIs / routing structures!

## Backend Setup

We'll begin by setting up an Express.js server to interact with the blockchain networks via viem's client instances. In a normal dApp, we wouldn't need to separate out a backend from a frontend, but due to network conditions at the time of this tutorial - this is a decent setup to avoid CORS issues with certain providers.

### Install dependencies

npm

install @lavanet/lava-viem express viem

### ✂ Build a Constructor

```
// viemclient.js const
{ createViemClientWithLavaSDK }
=
require ( "@lavanet/lava-viem" ) ;
const clientList =
{ } ;
async
function
createClientForChain ( chainID )
{ try
{ const client =
await
createViemClientWithLavaSDK ( { badge :
{ badgeServerAddress :
```

```

"https://badges.lavanet.xyz" , projectId :

" // " ,

// Fetch your project ID from https://gateway.lavanet.xyz } , geolocation :

"1" ,

//optional chainIds : chainID } ) ; if

( client )

{ console . log ( { chainID }                               intialized: , client . name , client . transport . name , client . uid ) ; return client ; }

else

{ console . log ( { chainID } ✖ failed to initialize! ) ; } ; }

catch

( error )

{ console . log ( ! Error: { error } ) } ; } ;

async

function

getClient ( chainID )

{ const client = clientList [ chainID ] ; if

( ! client )

{ throw

new

Error ( Unsupported or unitialized chain: { chainID } ) ; } return client ; } ;

module . exports

=

{ createClientForChain , clientList } ;

```

inviemclient.js , we define a function to create viem clients for various chains and store them in clientList . We'll want to export this so that we incorporate this logic in our server. We'll also write a small async function getClient() which allows us to select which chain to use for a given request!

## Write Initialization Function

```

// server.js
const express =
require ( 'express' ) ; const
{ clientList , createClientForChain }

=

require ( './viemclient' ) ;

const app =
express ( ) ; const supportedChains =

[ "ARB1" ,

"AVAX" ,

"CELO" ,

"ETH1" ,

"FVM" ,

"OPTM" ,

"POLYGON1" ] ;

( async

( )

```

=>

```
{ for
( const chain of supportedChains )
{ const client =
await
createClientForChain ( chain ) ; clientList [ chain ]
= client ; } } ( ) ;
```

// ... Define API endpoints such as /api/wallet/balance Inserver.js , we import the functions fromviemclient.js and use them to initialize clients and set up API endpoints. We pack this away in an anonymous asynchronous function... Later, we'll put some API endpoints here!

## Create APIs

Before building routes, we need to revisitviemclient.js . We need to add functions that get the latest block number, get the wallet balance of a wallet in question, and get the number of transactions for a given address. All of these will use thegetClient() function to determine which instance we will communicate to... Inviemclient.js put the following:

```
//viemclient.js (cont'd)

// Function that gets the latest block from the selected chain! async

function

getBlockNumber ( chainInput )

{

const client =

await

getClient ( chainInput ) ;

//Call the viem getBlockNumber const latestBlockNumber =

await client . getBlockNumber ( ) ;

//convert to Number return

Number ( latestBlockNumber ) ; }

// Function that gets wallet balance of a given address on a given chain async

function

getWalletBalance ( addressInput , chainInput )

{

const client =

await

getClient ( chainInput ) ;

//Call the viem getBalance let balance =

await client . getBalance ( {

address : addressInput } ) ;

return balance ; } ;

// Function that gets the number of TXs from a given address! async

function

getWalletTxNumber ( addressInput , chainInput )

{ const client =

await

getClient ( chainInput ) ;
```

```

//Call the viem getTxCount const txCount =
await client . getTransactionCount ( {
address : addressInput } ) ;

return txCount ;

} ; Inserver.js we'll need to add some routes, so that these can be called from our frontend without issue. That means ourserver.js can
include something like this:

//server.js (cont'd)

// Middleware to parse JSON bodies app . use ( express . json ( ) ) ;

app . get ( '/api/chain/latest_block_num' ,
async
( req , res )
=>
{ console . log ( "✔ GET - /api/chain/latest_block_num" , req . query . chain ) ; try
{ const chain = req . query . chain const latestBlockNum =
await
getBlockNumber ( chain ) ;
console . log ( ➡ { chain } Returned BlockNum: { latestBlockNum } ) res . json ( {
chain : chain ,
latestBlockNumber : latestBlockNum } ) }
catch
( error )
{ res . status ( 500 ) . json ( {
error : error . message
} ) ; } } )

// Route to get wallet balances app . get ( '/api/wallet/balance' ,
async
( req , res )
=>
{ console . log ( "✔ GET - /api/wallet/balance" , req . query . address , req . query . chain ) ; try
{ const walletAddress = req . query . address ; const chain = req . query . chain const balance =
await
getWalletBalance ( walletAddress , chain ) ;
// Your function to get the balance const balanceString = balance . toString ( ) ;
console . log ( ➡ { chain } Returned Balance: { balance } for { walletAddress } ) res . json ( {
chain : chain ,
address : walletAddress ,
balance : balanceString } ) ; }
catch
( error )
{ res . status ( 500 ) . json ( {
error : error . message
} ) ; } // Logic to interact with blockchain and fetch balance } ) ;

```

```
//Route to get Transaction Count app . get ( '/api/wallet/transaction_count' ,
async
( req , res )
=>
{ console . log ( "👉 GET - /api/wallet/transaction_count" , req . query . address , req . query . chain ) ; // Logic to interact with blockchain
and fetch transactions try
{ const walletAddress = req . query . address ; const chain = req . query . chain ;
// Check if all required parameters are provided if
( ! walletAddress ||
! chain )
{ return res . status ( 400 ) . json ( {
error :
'Missing required parameters'
} ) ; } ;
//Get and return the Transactions
const transactionCount =
await
getWalletTxNumber ( walletAddress , chain ) ; console . log ( ➡ { chain } Counted { transactionCount } TXs on { walletAddress } ) ;
res . json ( { chain ,
address : walletAddress ,
count : transactionCount } ) ;
}
catch
( error )
{ res . status ( 500 ) . json ( {
error : error . message
} ) ; } } ) ;
const
PORT
= process . env . PORT
||
3000 ; app . listen ( PORT ,
( )
=>
{ console . log (
< Server running on port { PORT } } ) ; } ) ; These 3 basic routes will form the basis of our application! Once
you have constructed them correctly, go ahead and give them a test with node server.js . We should get something like the following (give
or take a few lines ;) 🍷
```

## Frontend Setup

Now, we're ready to move onto building our interfaces, if you're familiar with React, this should be a breeze. If not, please ensure that you've setup your `index.js`, `index.html`, and `App.js`. We deliberately avoid using `create-react-app` because of a few configuration issues it has with common web3 dependencies. If you're not used to it, setting up a React environment without using `create-react-app` is not trivial! So take your time and consult a separate [tutorial](#) or [two](#).

You may use any of these dependencies or more, depending on your setup:

Dependency Tree (npm ls )

```
|— @babel/core@7.23.6
|— @babel/preset-env@7.23.6
|— @babel/preset-react@7.23.3
|— babel-loader@9.1.3
|— css-loader@6.8.1
|— react-dom@18.2.0
|— react@18.2.0
|— style-loader@3.3.3
|— webpack-cli@5.1.4
|— webpack-dev-server@4.15.1
└— webpack@5.89.0
```

## Set up a WalletInfo Component

```
//WalletInfo.js
```

```
function
```

```
WalletInfo ( )
```

```
{ const
```

```
[ address , setAddress ]
```

```
=
```

```
useState ( " ) ; const
```

```
[ chain , setChain ]
```

```
=
```

```
useState ( 'ETH1' ) ; const
```

```
[ balance , setBalance ]
```

```
=
```

```
useState ( " ) ; const
```

```
[ latestBlock , setLatestBlock ]
```

```
=
```

```
useState ( " ) const
```

```
[ txCount , setTxCount ]
```

```
=
```

```
useState ( " ) ; const
```

```
[ error , setError ]
```

```
=
```

```
useState ( " ) ;
```

```
const chainOptions =
```

```
{ 'ARB1' :
```

```
'Arbitrum Mainnet' , 'AVAX' :
```

```
'Avalanche Mainnet' , 'CELO' :
```

```
'Celo Mainnet' , 'ETH1' :
```

```
'Ethereum Mainnet' , 'FVM' :
```

```

'FileCoin Mainnet' , 'OPTM' :
'Optimism Mainnet' , 'POLYGON1' :
'Polygon Mainnet' } ;

const
fetchWalletBalance
=
async
( )
=>
{ const response =
await
fetch ( http://localhost:3000/api/wallet/balance?address= { address } &chain= { chain } ) ; if
( ! response . ok )
throw
new
Error ( Error: { response . statusText } ) ; const data =
await response . json ( ) ; setBalance ( data . balance ) ; } ;

const
fetchCurrentBlock
=
async
( )
=>
{ const response =
await
fetch ( http://localhost:3000/api/chain/latest_block_num?chain= { chain } ) if
( ! response . ok )
throw
new
Error ( Error: { responseLatestBlock . statusText } ) ; const data =
await response . json ( ) ; setLatestBlock ( data . latestBlockNumber ) ; }

const
fetchTransactionCount
=
async
( )
=>
{ const response =
await
fetch ( http://localhost:3000/api/wallet/transaction_count?chain= { chain } &address= { address } ) ; if
( ! response . ok )

```

```

throw

new

Error ( Error: { response . statusText } ) ; const data =

await response . json ( ) ; setTxCount ( data . count ) ; } ;

const

fetchWalletData

=

async

( )

=>

{ setError ( " " ) ; try

{ await

fetchCurrentBlock ( ) ; await

fetchWalletBalance ( ) ; await

fetchTransactionCount ( ) ; }

catch

( err )

{ setError ( err . message ) ; } } ; The basic logic of theWalletInfo.js component is above. We havefetch functions that call the APIs we
created and grab the proper responses and set state with them; we also outlined ourchainOptions for when we build our interface. Each
time a button we'll create is called, we'll activate each of these functions so as to update the interface, hencefetchWalletData() . Before
worrying about all that, we will also need to add areturn statement detailing the layout of the component before closing our final bracket!

```

//WalletInfo.js (cont'd)

return

( < div

## style

```

{ {
padding :
'20px'
} }

< center
< h1
The Lava Bazaar </ h1
< h2
P2P Cross-Chain Asset Checker </ h2
powered by < a

```

## href

' <https://docs.lavanet.xyz/viem> '

Lava & viem </ a

< div

## style



```

{ {
marginBottom :
'20px'
} }

< TextField label = " Wallet Address " value = { address } onChange = { ( e )
=>
setAddress ( e . target . value ) } variant = " outlined " fullWidth margin = " normal " />
< FormControl
fullWidth

```

## margin

```

" normal "

< InputLabel
Blockchain </ InputLabel

< Select value = { chain } onChange = { ( e )
=>
setChain ( e . target . value ) } label = " Blockchain "
{ Object . entries ( chainOptions ) . map ( ( [ value , label ] )
=>
( < MenuItem

```

## key

```

{ value }

```

## value

```

{ value }

{ label } </ MenuItem
) ) } </ Select
</ FormControl

< Button variant = " contained " color = " primary " onClick = { fetchWalletData } style = { {
marginTop :
'20px'
} }

Fetch Wallet Data </ Button
</ div

{ balance &&

< p
Balance: { balance } </ p
} { txCount &&

< p
TxCount: { txCount } </ p
} { latestBlock &&

```

```

< p
    Latest Block: { latestBlock } </ p
}
{ error &&
< p

```

## style

```

{ {
color :
'red'
} }

Error: { error } </ p
} </ center
</ div
) ; }

// Now we can export! export
default
WalletInfo ; And we have a complete UI! Let's be sure to add it to theApp.js mainApp() function:
//App.js
function
App ( )
{ return
( < div

```

## className

```

" App "
    < WalletInfo
/> </ div
) ; }

export
default

```

App ; Once you're certain you've plugged up all the holes in your frontend - go ahead and give your new Lava Bazaar application a spin with `npm start` command. if all is well, you should get output similar to the following:

## Test your might!

Give it a test! Does it work? Take a look at a final version [here!](https://github.com/KagemniKarimu/lava-bazaar)

<https://github.com/KagemniKarimu/lava-bazaar>

## Challenges

Need a way to turn up the difficulty? Want to practice your web3 dev skills and learn more about the integration? Try the following:

- Add support for more chains
- Parse the Balances to Make Them more Human Readable
- Add Validation for Address Input(s)
- Implement Real-Time Balance Watching
- Cache Responses for More Speed

- Parallelize the Initialization Process for all Chains
  - Add Tx LookUp in Addition to Address Lookup on the same Text Input
- 

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