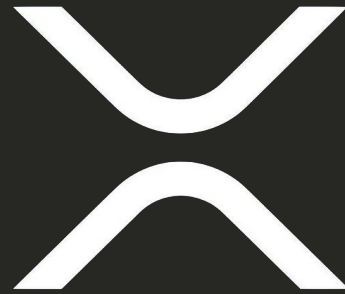


the
XRP Ledger



Wietse Wind

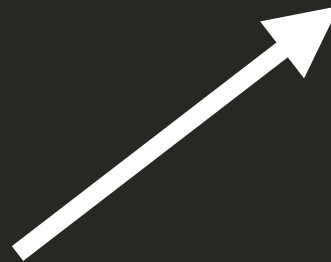
Ripple

Company

XRP

Crypto

Banks.
Settlement.



- ▶ 2011

- ▶ \$200

- ▶ 2016

- ▶ **Ripple**
- ▶ Real company, market + customers
- ▶ **XRPL, Tech**
- ▶ Advantages for users & developers
 - ▶ Low fee: 12 drops, 0.000012
 - ▶ Accessible: JSON, Websockets
 - ▶ Fast:



Learn about **XRP**

Join our Meetup in Eindhoven (NL) on June 26th



how long does it take
for an XRP transaction
to be 100% definitive?

- ▶ **Ripple**
 - ▶ Real company, market + customers
- ▶ **XRPL, Tech**
 - ▶ Advantages for users & developers
 - ▶ Low fee: 12 drops, 0.000012
 - ▶ Accessible: JSON, Websockets
 - ▶ Fast: ~4 sec ledger close & transaction definitive

```
var s = new WebSocket('wss://s1.ripple.com')

s.onopen = function () {
  s.onmessage = function (m) {
    console.log(JSON.parse(m.data))
  }

  s.send(JSON.stringify({
    command: 'subscribe', streams: [ 'transactions' ]
  })))
}
```

- ▶ Tools / Howto / ...
- ▶ Open source (Github)
 - ▶ Docker
 - ▶ npm
- ▶ Community
 - ▶ XRP Tip Bot
 - ▶ Ledger.exposed



Welcome @WietseWind!

Hi! Helping to spread the ❤️ using XRP tips! Click [here to learn more](#) about how to use the XRP Tip Bot.

Tips sent

261

[Details](#)

Tips received

657

[Details](#)

✕ Balance

480.934117

[Withdraw](#) or [deposit](#)

Feel like sending @WietseWind (the XRP Tip Bot developer) a sip 🍷?



Tip **0.15 XRP** 🎉

How to use the XRP Tip Bot

Send tips

1. Login with reddit / Twitter / Discord

Login at this website using your reddit-account. No registration required. We just need to know your reddit / Twitter / Discord username, so we know who's balance to increase when you deposit XRP to the Tip Bot.

2. Deposit XRP

You send some XRP to the Tip Bot address using the destination tag for your account. Once received (XRP is fast!) you will be able to use your funds to send tips.

3. Send tip using a reply

Receive tips

1. Receive tips

So you posted something interesting, helped someone, or someone just likes you. A generous person replies something like this to one of your posts: reddit: **+3.6789 /u/xrptipbot**, Twitter / Discord: **+3.6789 @xrptipbot**. The Tip Bot will notice it has been mentioned, and transfers the XRP 🎉

2. Login with reddit / Twitter / Discord

Login using your reddit / Twitter / Discord account to check your Tip Bot balance, deposit XRP or withdraw your tips.

3. Withdraw or tip others

Account Transaction Flow

Most recent XRP only **Payment** transactions

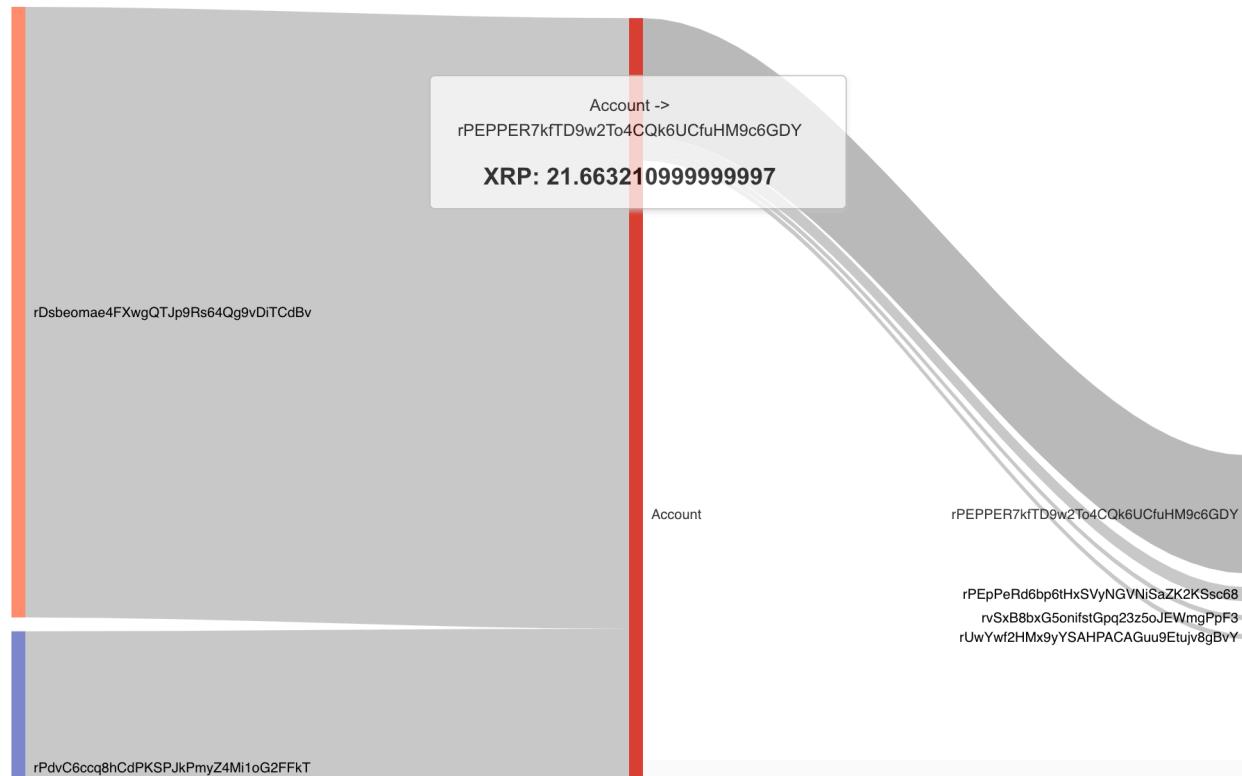
Enter a (single) wallet address

rpePPeRpC89vpCY3CDzhzMCs78nPoNnAKm

Check

Chart based on most recent **14** transactions

The transactions are sent from / to: **3** input accounts and **4** output accounts



Richlist stats

Last update: 14 minutes ago

XRP owned by the top 100 accounts

37,630,787,736 XRP - **37.63 %**

Calculation:

$\text{SUM(Non-escrowed XRP Top 100 accounts)} / \text{SUM(Existing XRP on ledger)} * 100$

Note: there are multiple **exchange wallets** (accounts) in the Top 100. These wallets contain the funds of many individual investors. The actual number will be **significantly lower!**

Non-escrowed XRPripple

✓ Existing XRP

The numbers in the tables below are not taking escrowed XRP into account.

By # of accounts (balance range)

By percentage of accounts

# Accounts	Balance from	- To	Sum (XRP)
4	1,000,000,000 XRP	∞	14,671,762,726 XRP
12	500,000,000 XRP	999,999,999 XRP	9,443,822,594 XRP
43	100,000,000 XRP	499,999,999 XRP	11,633,108,084 XRP
69	20,000,000 XRP	99,999,999 XRP	2,597,445,561 XRP
58	10,000,000 XRP	19,999,999 XRP	747,878,460 XRP
169	5,000,000 XRP	9,999,999 XRP	1,181,664,822 XRP
1002	1,000,000 XRP	4,999,999 XRP	1,944,735,693 XRP
1084	500,000 XRP	999,999 XRP	728,890,387 XRP
7596	100,000 XRP	499,999 XRP	1,497,946,708 XRP
3334	75,000 XRP	99,999 XRP	331,181,038 XRP

Infrastructure

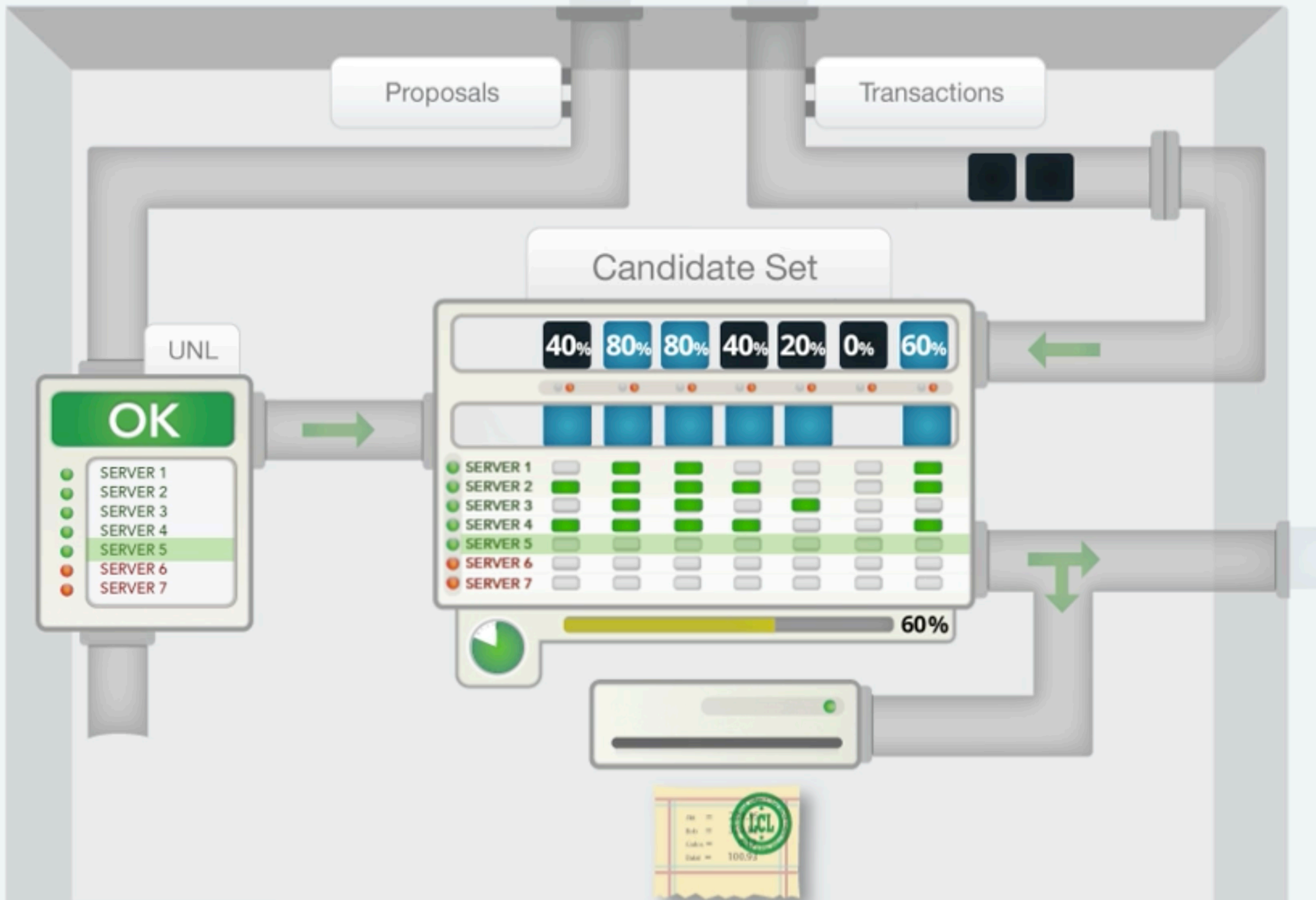
rippled

XRPL features

TransactionTypes

Infrastructure

- ▶ Validators
 - ▶ UNL
 - ▶ Consensus: vote & order



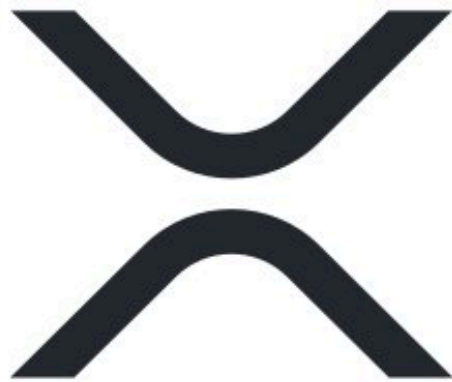
Infrastructure

- ▶ Validators
 - ▶ UNL
 - ▶ Consensus: vote & order
- ▶ Nodes
 - ▶ JSON, Websockets
 - ▶ Public blockchain
 - ▶ Full history?



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how much disk space required
to run a rippled node,
to read/write transactions
from/to the XRP ledger?

rippled node disk space

- ▶ Docker image 488MB
- ▶ Ledger history: 256
 - ▶ Cleanup: after 256 (min.)
- ▶ Database size: 1,7GB

~ 2,3GB - SSD(!)

Full History: ~8TB

xrptipbot/rippled

```
docker run -dit --name rippled -p 8080:80  
-v /tmp/ripple/:/config/ xrptipbot/rippled
```

<https://github.com/WietseWind/docker-rippled/tree/master/config>

```
var s = new WebSocket('ws://localhost:8080')

s.onopen = function () {
  s.onmessage = function (m) {
    console.log(JSON.parse(m.data))
  }

  s.send(JSON.stringify({
    command: 'subscribe', streams: [ 'transactions' ]
  }))
}
```

XRPL features

- ▶ Account Reserve
- ▶ Decentralized Exchange
 - ▶ Offers
- ▶ Payment Channels
- ▶ Escrow
- ▶ MultiSig
- ▶ AccountSet
- ▶ Checks

Normal transaction

- ▶ Drops
- ▶ String
- ▶ Sequence

```
1 {  
2   "TransactionType" : "Payment",  
3   "Account" : "rf1BiGeXwwQoi8Z2ueFYTEXSwuJYfV2Jpn",  
4   "Destination" : "ra5nK24KXen9AHvsdFTKHSANinZseWnPcX",  
5   "Amount" : "1000000",  
6   "Fee": "12",  
7   "Sequence": 2,  
8 }
```

- ▶ Dest. Tag
- ▶ Memo

```
  "Memos": [  
    {  
      "Memo": {  
        "MemoType": "687474703a2f2f65786...",  
        "MemoData": "72656e74"  
      }  
    }  
  ],
```

- ▶ Payment
- ▶ Q?

Decentralized Exchange

- ▶ Use case

- ▶ IOU

- ▶ TrustLine

- ▶ Offers

- ▶ Matching

- ▶ Q?

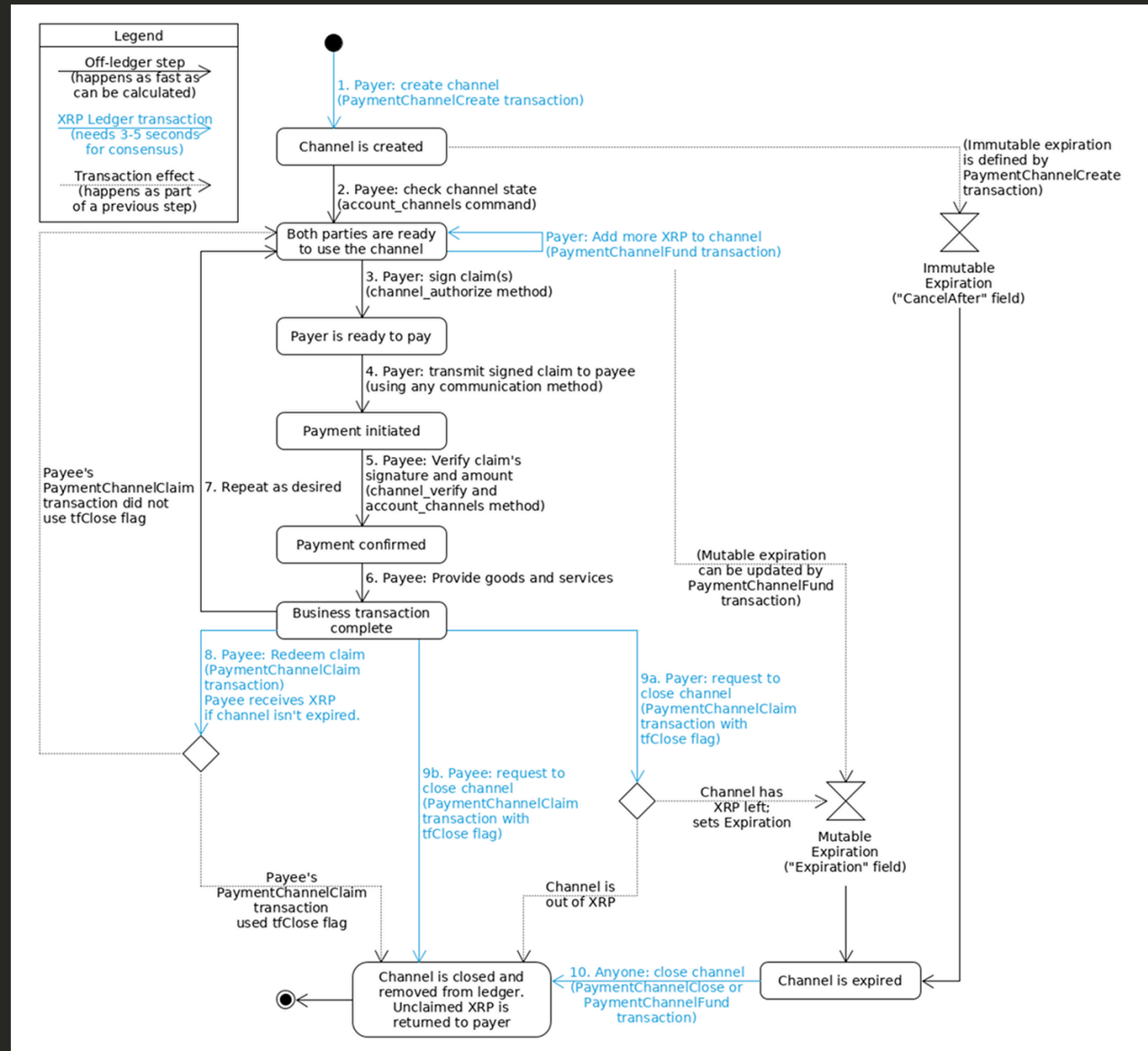
```
1 {  
2   "TransactionType" : "Payment",  
3   "Account" : "rf1BiGeXwwQoi8Z2ueFYTEXSwuJYfV2Jpn",  
4   "Destination" : "ra5nK24KXen9AHvsdFTKHSANinZseWnPcX",  
5   "Amount" : {  
6     "currency" : "USD",  
7     "value" : "1",  
8     "issuer" : "rf1BiGeXwwQoi8Z2ueFYTEXSwuJYfV2Jpn"  
9   },  
10  "Fee": "12",  
11  "Flags": 2147483648,  
12  "Sequence": 2,  
13 }
```

Payment Channels

► Use case

► ILP

► Q?



Escrow

- ▶ Use case

- ▶ Create

- ▶ Cancel

- ▶ Finish

- ▶ Condition

- ▶ Q?

```
1 {  
2   "Account": "rflBiGeXwwQoi8Z2ueFYTEXSwuJYfV2Jpn",  
3   "TransactionType": "EscrowCreate",  
4   "Amount": "10000",  
5   "Destination": "rsA2LpzuawewSBQXkiju3YQTMzW13pAAAdW",  
6   "CancelAfter": 533257958,  
7   "FinishAfter": 533171558  
8 }
```

**Wietse Wind**

@WietseWind



Over the moon 😊 Grinning from ear to ear 😄 I am so very #happy 🎉 And I want to share this using a very, very special \$XRP #transaction xrpcharts.ripple.com/#/transactions ... - #xrpl #announcement ❤️ 🎉

Tweet vertalen

**XRP Charts**

XRP Ledger Data Visualization.

xrpcharts.ripple.com

18:45 - 22 mei 2018

85 retweets 489 vind-ik-leuks



146

85

489

**Wietse Wind** @WietseWind · 22 meiOh, and for the sake of open source: gist.github.com/WietseWind/e53... 😊

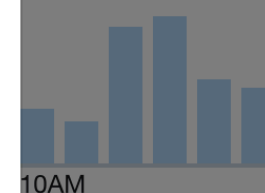
Tweet vertalen

Wietse Wind

WietseWind

Software, programming (nodejs, php, sh, ...), entrepreneurship, parrots and P 🎉

Nederland (Netherlands)

wietse.com**Je tweetactiviteit**Je Tweets zijn 9.453
afgelopen 24 uur

Bekijk je toptweets

DESCRIPTION RAW**STATUS:**

This transaction was successful, and validated in ledger **38843424** on **May 22, 2018 3:58 PM**.

DESCRIPTION:

This is an **EscrowCreate** transaction.

The escrow is from **rPdvC6ccq8hCdPKSPJkPmyZ4Mi1oG2FFkT** to **rPPnHiX69sHhYb9HE8BgZgcrCXbvk9baby**

It escrowed **1,000** XRP

It can be finished after **December 1, 2031 1:00 PM**.

The transaction's sequence number is **152**

MEMOS:

The transaction contains the following memos:

1.
 - **Type:** <https://kppnu8a.dlvr.cloud/Ultrasound.png> (decoded hex)
 - **Data:** [Due date: December 1, 2018](#) (decoded hex)
2.
 - **Data:** [For your 13th birthday](#) (decoded hex)

TRANSACTION COST:

Sending this transaction consumed **0.000012** XRP.

AFFECTED LEDGER NODES:

It affected **5** nodes in the ledger:

CREATED NODES:

- It created a **DirectoryNode** node owned by **rPPnHiX69sHhYb9HE8BgZgcrCXbvk9baby**
- It created a **Escrow** node

MODIFIED NODES:

- It modified the **AccountRoot** node of **rPdvC6ccq8hCdPKSPJkPmyZ4Mi1oG2FFkT**
 - [Balance reduced by 1,000.000012](#) from **8,339.486476** to **7,339.486464** XRP
- It modified an **AccountRoot** node

```
1  const RippledWsClient = require('rippled-ws-client')
2  const RippledWsClientSign = require('rippled-ws-client-sign')
3
4  const SeedOrKeypair = 'sXXXXXXXXXXXXXXXXXXXX' // The secret of the sending wallet
5
6  const FinishAfter = Math.floor(new Date('2031-12-01T12:00:00Z') / 1000) - 946684800 /* XRPL Timestamp offset */
7
8  const Transaction = {
9    TransactionType: 'EscrowCreate',
10   Account: 'rSENDINGWALLET',
11   Destination: 'rRECEIVINGWALLET',
12   FinishAfter: FinishAfter,
13   Amount: 1 * 1000000, // Amount in drops, so multiply (6 decimal positions), this is 1 XRP
14   LastLedgerSequence: null,
15   Fee: 12,
16   Memos: [
17     {
18       Memo: {
19         MemoType: Buffer.from('Sometext over here', 'utf8').toString('hex').toUpperCase(),
20         MemoData: Buffer.from('Some more text over here', 'utf8').toString('hex').toUpperCase()
21       }
22     },
23     {
24       Memo: {
25         MemoData: Buffer.from('And more text', 'utf8').toString('hex').toUpperCase()
26       }
27     }
28   ]
29 }
30
31 new RippledWsClient('wss://s1.ripple.com').then((Connection) => {
32   new RippledWsClientSign(Transaction, SeedOrKeypair, Connection).then((TransactionSuccess) => {
33     console.log('TransactionSuccess', TransactionSuccess)
34     Connection.close()
35   }).catch((SignError) => {
36     console.log('SignError', SignError.details)
37     Connection.close()
38   })
39 }).catch((ConnectionError) => {
40   console.log('ConnectionError', ConnectionError)
41 })
```

MultiSig

► Use

► Lists

► Quorum

► Q?

```
1 {
2   "TransactionType": "SignerListSet",
3   "Account": "rnBFvgZphmN39GWzUJeUitaP22Fr9be75H",
4   "Fee": "10000",
5   "SignerQuorum": 3,
6   "SignerEntries": [
7     { "SignerEntry": {
8       "Account": "rsA2LpzuawewSBQXkiju3YQTMzW13pAAdW", "SignerWeight": 2 }
9     },
10    { "SignerEntry": {
11      "Account": "rUpy3eEg8rqjqfUoLeBnZksbKbFsKXC3v", "SignerWeight": 1 }
12    },
13    { "SignerEntry": {
14      "Account": "raKEEVSGnKSD9ZyvXu4z6Pqpm4ABH8FS6n", "SignerWeight": 1 }
15    }
16  ]
17 }
```

```
11 "Signers" : [
12   { "Signer" : {
13     "Account" : "rsA2LpzuawewSBQXkiju3YQTMzW13pAAdW",
14     "SigningPubKey" : "02B3EC4E5DD9...",
15     "TxnSignature" : "30450221009C1..."
16   }
17 },
18   { "Signer" : {
19     "Account" : "rUpy3eEg8rqjqfUoLeBnZksbKbFsKXC3v",
20     "SigningPubKey" : "028FFB276505...",
21     "TxnSignature" : "30440220680BB..."
22   }
23 },
24 ],
25 "SigningPubKey" : "",
```

AccountSet

► Use case

► Flags

► Eg. Require DestTag

► Info

► Key

► Regular

► Master

► Q?

```
1 {  
2     "TransactionType": "AccountSet",  
3     "Account" : "rflBiGeXwwQoi8Z2ueFYTEXSwuJYfV2Jpn",  
4     "Fee": "12",  
5     "Sequence": 5,  
6     "Domain": "6578616D706C652E636F6D",  
7     "SetFlag": 5,  
8     "MessageKey": "rQD4SqHJtDxn5DDL7xNnojNa3vxS1Jx5gv"  
9 }
```

Checks

▶ Testnet

▶ Use case

▶ Create

▶ Cash

▶ Cancel

▶ Q?

```
1 {  
2   "TransactionType": "CheckCreate",  
3   "Account": "rUn84CUYbNjRoTQ6mSW7BVJPSVJNLb1QLo",  
4   "Destination": "rfkE1aSy9G8Upk4JssnwBxhEv5p4mn2KTy",  
5   "SendMax": "100000000",  
6   "Expiration": 570113521,  
7   "DestinationTag": 1,  
8   "Fee": "12"  
9 }
```

```
1 {  
2   "Account": "rfkE1aSy9G8Upk4JssnwBxhEv5p4mn2KTy",  
3   "TransactionType": "CheckCash",  
4   "Amount": "100000000",  
5   "CheckID": "838766BA2B99...",  
6   "Fee": "12"  
7 }
```

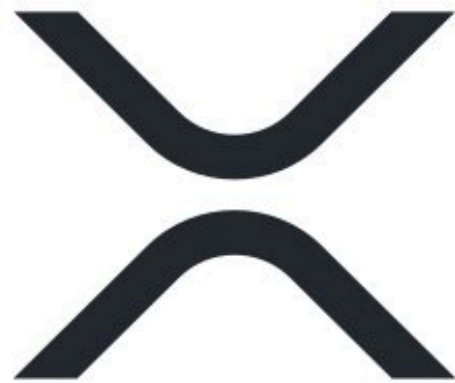
Demo

- ▶ Live transactions
(with Vue Webpack)



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what type of transaction
is processed the most
on the XRP ledger?

Getting started

- ▶ docker
- ▶ npm
- ▶ github
- ▶ gist
- ▶ runkit