

How Local are Ripple Transactions

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Responsibility of Prof. Bryan Ford
Supervision of Cristina Basescu and Kelong Cong

Semester Project Presentation

School of Computer and Communication Systems
Decentralized and Distributed Systems lab



 Alice

 Bob





Exchange value as quickly as information

Wallets

Persons

50 XRP

Gateways

1000 XRP

Credit link

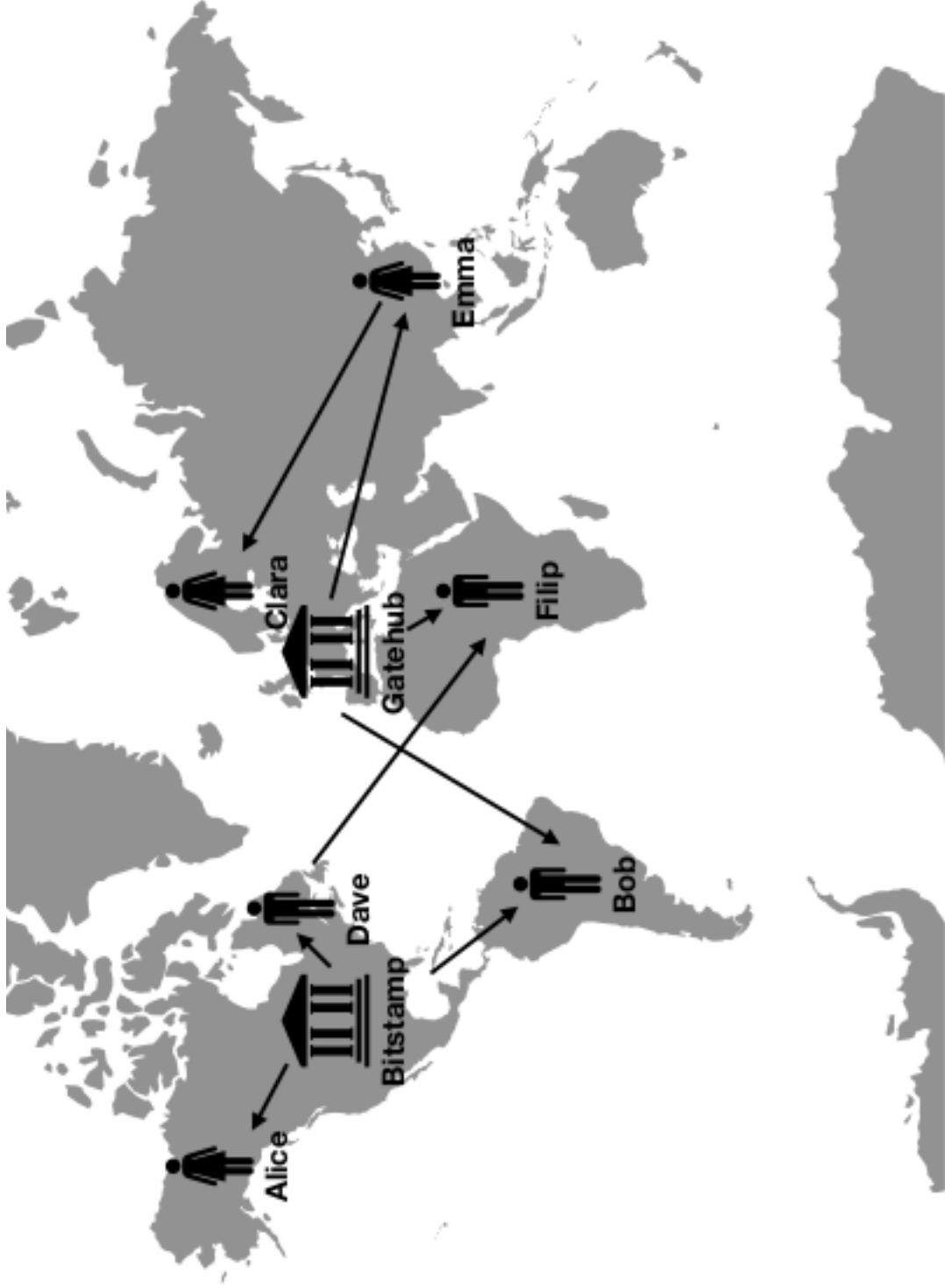
A $\xrightarrow{100 / 300 \text{ EUR}}$ B

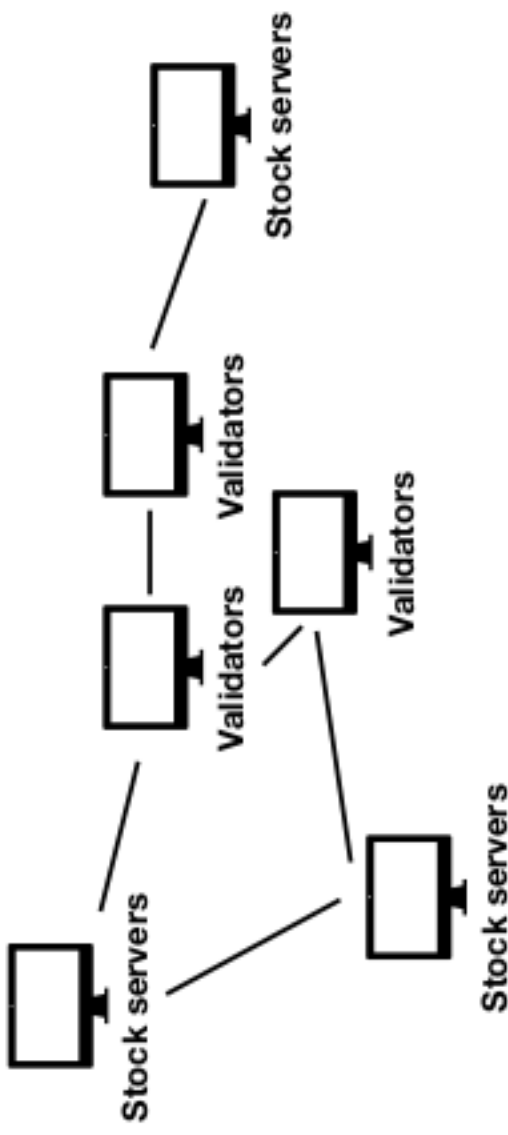
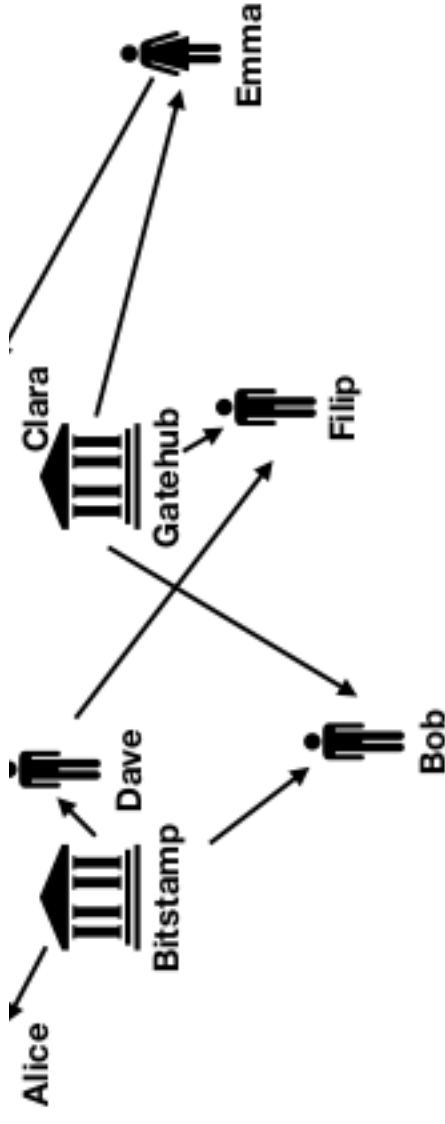
Nodes


Stock servers


Validators







- Direct XRP transactions
- Path-based transactions

Alice



50 XRP

Bob



20 XRP

Alice

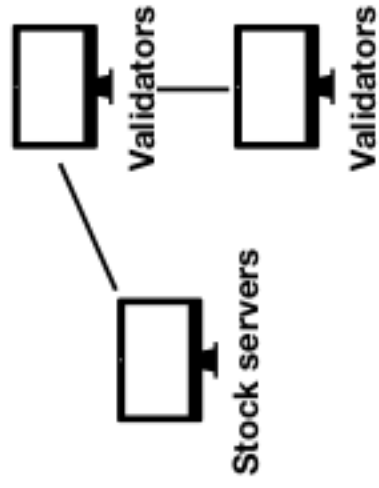


50 XRP

Bob



20 XRP



Alice



50 XRP

Bob



20 XRP



Stock servers



Validators



Validators



Alice

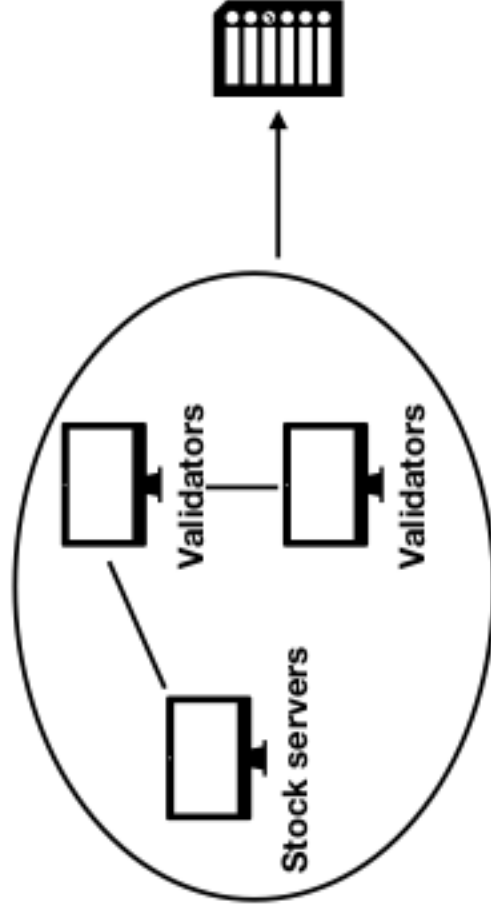


50 XRP

Bob



20 XRP

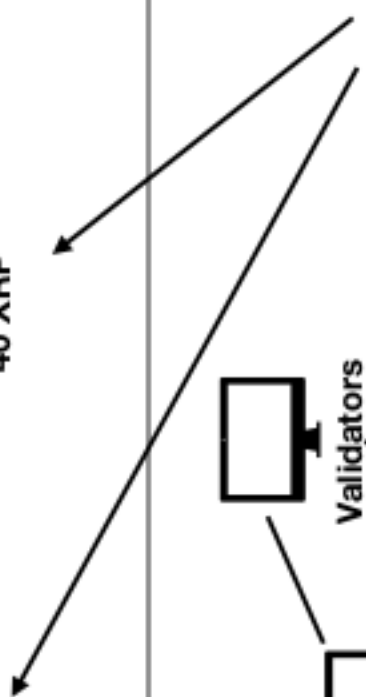
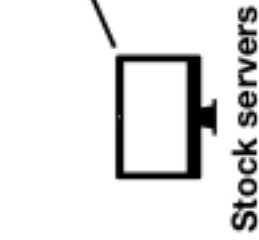


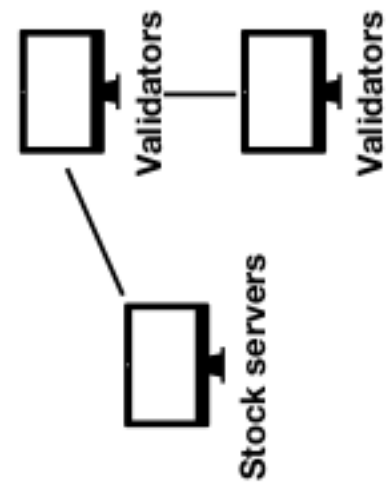
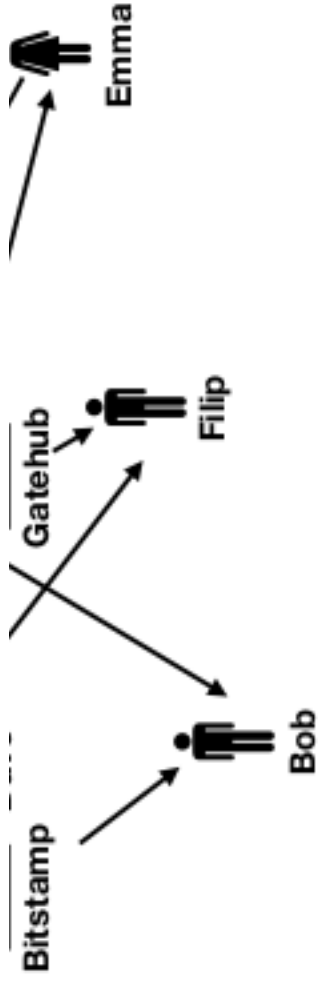
Alice

Bob

30 XRP

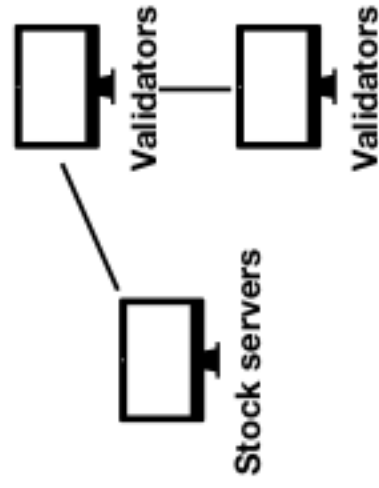
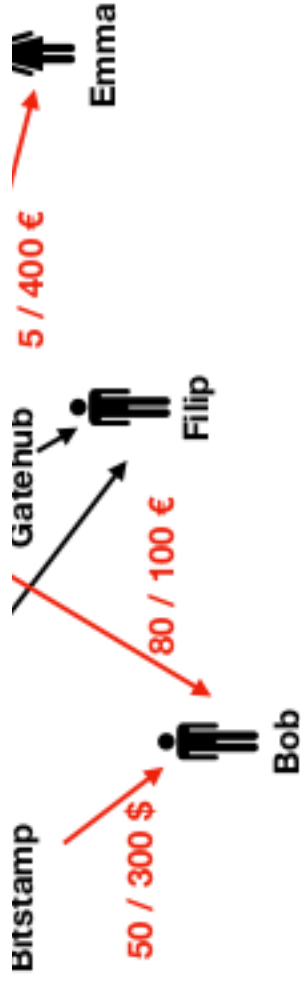
40 XRP





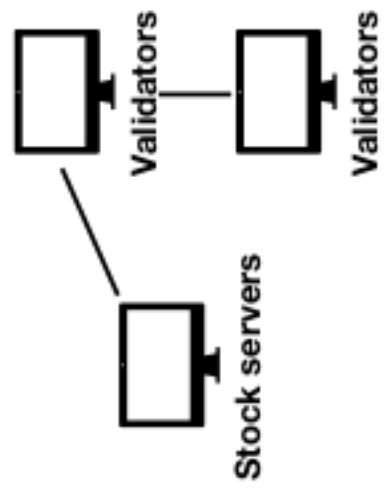
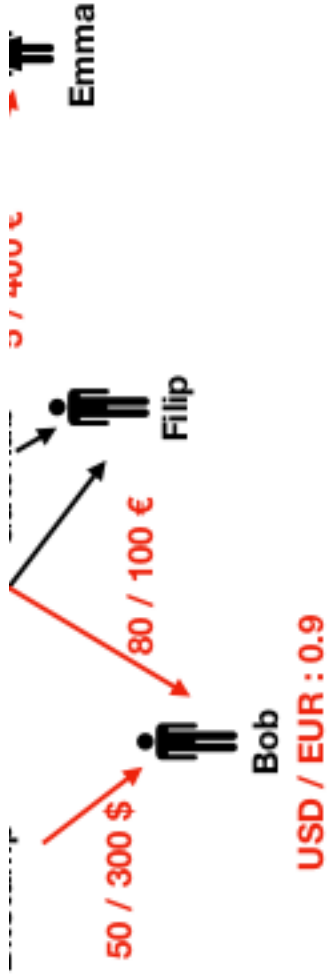
EPFL



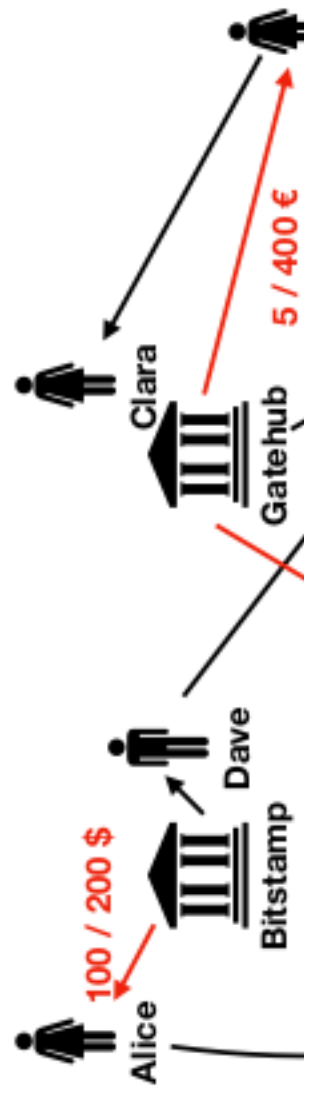


EPFL





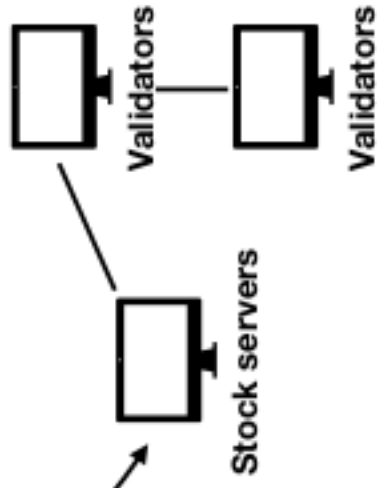
EPFL



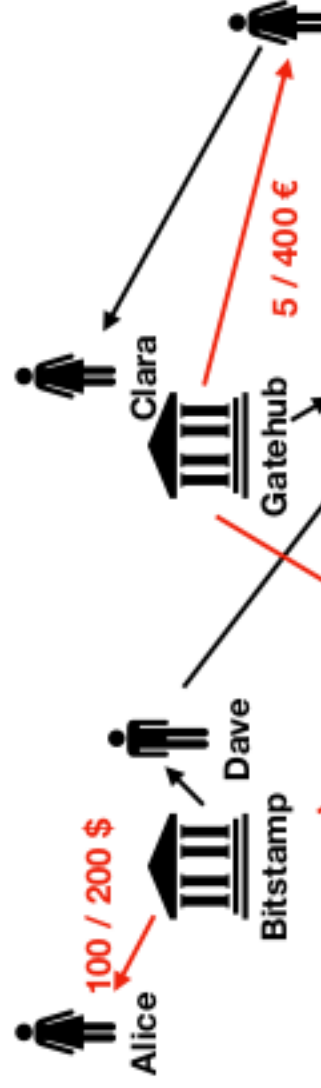
II
Emma

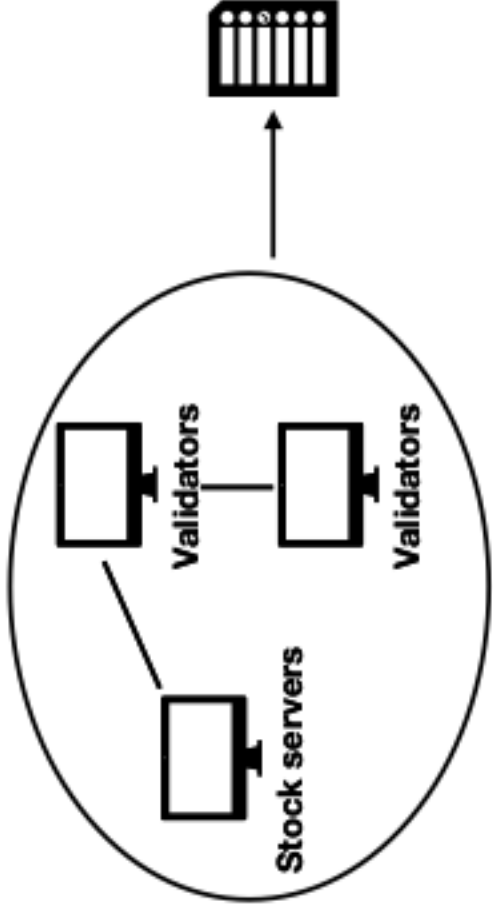
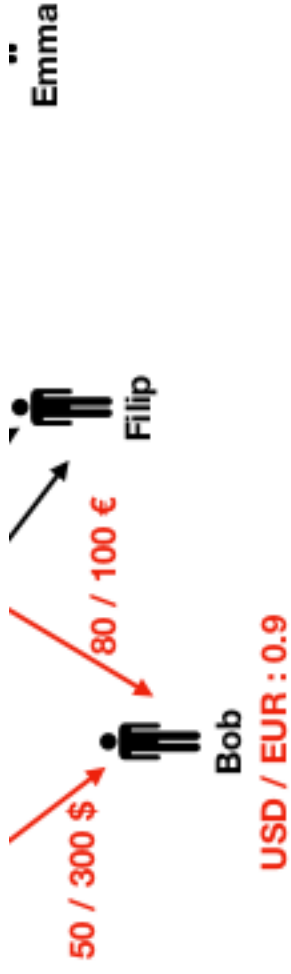


USD / EUR : 0.9

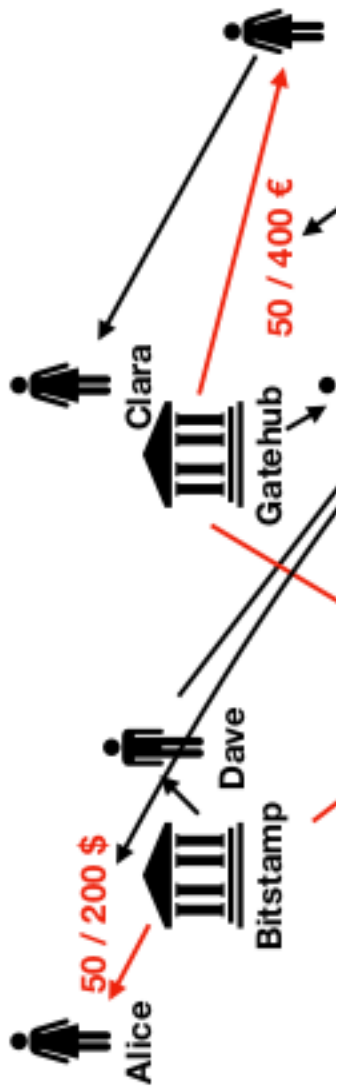


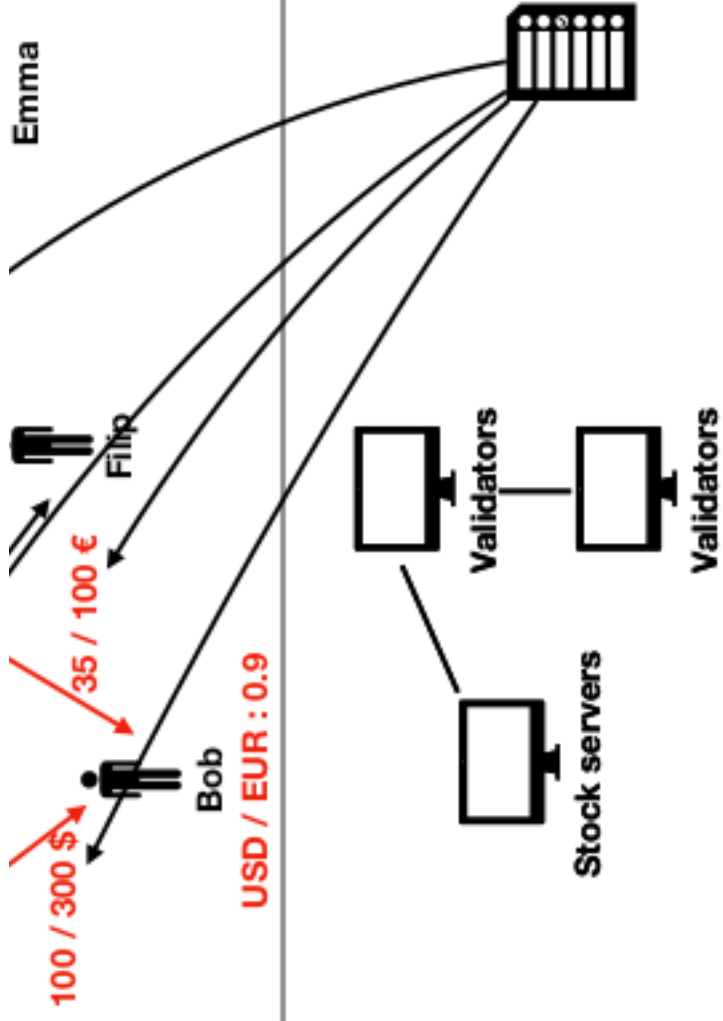
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EPFL





Using nodes to get the senders location :

Using nodes to get the senders location :

- Use the Ripple Crawler

Using nodes to get the senders location :

- Use the Ripple Crawler **x**

Using nodes to get the senders location :

- Use the Ripple Crawler **X**
- Connect to existing nodes

Using nodes to get the senders location :

- Use the Ripple Crawler **X**
- Connect to existing nodes **X**

Using nodes to get the senders location :

- Use the Ripple Crawler **X**
- Connect to existing nodes **X**
- Running our own node

...

Using nodes to get the senders location :

- Use the Ripple Crawler **X**
- Connect to existing nodes **X**
- Running our own node **X**

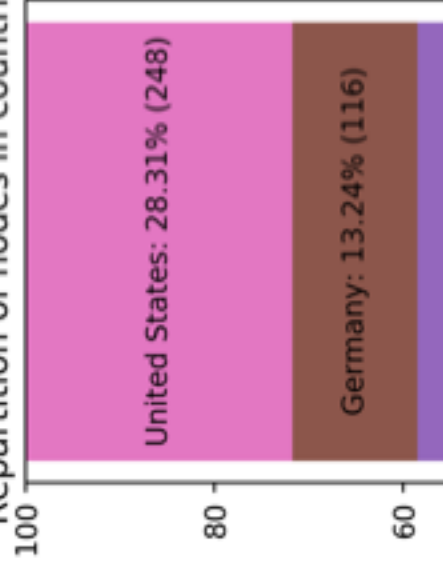
Running a gateway

Running a gateway **x**

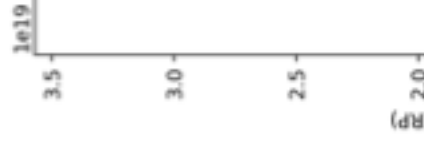
Can we try to correlate the currency usage to the number of nodes in a given country ?

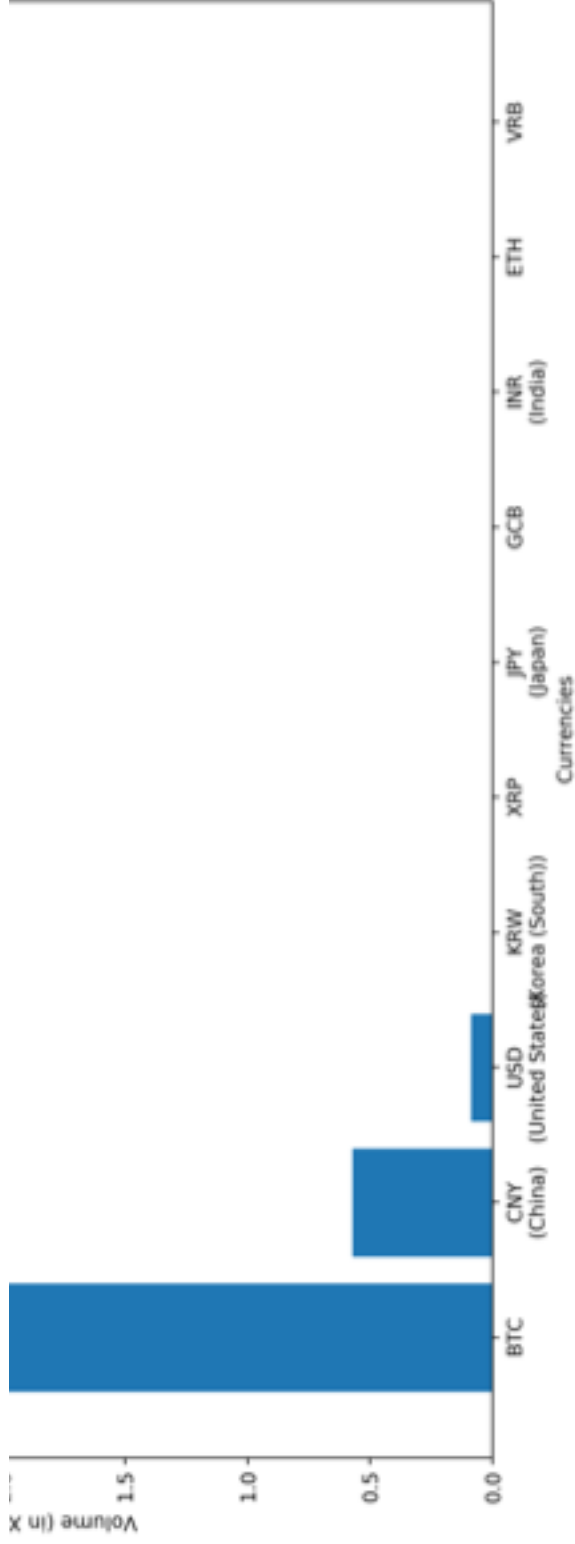
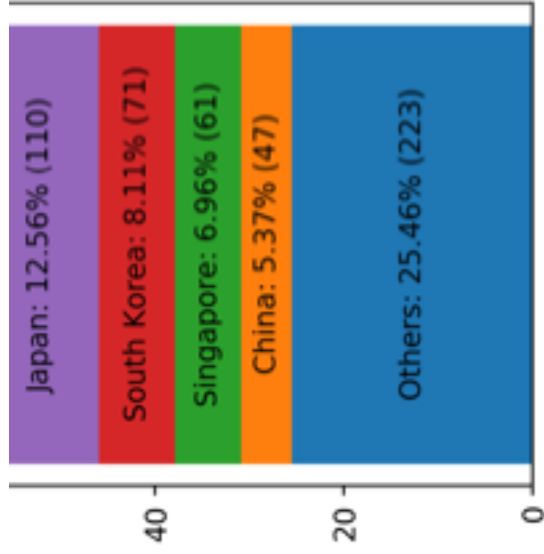


Repartition of nodes in countries



Volume (in XRP) for top 10 currencies



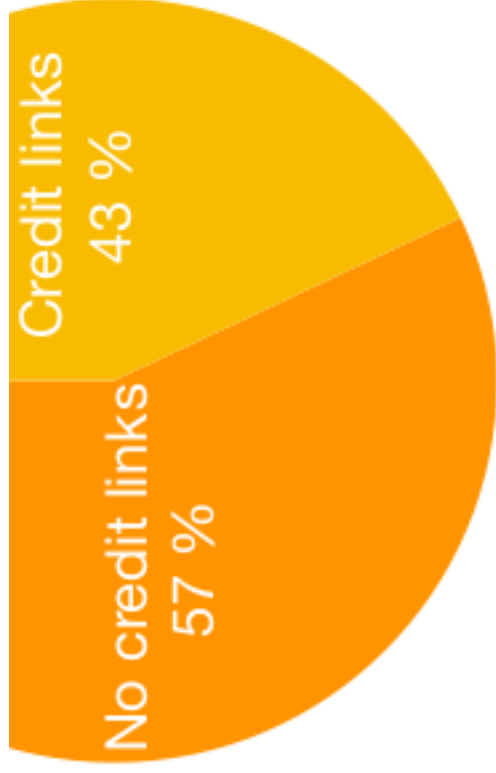


We are left with transactions

Credit links

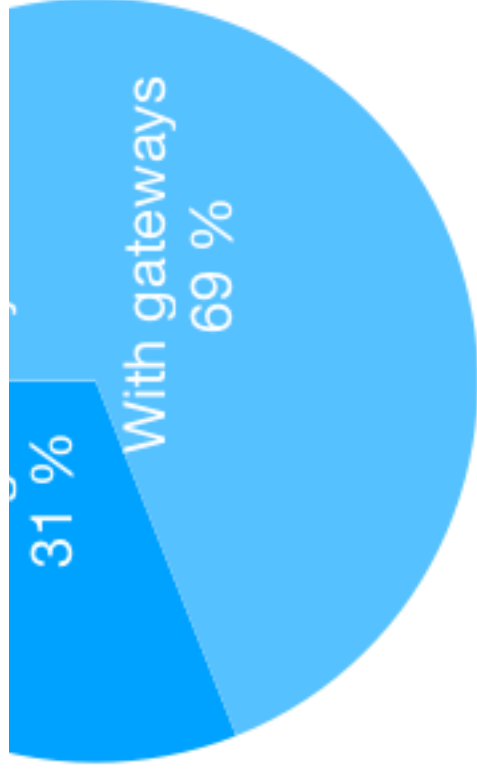
Wallets





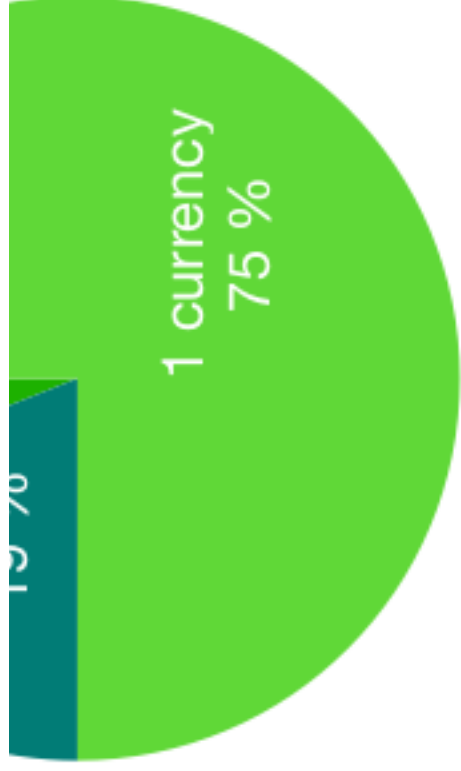
For wallets that have credit links



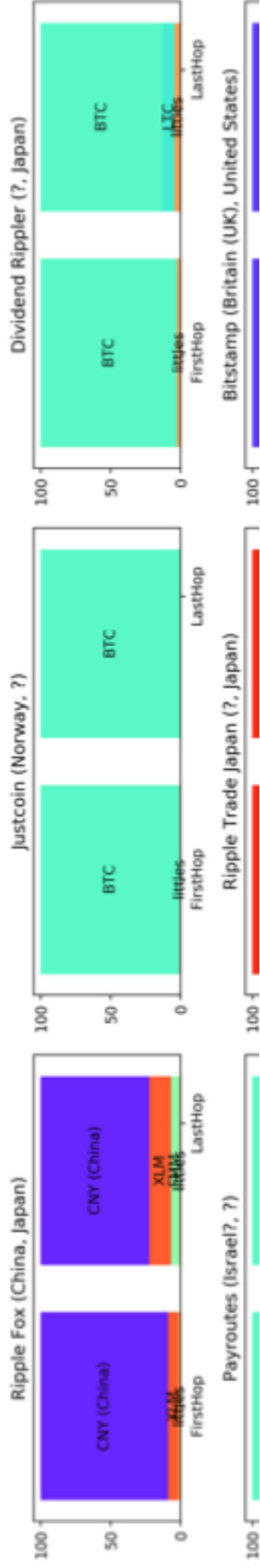


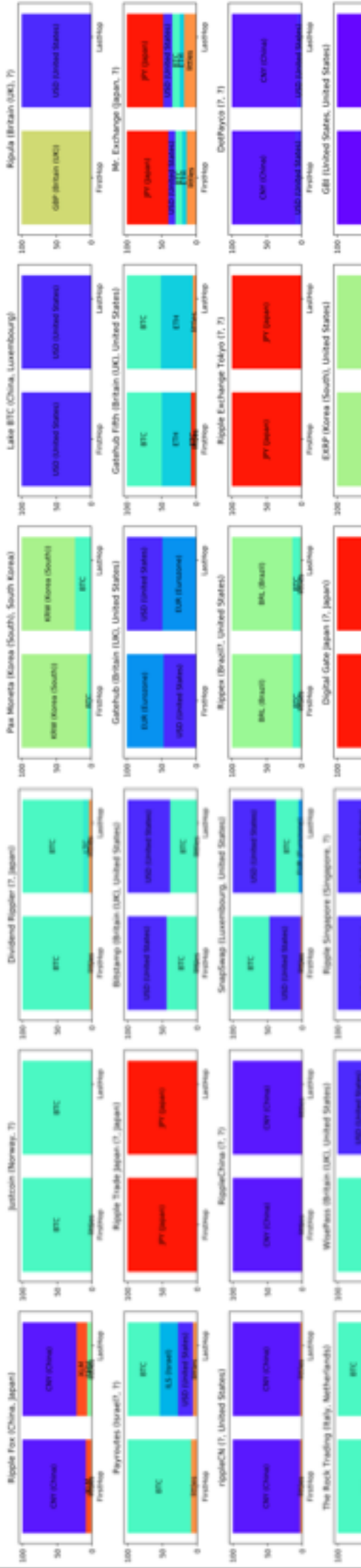
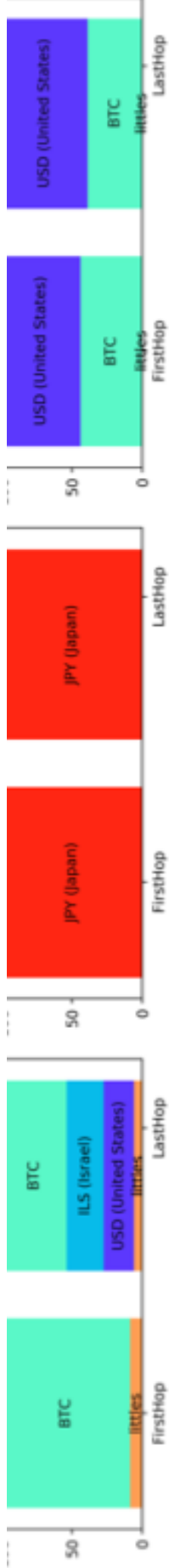
Currency of credit links with gateways

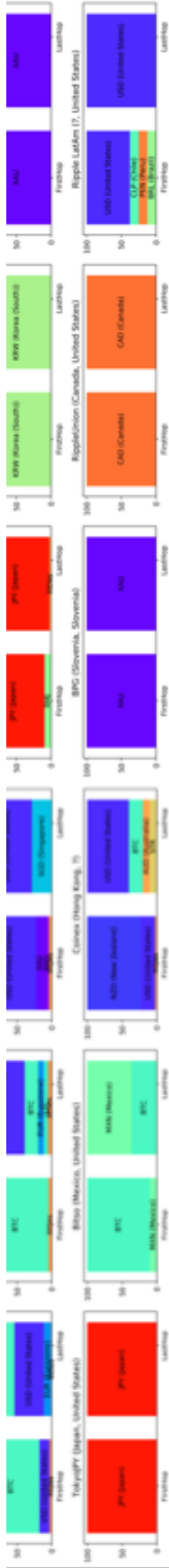




Gateways as first and last hop ?



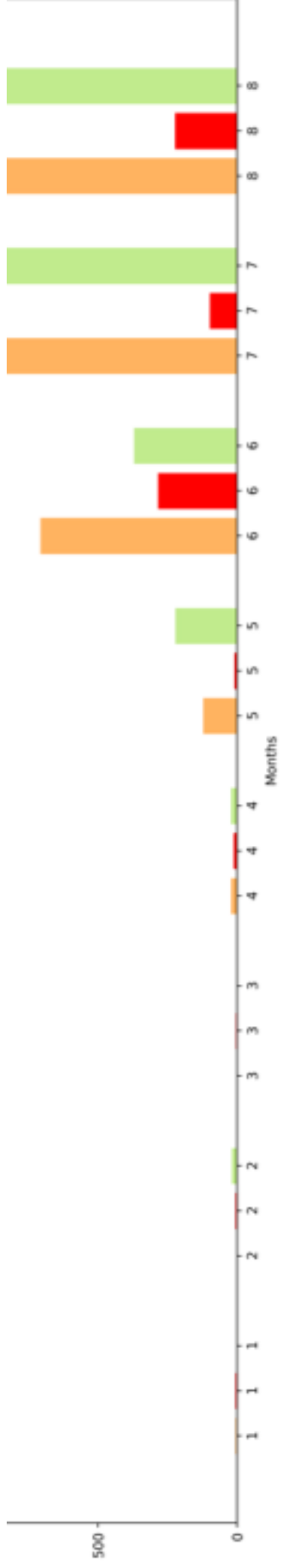




Evolution of credit links

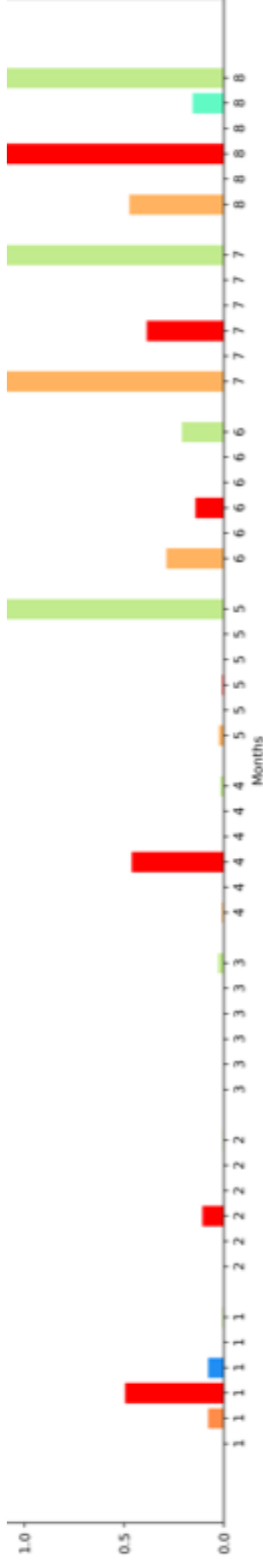
Number of transactions processed by gateways as first hop for USD in 2017 per month





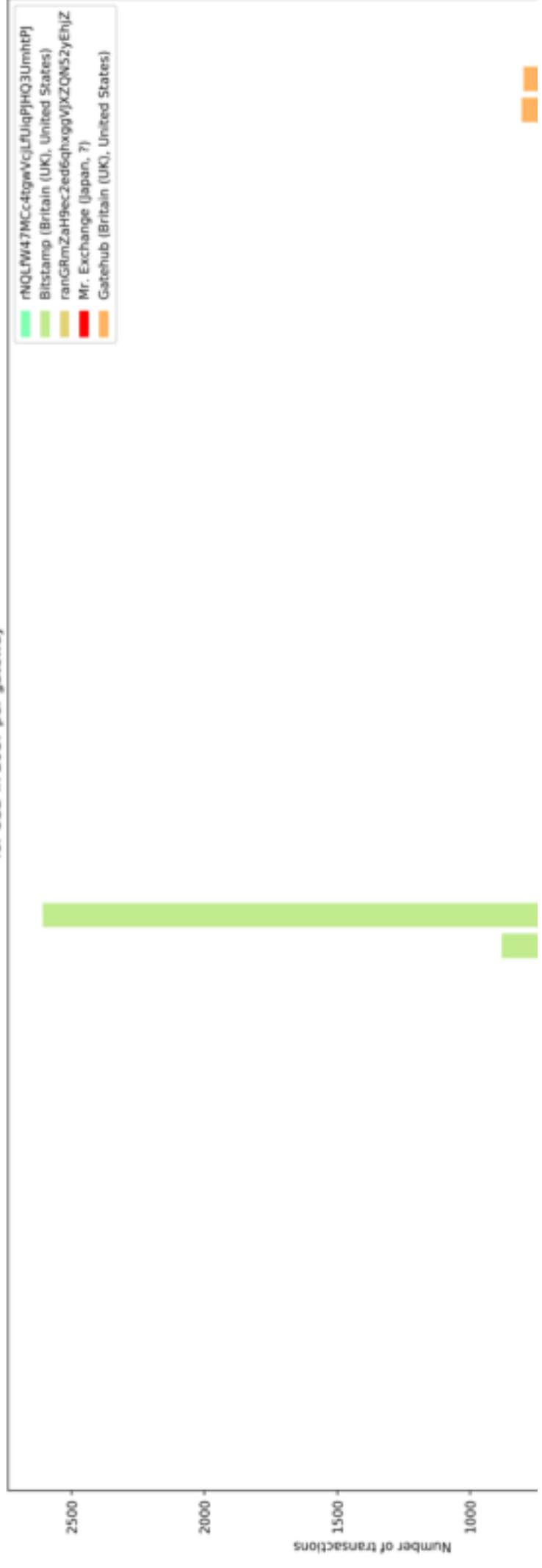
Volume processed by gateways as first hop for USD in 2017 per month

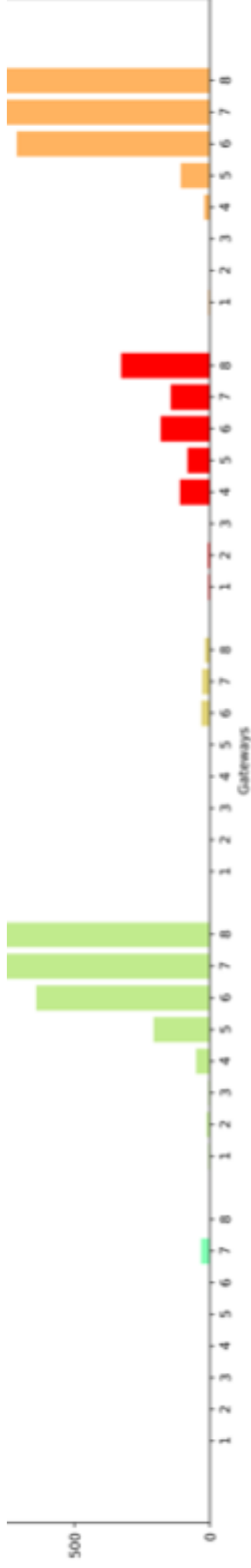




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Number of transactions processed by gateway as last hop for USD in 2017 per gateway

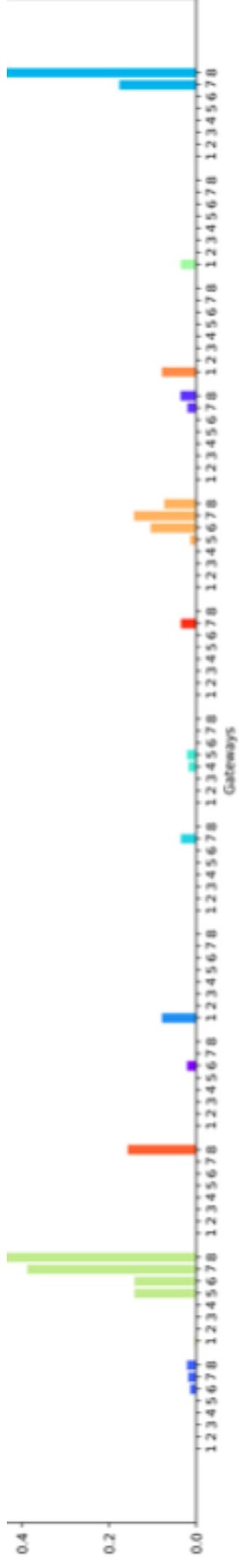




Volume processed by gateways as last hop for USD in 2017 per gateway



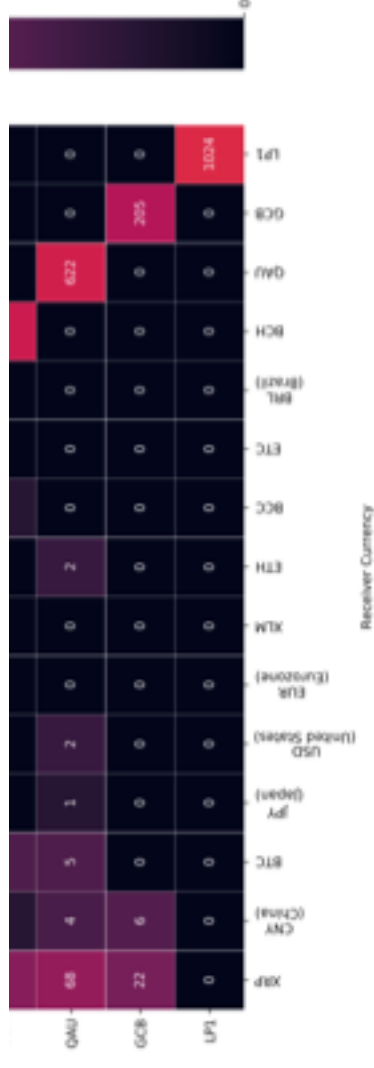
- rEN3zevNnGMMwFRHZ9uNnbswYfCLCXXPPX
- Bitstamp (Britain (UK), United States)
- reg5MeWXLXWAqg6AK6uMqcpnni6uIMqpu
- rUnPwmIqIm65XXQDtMXLSsuBghYx1gYIB
- rGaR5TGzYjA5MWy2fXdbxUEWHjWAsrVm77
- rEzvgZ1xHGp1BPjWvPIKdEYpBDRGekmMB
- rBNvgTnsdh8ckC19RM8avGNuMZnpwrMP6n
- r3Gs2n5ogVHa8qfHwkkzTy9QJEsawUQVn38
- Gatehub (Britain (UK), United States)
- rDm49Dc7UnwgcTFGzWC1kczKXcomp5jrmH
- rFn54seLM259g83Tk9qeRnmwHgfqK6Un3
- rMZHTKerFHzk86bHarvYKawGWwYQug3MU
- rpQhAu8n7WwvNPFfeqXPDVZyNxB5haQrYZU



Currencies

How sender and receiver currencies are linked ?



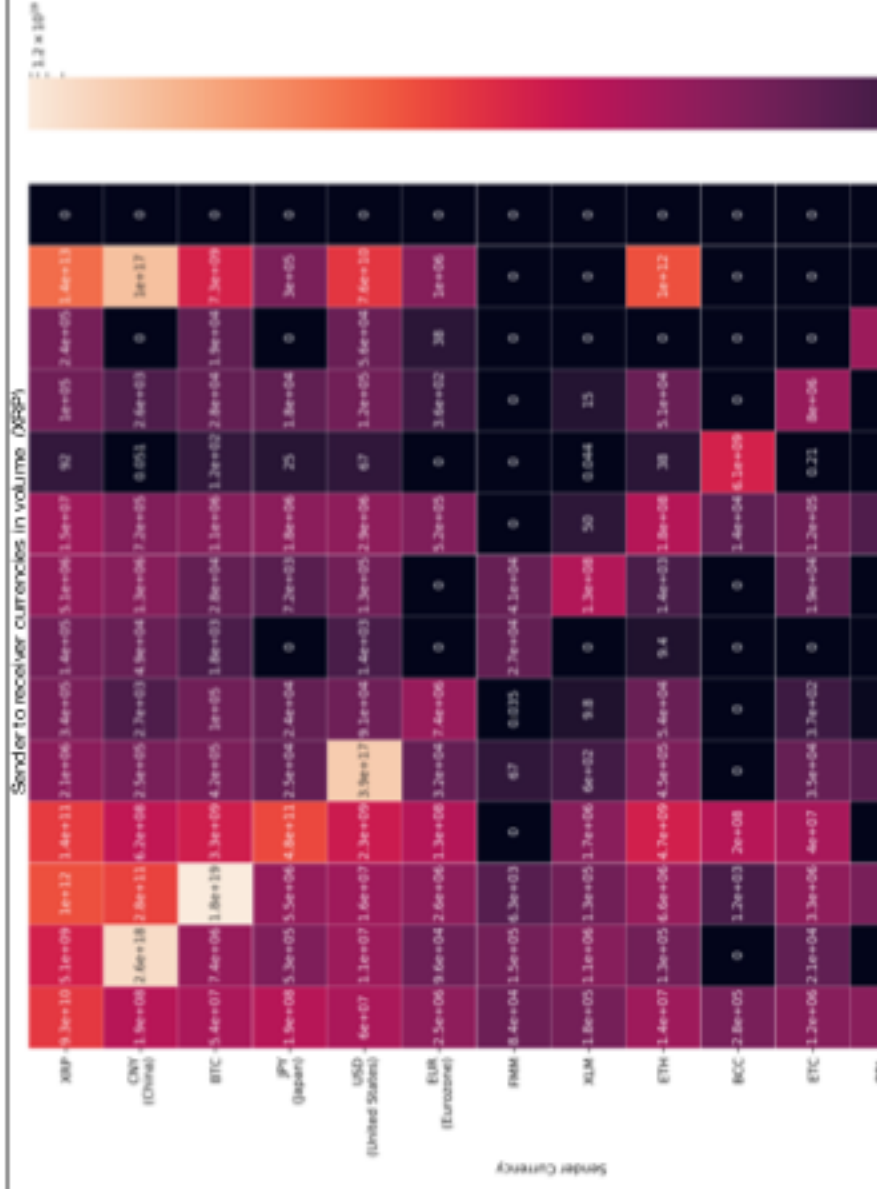


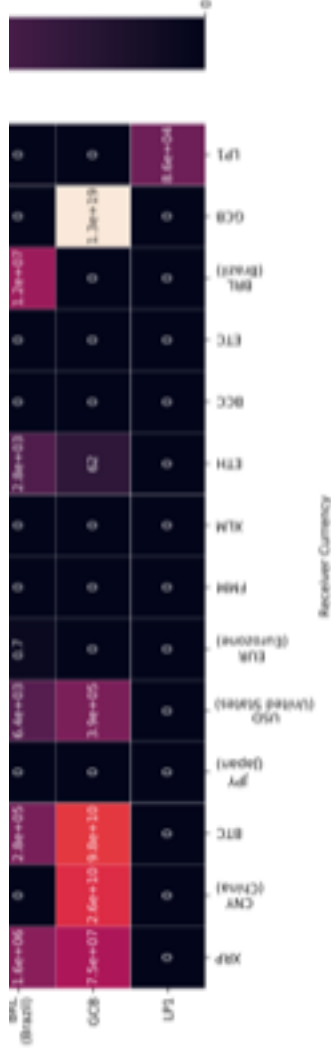
How local are Ripple transactions - Etienne Caquot - 12 June 2019 46

- Could not have any information from nodes
- Significant same sender and receiver currency in transactions. Cross currency is not dominant
- Gateways tends to specialize.

- Gateways are situated in the country of the currency they route except for USD.

https://github.com/dedis/student_19_ripple-locality





Receiver Currency

```

{
  "fee": "1e-05",
  "hash": "3F7A1B3A771D477B03104E86CE73790BB8C8E516BEE680BB4AD9893444D21CF3",
  "sender": "rHb9CJAWyB4rj91VRWn96DkukG4bwdtyTh",
  "success": "tesSUCCESS",
  "XRPAcc": [
    {
      "isIncr": false,
      "account": "rHb9CJAWyB4rj91VRWn96DkukG4bwdtyTh",
      "amount": "1.100000000064938e-05"
    },
    {
      "isIncr": true,
      "account": "rbvFfuYysurzPHq5kgs53A16j5svbFxgv",
      "amount": "1.0000001111620804e-06"
    }
  ],
  "flags": "",
  "receiver": "rbvFfuYysurzPHq5kgs53A16j5svbFxgv"
}

```



```
"date": "2013-06-29T13:10:20+00:00",
"actualIssuerReceiver": "--",
"receiverCurrency": "XRP",
"receiverAmount": "0.000001",
"senderCurrency": "XRP"
}
```

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```
"links": [
  {
    "isIncr": false,
    "currency": "GKO",
    "amount": 0.8964589870013441,
    "node1": "rQ9ArM8TdHmeQHvd969nQPP1TZosBhzdXg",
    "node2": "ruazs5h1qEsqpke88pcqnaseXd6m6od2xc",
    "holder": "rQ9ArM8TdHmeQHvd969nQPP1TZosBhzdXg"
  },
  {
    "isIncr": true,
    "currency": "GKO",
    "amount": 0.8964589870013242,
    "node1": "rLm7SJT73iAoN1XDiKsqWEf4W8Ba2bVB6y",
    "node2": "ruazs5h1qEsqpke88pcqnaseXd6m6od2xc",
    "holder": "rLm7SJT73iAoN1XDiKsqWEf4W8Ba2bVB6y"
  }
]
```

```
    ]
  }
}
```

```
{
  "account": "rUPiAddSwJTrkWzGX4aHG1u7eZg9GTV6Bd",
  "ledger_current_index": 46580945,
  "lines": [
    {
      "account": "rfYv1TXnwgDDK4WQNbfALykYuEBnrR4pDX",
      "balance": "0.00001492689992518072",
      "currency": "BTC",
      "limit": "0",
      "limit_peer": "0",
      "no_ripple": true,
      "quality_in": 0,
      "quality_out": 0
    },
    {
      "account": "rfYv1TXnwgDDK4WQNbfALykYuEBnrR4pDX",
      "balance": "0",
      "currency": "LTC",
      "limit": "0",
      "limit_peer": "0",
      "no_ripple": true,

```

```
"quality_in": 0,  
  "quality_out": 0  
},  
],  
"status": "success",  
"validated": false  
}
```

3 621 347 transactions had paths over the 31 028 222

