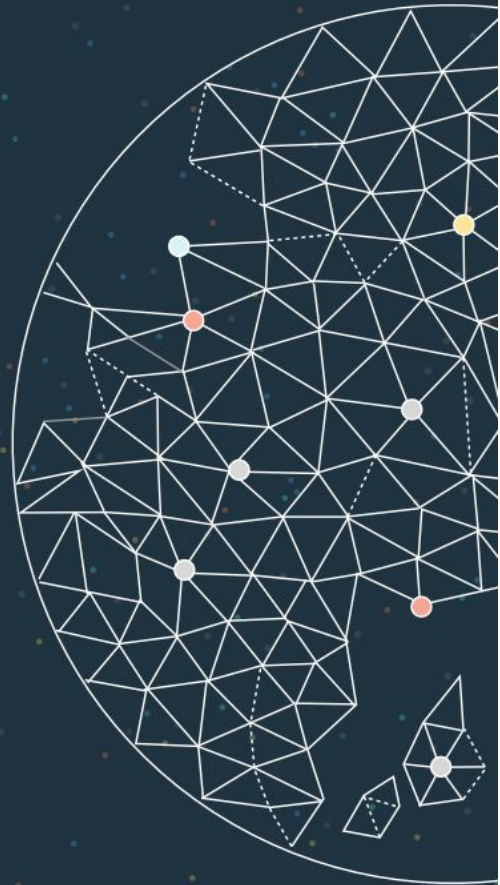


# Creating the Internet for Payments

 @jedmccaleb, Co-Founder of @stellarorg





**Payments are broken**

A man with dark hair and a mustache, wearing a dark green long-sleeved shirt, is looking down at a smartphone held in his right hand. The background is a plain, light gray wall. The image is framed by a thin blue border at the top.

**Sending 50 yuan to Thailand**



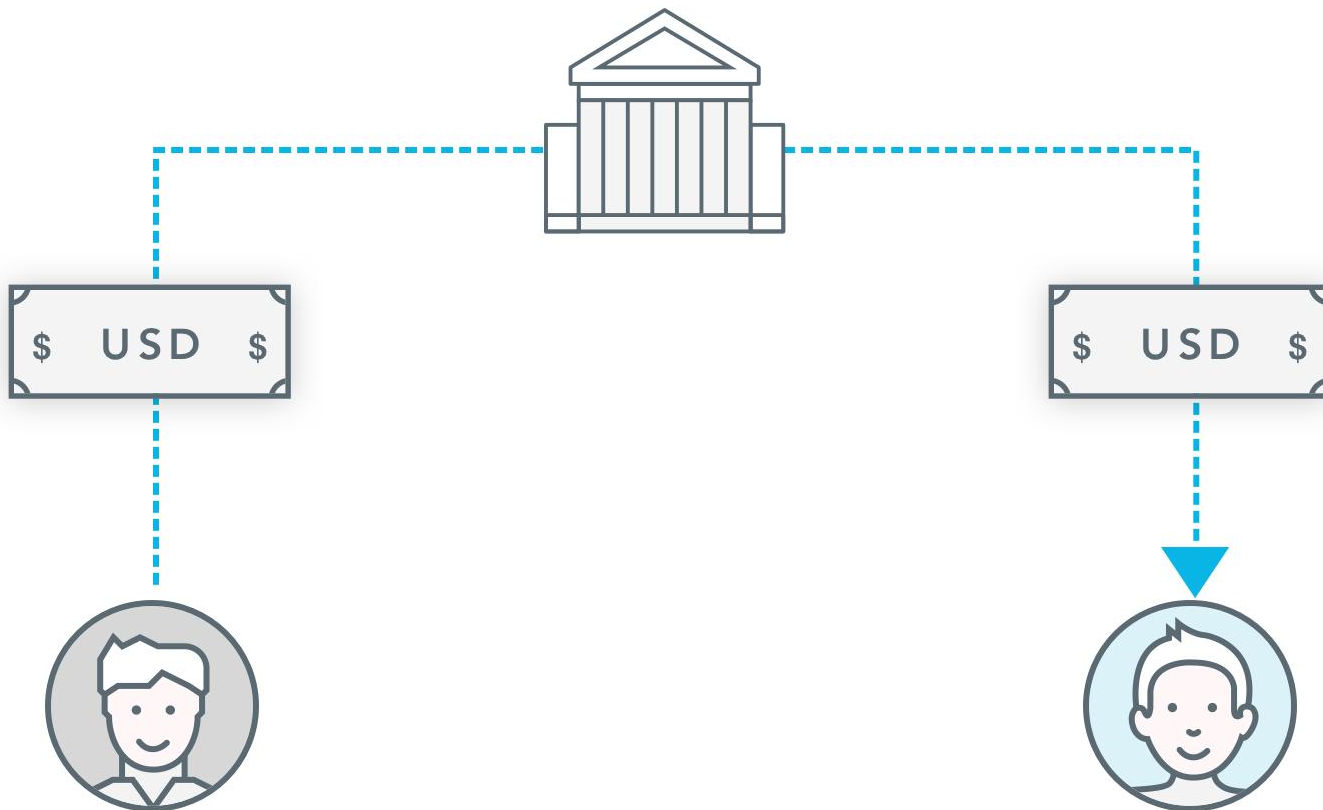


**Receiving payments from Nigeria**

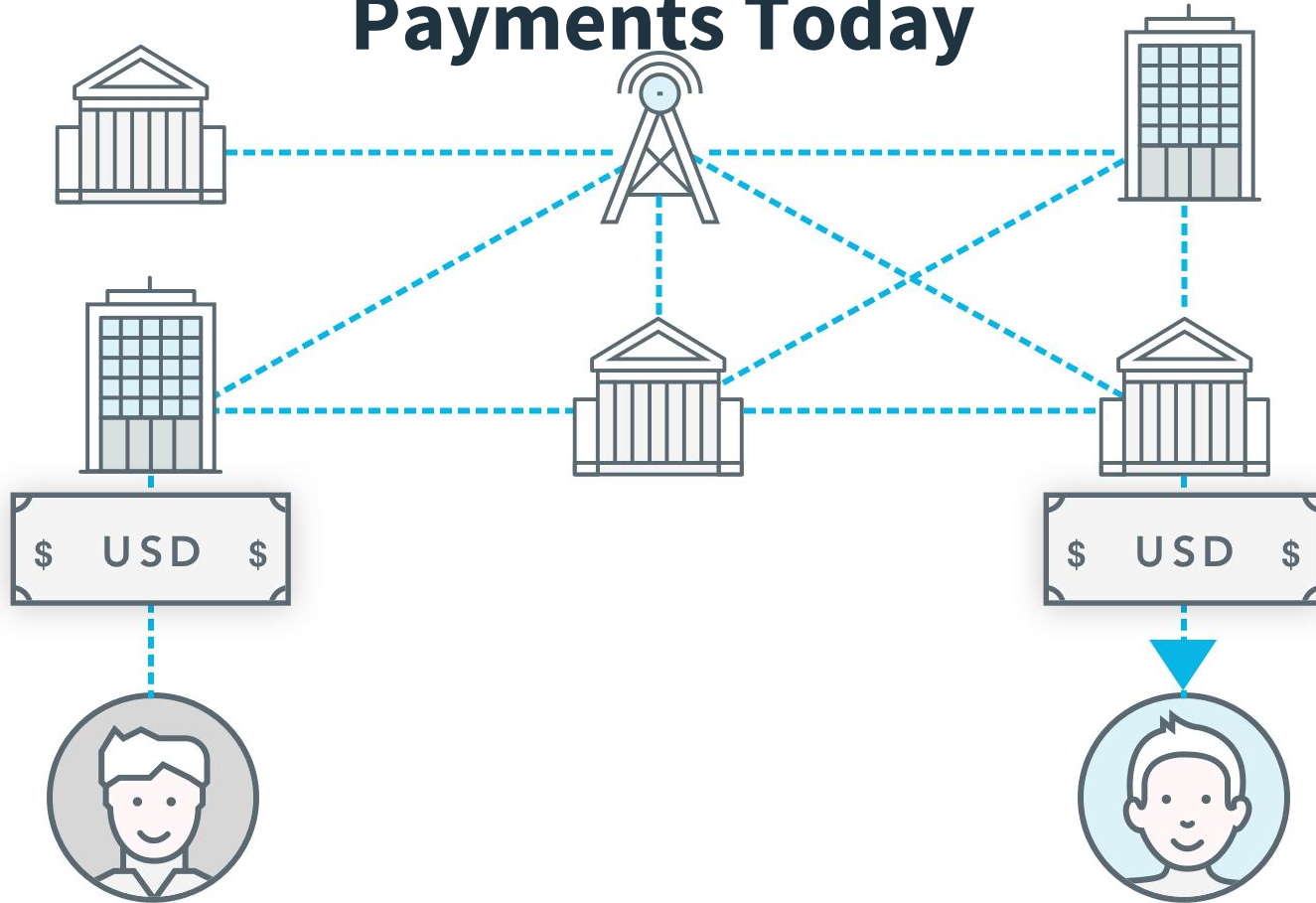
# Payments Today



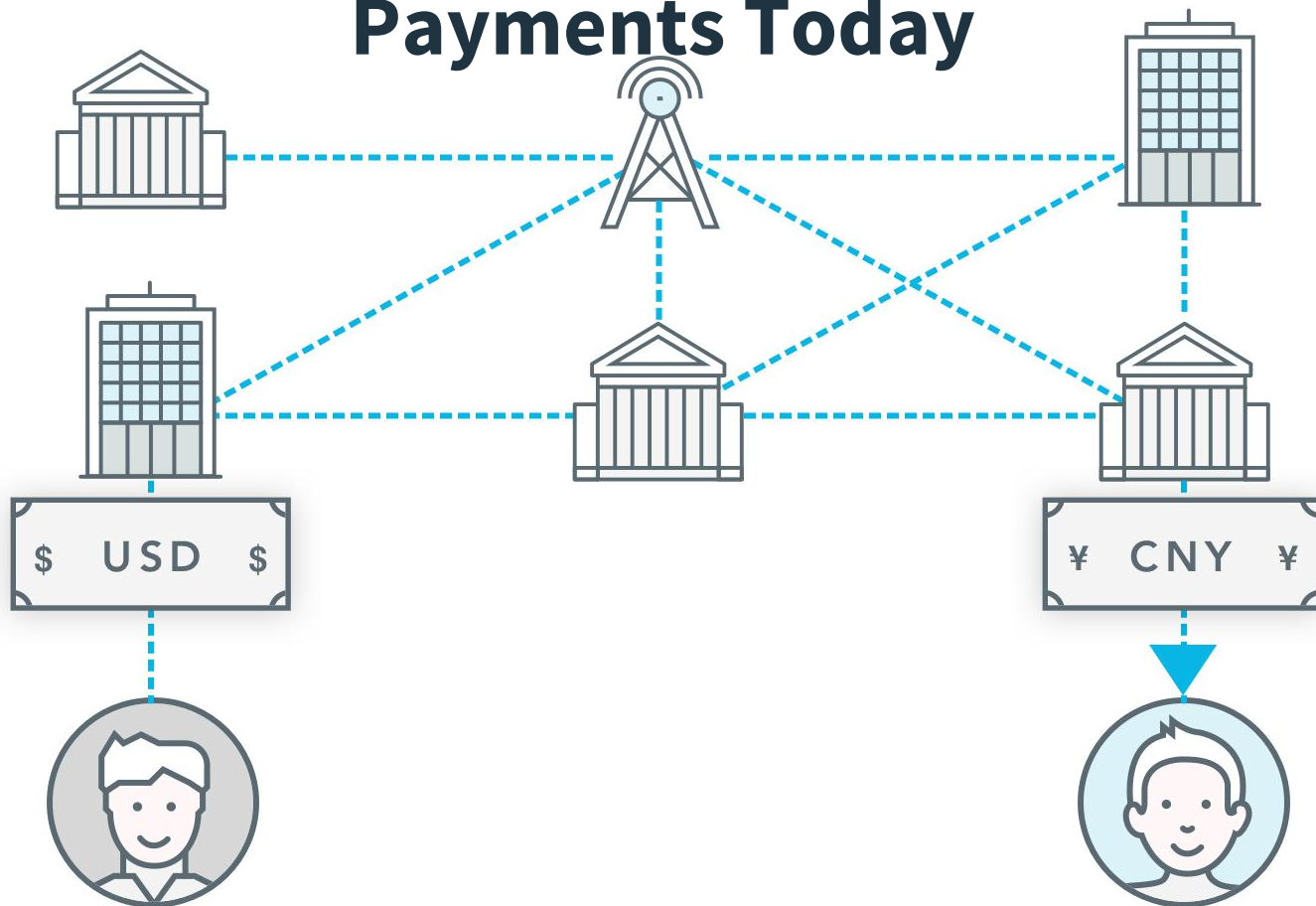
# Payments Today



# Payments Today

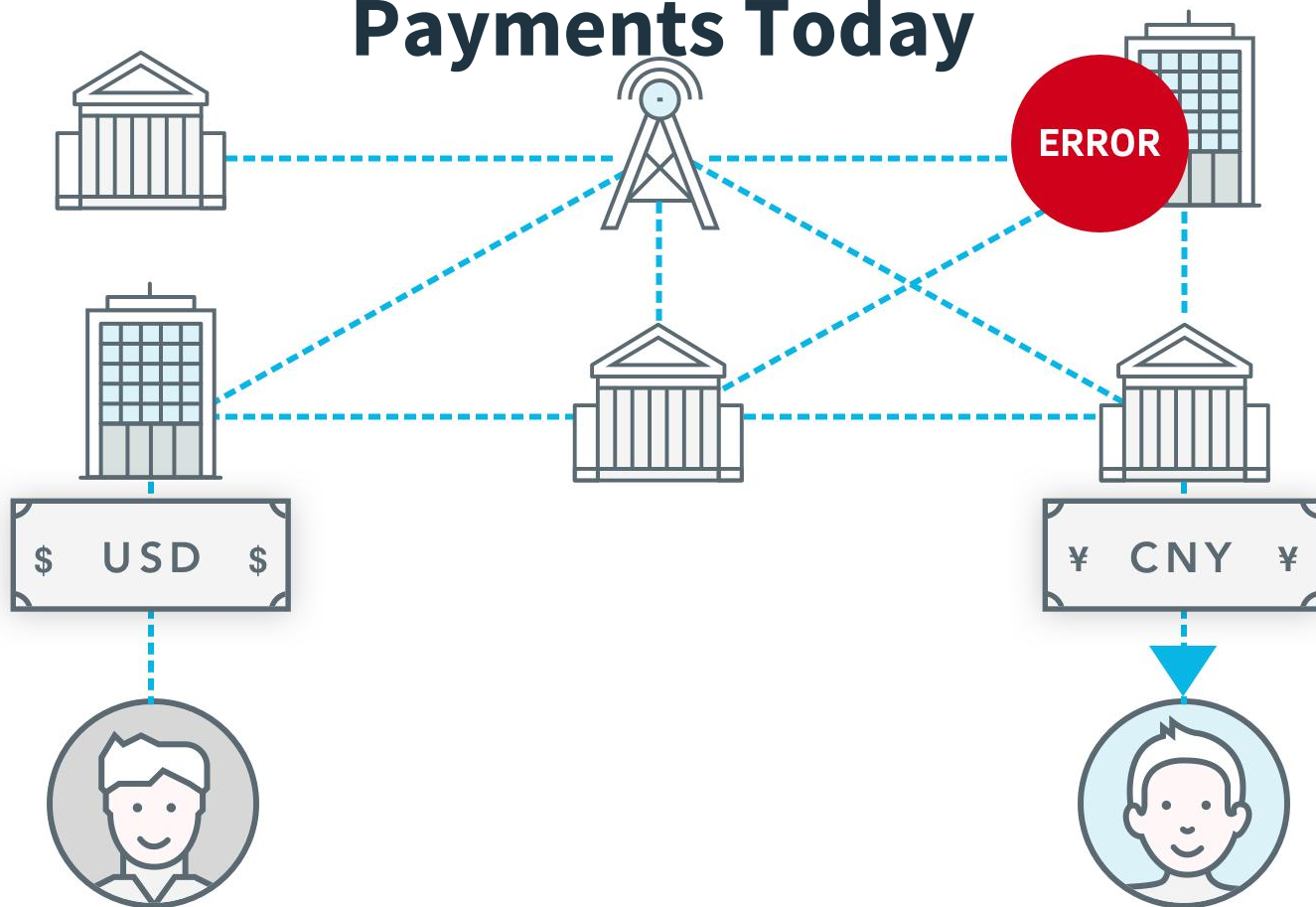


# Payments Today

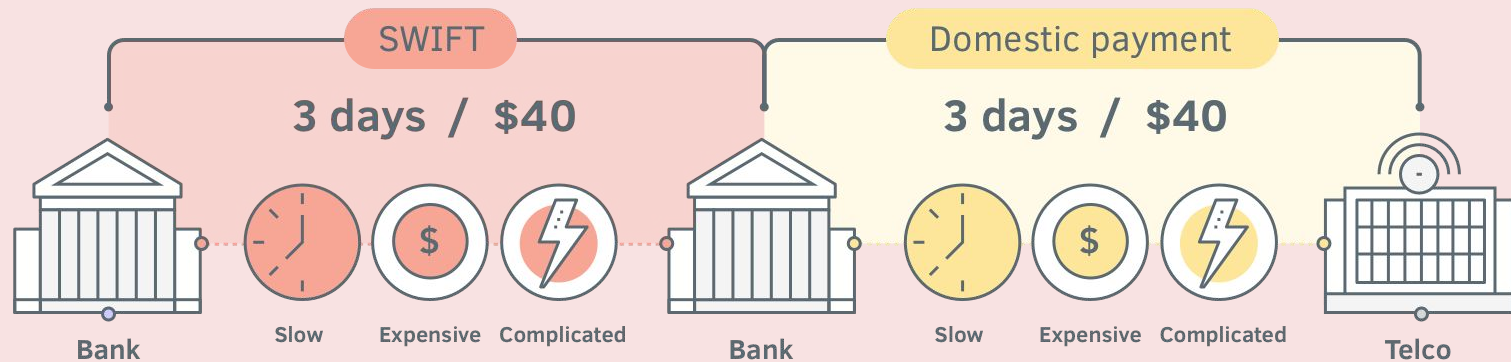




# Payments Today



# Payment Networks today

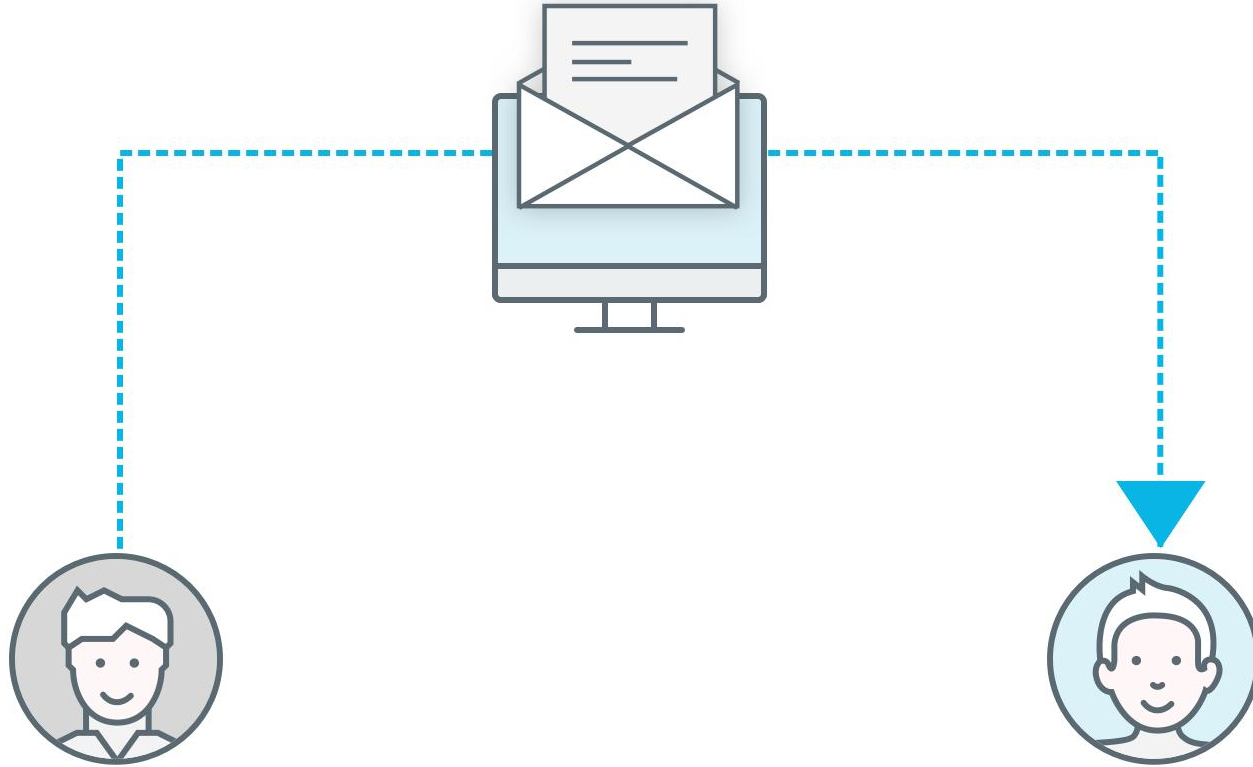


- Payments are slow and expensive
- Compliance is burdensome and risky
- Lack of interoperability

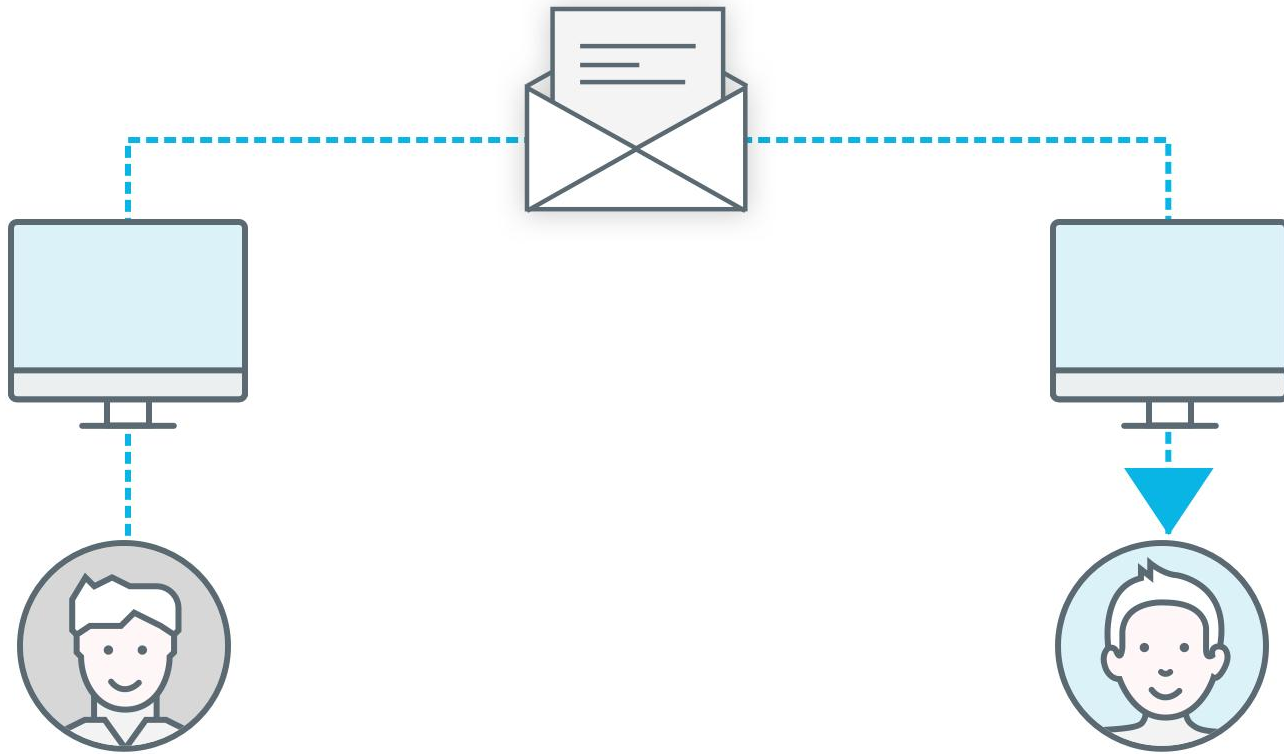


**Is there a way to fix this?**

# Analogy: email

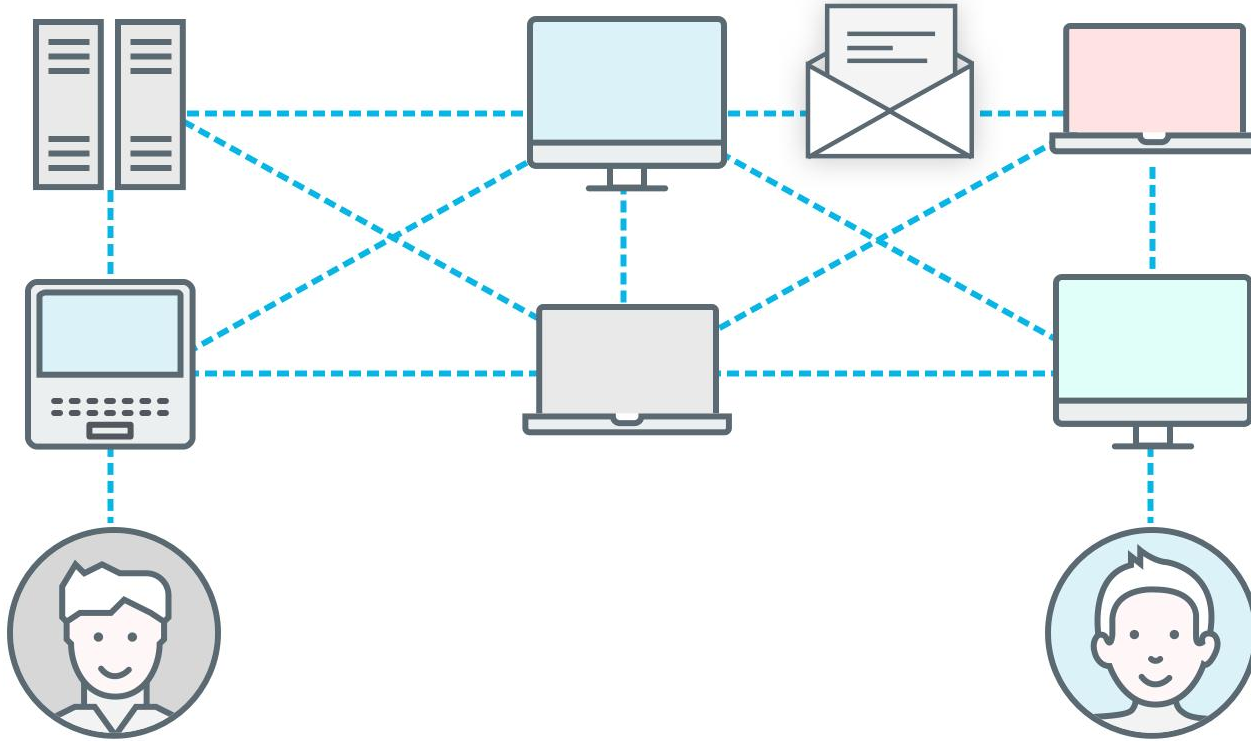


# Analogy: email

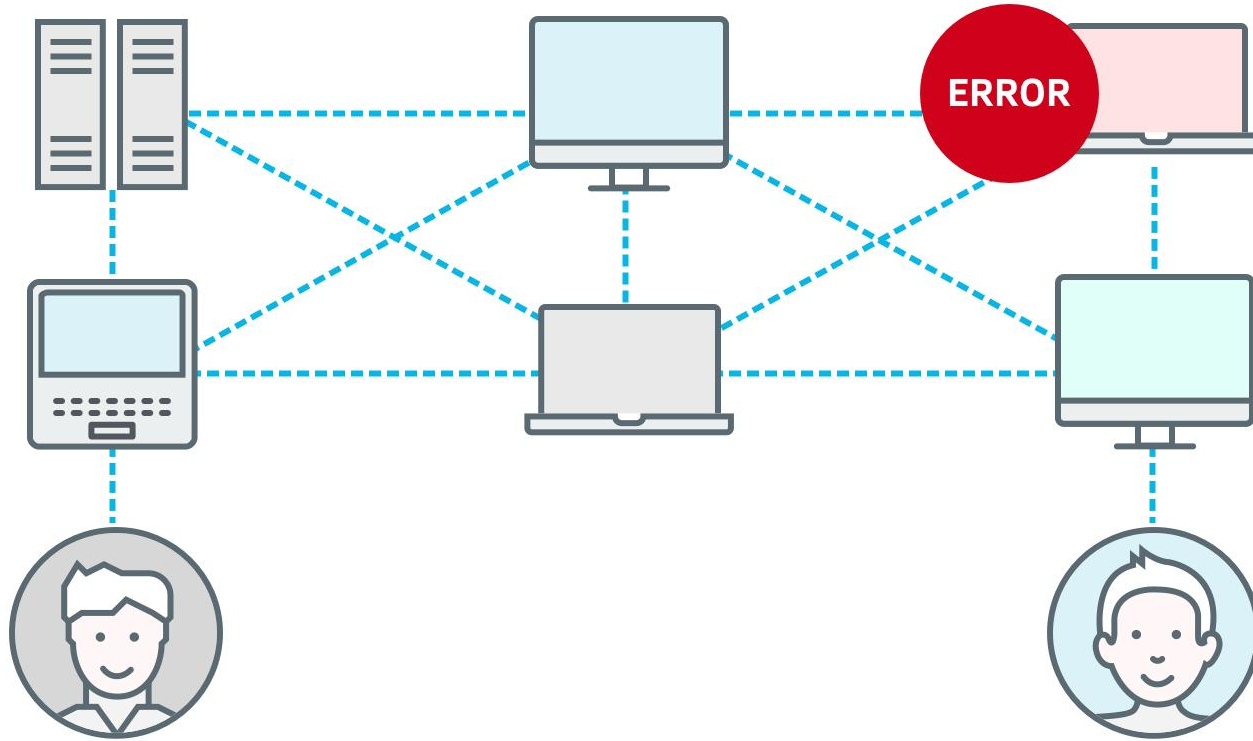




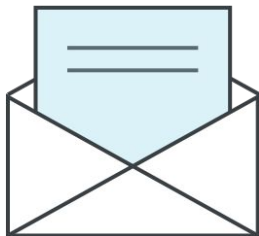
# Analogy: email



# Analogy: email



# SMTP



- Open
- Interoperable,  
From/To anywhere
- Fast

Network Working Group  
Request for Comments: DRAFT  
Replaces: [RFC 788](#), 780, 772

J. Postel  
ISI  
August 1982

## SIMPLE MAIL TRANSFER PROTOCOL

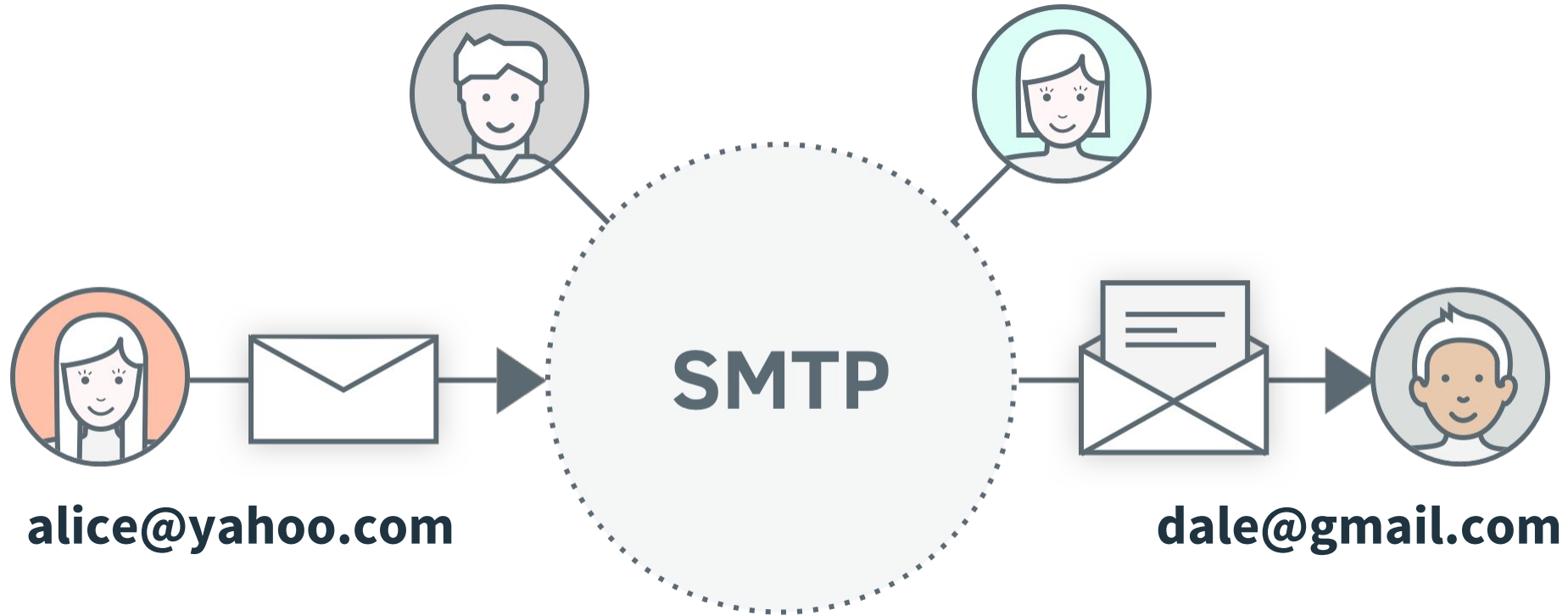
### 1. INTRODUCTION

The objective of Simple Mail Transfer Protocol (SMTP) is to transfer mail reliably and efficiently.

SMTP is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel. Appendices A, B, C, and D describe the use of SMTP with various transport services. A Glossary provides the definitions of terms as used in this document.


An important feature of SMTP is its capability to relay mail across transport service environments. A transport service provides an interprocess communication environment (IPCE). An IPCE may cover one network, several networks, or a subset of a network. It is important to realize that transport systems (or IPCEs) are not one-to-one with networks. A process can communicate directly with another process through any mutually known IPCE. Mail is an application or use of interprocess communication. Mail can be communicated between processes in different IPCEs by relaying through a process connected to two (or more) IPCEs. More specifically, mail can be relayed between hosts on different transport systems by a host on both transport systems.

# Open protocol for communications



# Why can't we use the same model for payments?

1. **Store, prove possession and transmit value.**
2. Digitally represent existing currencies and assets.
3. Make payments interoperable across institutions and currencies.
4. And make sure your system still scales!


A red, multi-pointed starburst graphic with a black outline, containing the text "Very Important Slide!".

Very Important  
Slide!



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A red starburst graphic with multiple points, containing the text "Very Important Slide!".

Very Important  
Slide!

# Why can't we use the same model for payments?

1. Store, prove possession and transmit value.
2. Digitally represent existing currencies and assets.
3. Make payments interoperable across institutions and currencies.
4. And make sure your system still scales!

**Is it possible to solve these problems?**



**Until one of these visionary  
Satoshi's gave us Bitcoin**




# Contributions of Bitcoin

- Converts a real world resource (electricity) into a digital asset
- Provides an immutable public record



# But this still leaves these remaining problems

1. ~~Store, prove possession and transmit value.~~ 
2. **Digitally represent existing currencies and assets.**
3. **Make payments interoperable across institutions and currencies.**
4. **And make sure your system still scales!**

# **Stellar solves the 3 remaining problems**



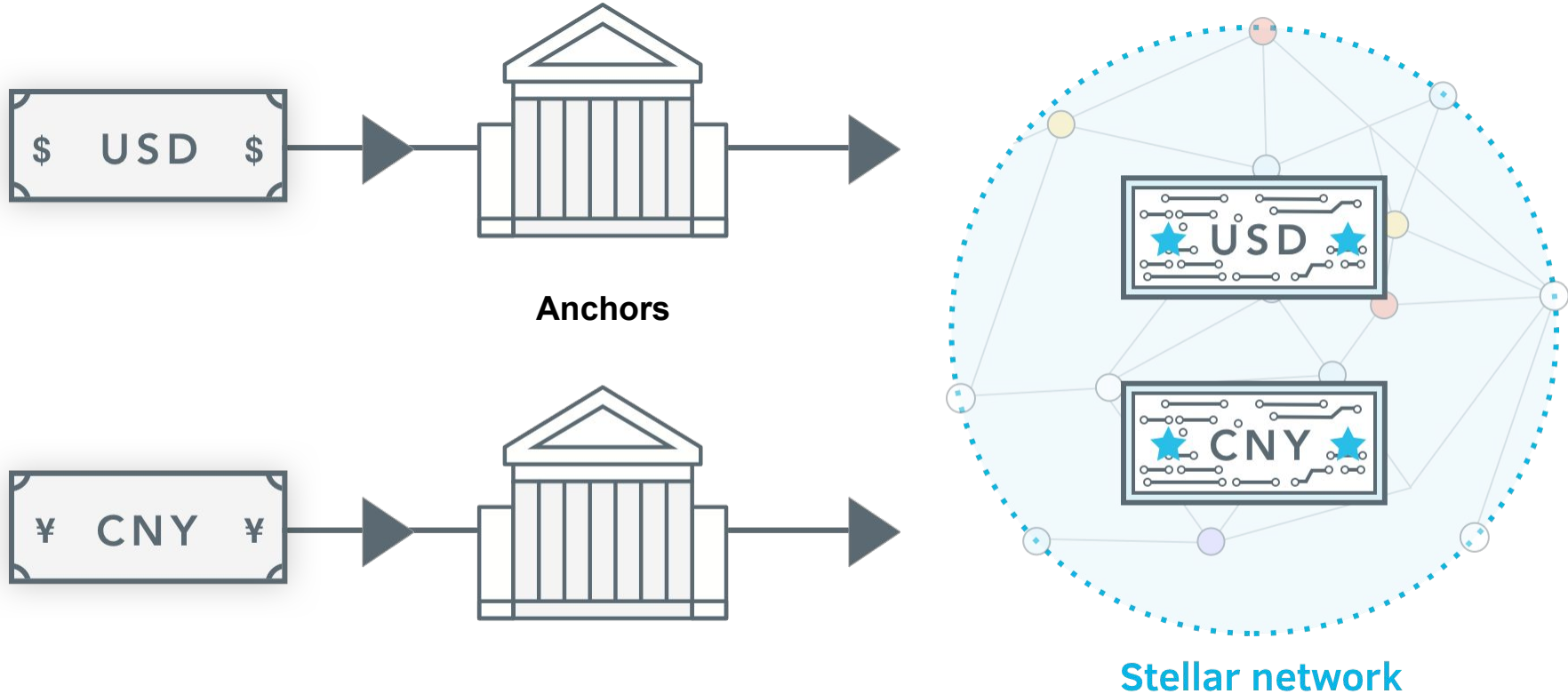
## Problem 2:

Digitally represent existing currencies and assets.



## Problem 2:

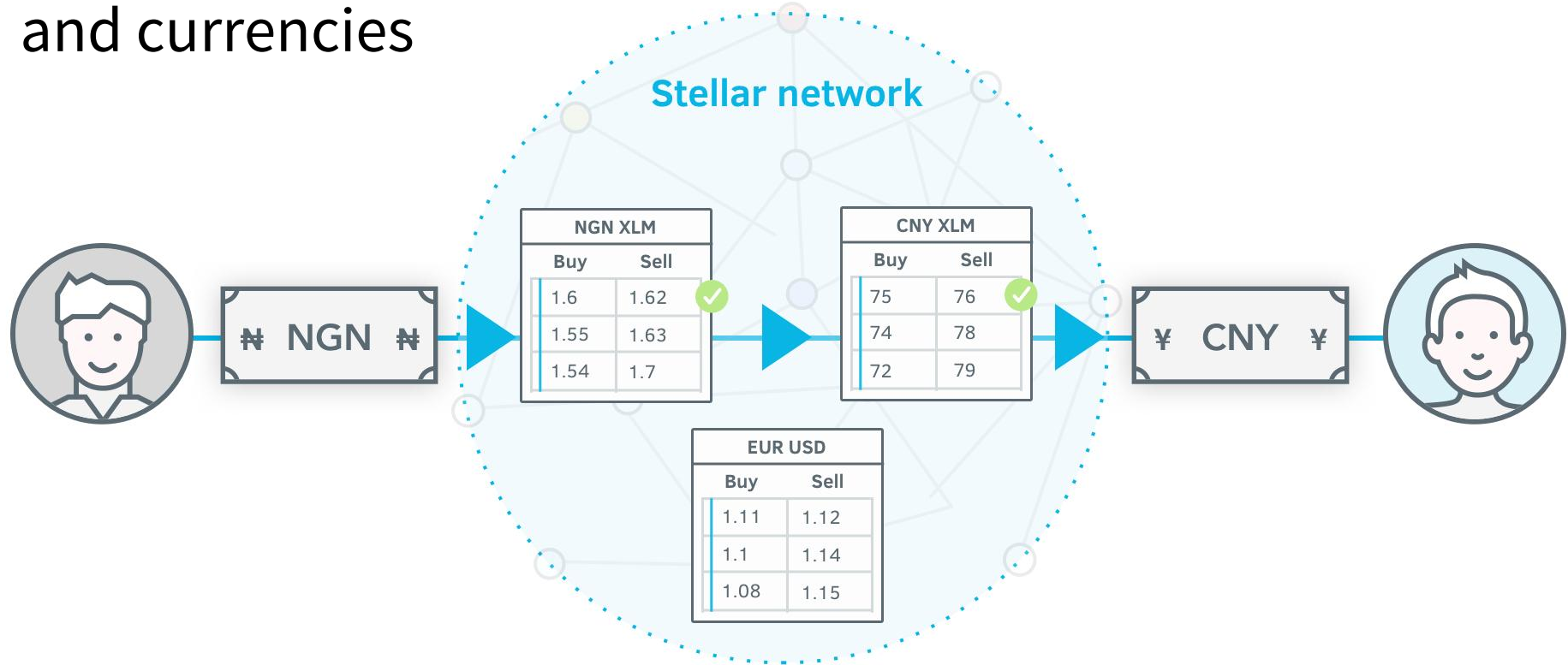
Digitally represent existing currencies and assets.





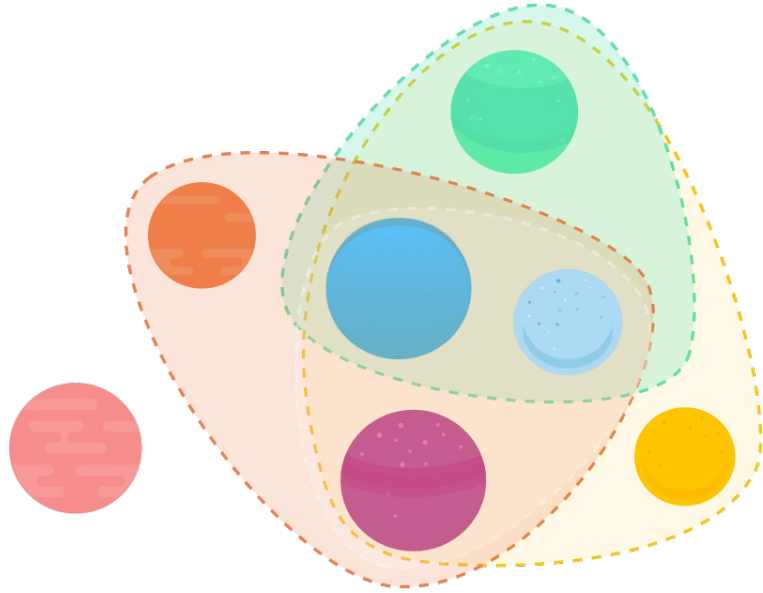
### Problem 3:

Make payments interoperable across institutions and currencies



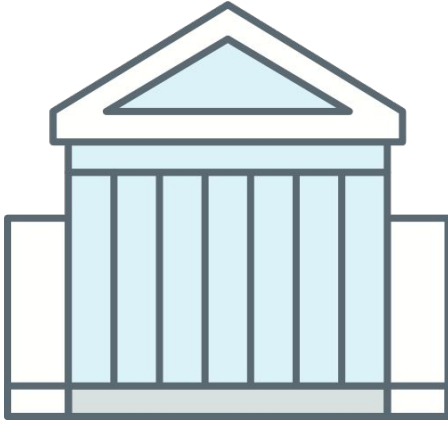
#### Problem 4:

Make sure your system still scales

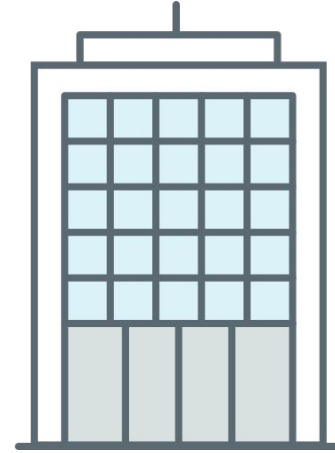


# Stellar Consensus Protocol (SCP)

# Payment Addresses



**bob\*barclays.com**



**tunde\*gtbank.com.ng**

# Bank's Mobile App

AT&T 9:00 AM 100%

Dashboard **Send to** Profile

Current balance

**6,000.00 EUR**

Send to

Recent: Bobby Rufus Tayonim

Amount

**CNY**

Q W E R T Y U I O P

AT&T 9:00 AM 100%

Dashboard **Send to** Profile

Current balance

**6,555.00 EUR**

Are you sure you want to send

**200 CNY**

using 26,64 EUR

to **Cheng?**

CANCEL OK

00 ZAR


Q W E R T Y U I O P

AT&T 9:00 AM 100%

Dashboard **Send to** Profile

Current balance

**5,973.36 EUR**

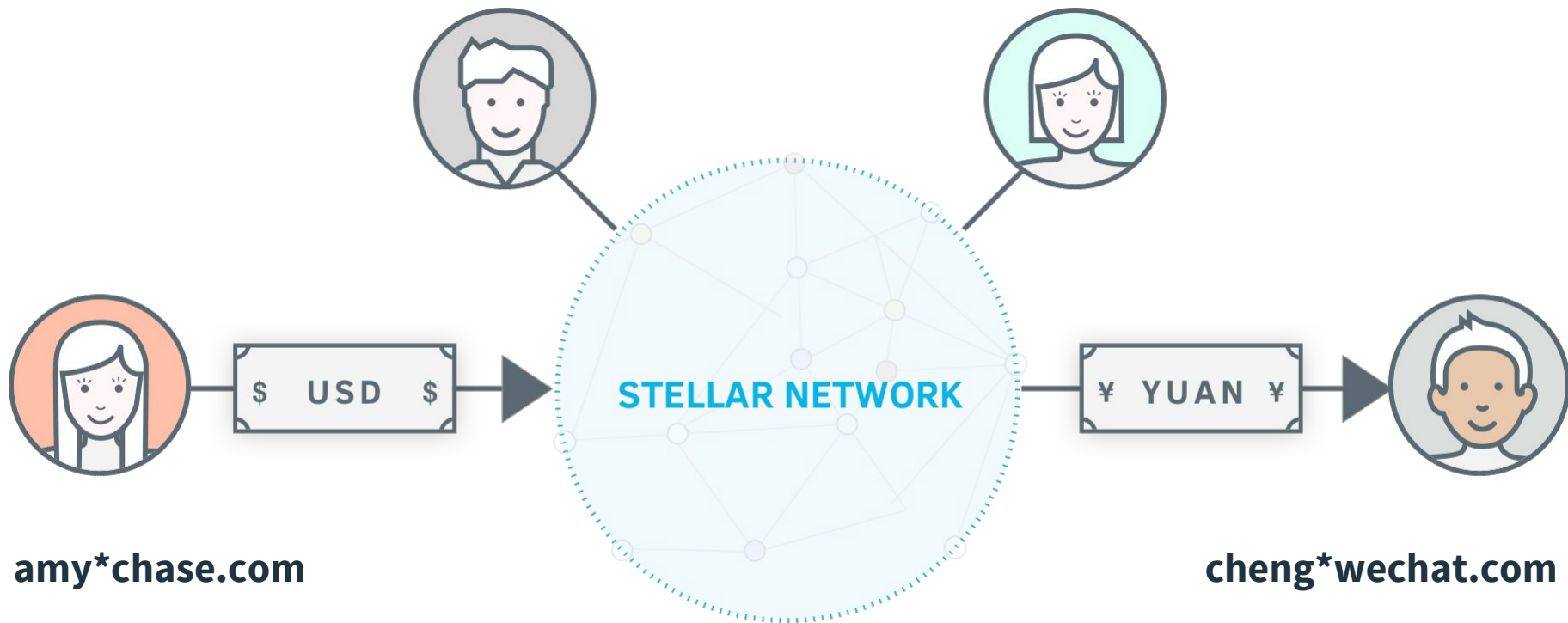


Transaction was completed.

THANK YOU

# stellar

## An open protocol for payments



**How does this become  
a standard?**

# **Stellar Development Foundation**



# Stellar Development Foundation

## Maintain the Code

```
149 lines (139 sloC) | 5.94 KB
Raw Blame History

1 package bridge
2
3 import (
4     "encoding/base64"
5     "net/http"
6     "strings"
7
8     "github.com/stellar/gateway/horizon"
9     "github.com/stellar/gateway/protocols"
10    "github.com/stellar/go-stellar-base/xdr"
11 )
12
13 var (
14     // TransactionBadSequence is an error response
15     TransactionBadSequence = &protocols.ErrorResponse{Code: "transaction_bad_seq", Message: "Bad Sequence. Please, try again"}
16     // TransactionBadAuth is an error response
17     TransactionBadAuth = &protocols.ErrorResponse{Code: "transaction_bad_auth", Message: "Invalid network or too few signatures"}
18     // TransactionInsufficientBalance is an error response
19     TransactionInsufficientBalance = &protocols.ErrorResponse{Code: "transaction_insufficient_balance", Message: "Transaction insufficient balance"}
20     // TransactionNoAccount is an error response
21     TransactionNoAccount = &protocols.ErrorResponse{Code: "transaction_no_account", Message: "Source account not found.", Status: http.StatusNotFound}
22     // TransactionInsufficientFee is an error response
23     TransactionInsufficientFee = &protocols.ErrorResponse{Code: "transaction_insufficient_fee", Message: "Transaction fee is insufficient"}
24     // TransactionBadAuthExtra is an error response
25     TransactionBadAuthExtra = &protocols.ErrorResponse{Code: "transaction_bad_auth_extra", Message: "Unused signatures attached"}
26 )
27
28 // ErrorFromHorizonResponse checks if horizon.SubmitTransactionResponse is an error response and creates ErrorResponse for it
29 func ErrorFromHorizonResponse(response horizon.SubmitTransactionResponse) *protocols.ErrorResponse {
30     if response.Ledger == nil && response.Extras != nil {
31         var txResult xdr.TransactionResult
32         txResult, err := unmarshalTransactionResult(response.Extras.ResultXdr)
33
34         if err != nil {
35             return protocols.NewInternalServerError(
36                 "Error decoding xdr.TransactionResult",
37                 map[string]interface{}{"err": err},
38             )
39         }
40
41         transactionResult := txResult.Result.Code
```

# Stellar Development Foundation

## Maintain the Code

```
149 lines (139 sloc) 5.94 KB
package bridge
import (
    "encoding/base64"
    "net/http"
    "strings"

    "github.com/stellar/gateway/horizon"
    "github.com/stellar/gateway/protocols"
    "github.com/stellar/go-stellar-base/xdr"
)

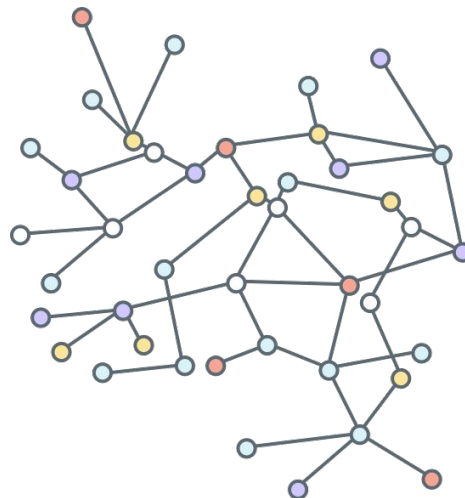
var (
    // TransactionBadSequence is an error response
    TransactionBadSequence = &protocols.ErrorResponse{Code: "transaction_bad_seq", Message: "Bad Sequence. Please, try again"}
    // TransactionBadAuth is an error response
    TransactionBadAuth = &protocols.ErrorResponse{Code: "transaction_bad_auth", Message: "Invalid network or too few signatures"}
    // TransactionInsufficientBalance is an error response
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        txResult, err := unmarshalTransactionResult(response.Extras.ResultXdr)

        if err != nil {
            return protocols.NewInternalServerError(
                "Error decoding xdr.TransactionResult",
                map[string]interface{}{"err": err},
            )
        }
    }

    transactionResult := txResult.Result.Code
```

## Grow the Network



Deloitte.

stripe

 **ICICI Bank**

coins.ph

PARKWAY  
PROJECTS

LOBSTR

rehive 

**TEMPO**  
MONEY TRANSFER 

 **Splash**  
MOBILE MONEY™

Mifos. 

oradian°

 **GTBank**

 **Flutterwave®**

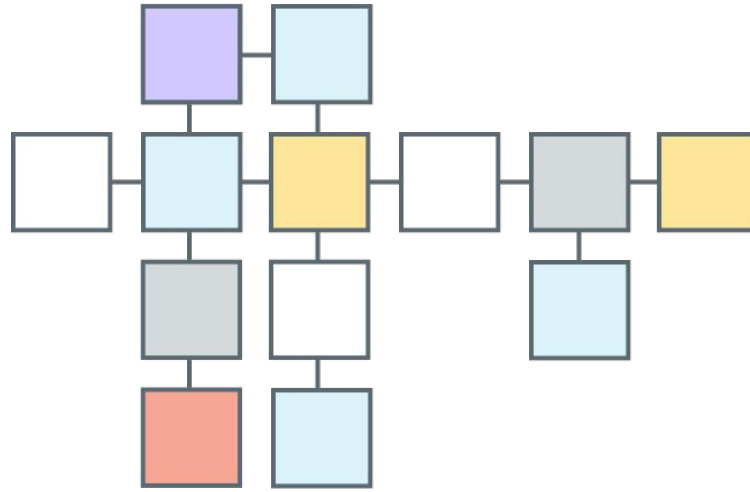
codetip.io

 **SIKA**

 **Keystone Bank**  
MEMBER FDIC

PRAEKELT

**You are at the forefront of  
change**



# Implications of a Stellar enabled world

# What people build with open platforms





stellar

**If we made you curious, ask at:**  
[partners@stellar.org](mailto:partners@stellar.org)

