

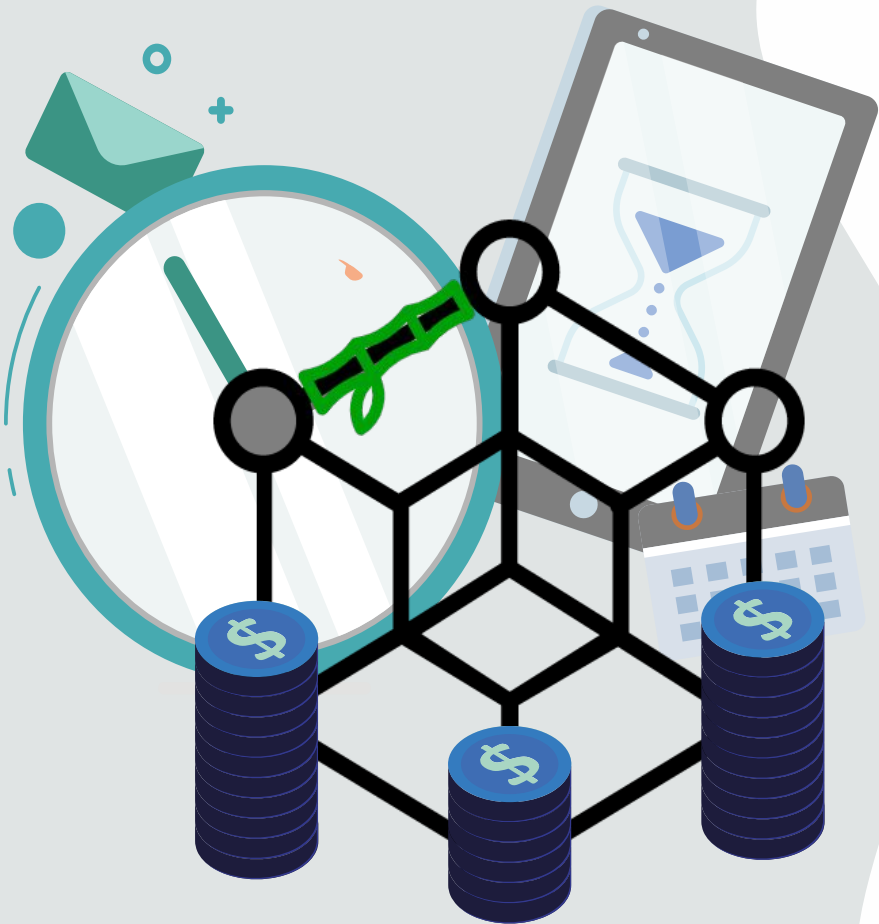
PANDA BORDERLESS

We have elected to put our money and faith in a mathematical framework that is free of politics and human error.

by Tyler Winkelvoss, Entrepreneur

Team TakoHackies





Panda



Borderless

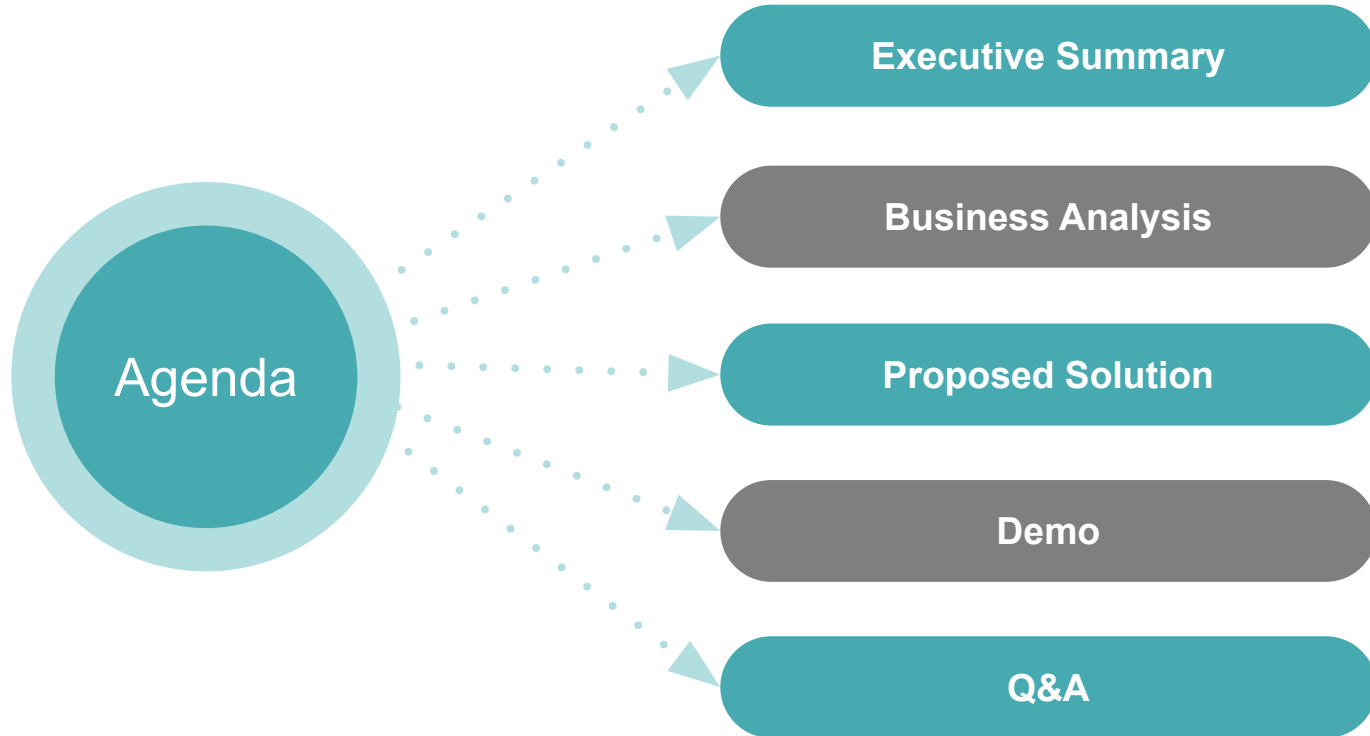
DeFi cross-border transactions, by enabling faster, cheaper, and more secure fund transfers.

NUS Fintech Month 2023 |
Blockchain Problem Statement |
Round 3: Finals

Team TakoHackies

Fabian Chua
Hande Gürsoy
Lam Xin Le
Shin Yung Xin

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Executive Summary

- **Executive Summary**
- **Problem Statement (Blockchain)**
- **Motivation / Inspiration**



Executive Summary

Artroniq Bhd is looking to collaborate with Panda Bank to provide services and consultations in research and development of blockchain based financial services for the bank. With an aim to make Panda Bank the world-leading digital bank, a future-oriented innovative banking service, which is a DeFi cross-border payment platform, called **PandaBorderless**, is proposed to address the cross border payment challenges with the use of Ethereum blockchain technology.

Problem

Existing cross border payment platform is **slow** and **costly** with **high operational complexity**, **low transparency** and **low security**.



Mission

Enhance **cost**, **speed**, **access** and **transparency** of cross-border payment platform



Solution

DeFi cross-border payment platform using IOU token with smart contract based exchange rates - **PandaBorderless**



Problem Statement (Blockchain)



Existing cross border payment platform is **time consuming** and **costly** with **high operational complexity, low transparency and low security**.



Time Consuming

Take multiple days to process transaction



High Cost

Subjected to intermediary charges, regulatory costs and FX fees currency exchange



High Operational Complexity

Repetitive back-office operations that are often duplicated by multiple intermediaries along banking chain



Low Security

Vulnerable to fraud and financial crime due to increased complexity and distance

Motivation / Inspiration



Snaking queue outside Lucky Plaza to remit money (2020)



The queue outside a remittance service at Lucky Plaza. (2019)



Otormpor Primary School, Phnom Penh, Cambodia (2019)

02

Business Analysis

- **Cross Border Payment Landscape**
- **Market Size**
- **Capabilities Overview**
- **Use Case Comparison**
- **Cost Comparison**



Cross Border Payment Landscape

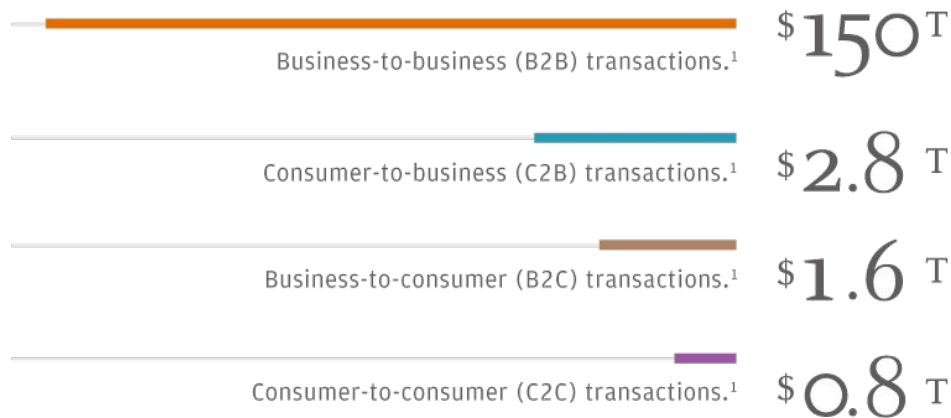
Emerging megatrends disruption

 **Payments**

 **Technology**

 **Risk**

\$156^T



[three-megatrends-disrupting-cross-border-payments](#) (JP Morgan, 2021)

Market Size (Singapore)



*compound annual growth rate (CAGR)

<https://www.alliedmarketresearch.com/press-release/singapore-remittance-market.html>

Capabilities Overview

1. What it does

2. How it works

3. Disadvantages



Facillitate **fast** and **direct** transfer of money between two parties.

Use case:
cross-border payments and currency exchange between financial institutions

1. uses a **distributed ledger technology (DLT)** called the **XRP Ledger**
2. XRP cryptocurrency acts as a **bridge currency**

1. **centralization** model, **closed-source** technology
2. **XRP**: lack of utility and speculative nature



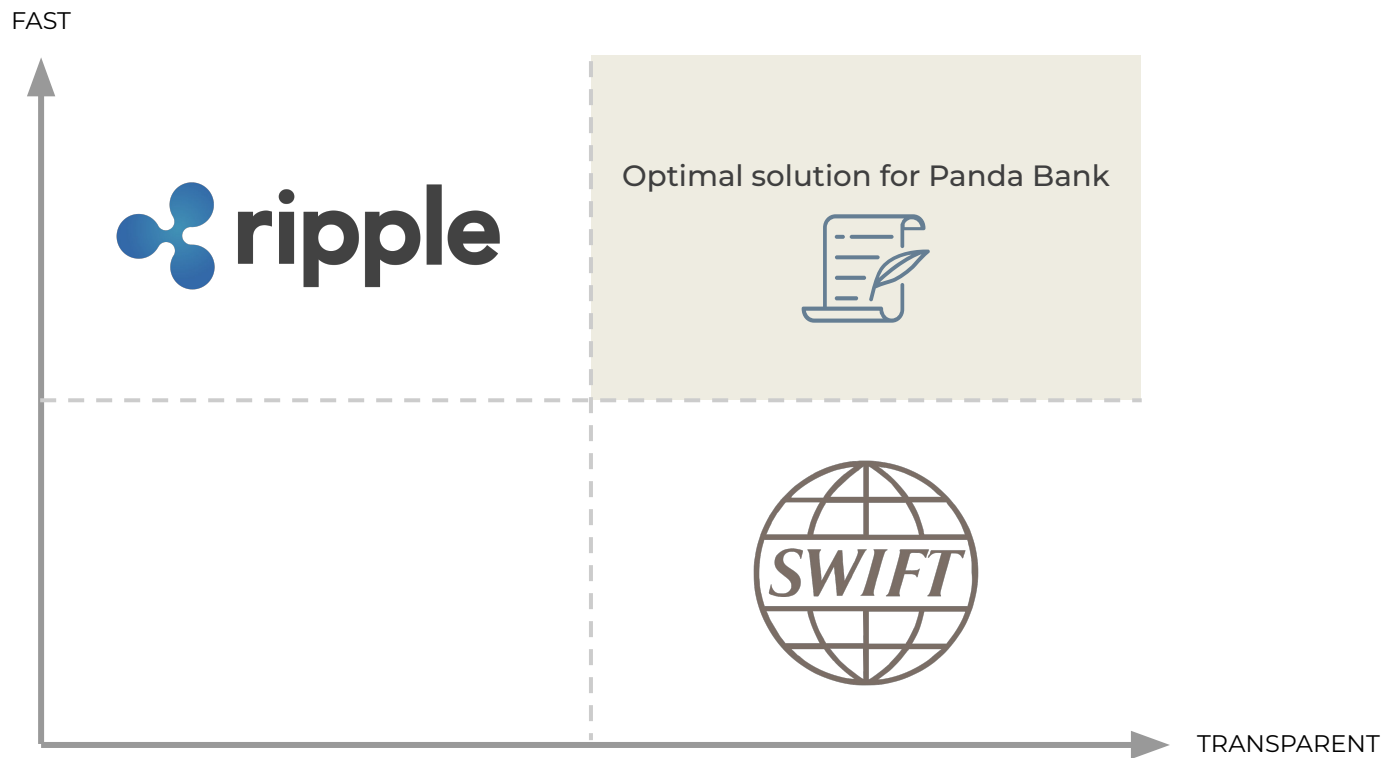
Enables banks and financial institutions to **securely** exchange **financial transactions**

Use case:
exchange of financial messages and transactions between banks and financial institutions


1. uses a **standardized system of codes**, known as **Bank Identifier Codes (BICs)**
2. use these codes to identify each other and exchange info

1. **Slow**
2. **Expensive**
3. **Not transparent**
4. **Not real-time**

Use Case Comparison



Cost Comparison

		Crypto (Eth)
Duration	1 - 4 working days	~ 14 seconds
Transaction fee	Fees 1% - 2% Exchange rates 3% - 5%	Gas price * Gas used
Things to prepare	Name of recipient Recipient's address Name and address of the bank receiving the funds SWIFT code of the bank (BIC) Recipient's account number (IBAN)	Sender's wallet address Recipient's wallet address
Example	Remitly: 2000 SGD → KHR Exchange rate = 3,086.26 Transaction fee = 19.66 SGD = ~15 USD	Approx. 0.0000000176217*2 Ether = 0.000000035 Ether = 0.000056 USD

<https://www.remitly.com/us/en/malaysia/pricing>

<https://goerli.etherscan.io/tx/0xa86b3c5050982e59604d48b1d87d20727c7fa313794f35d44d6b377075b1bee>

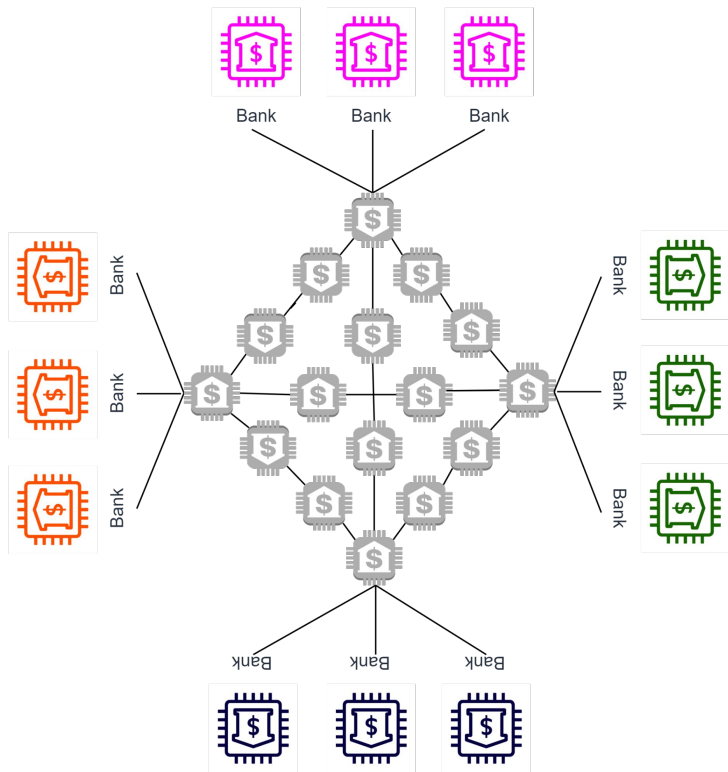


03

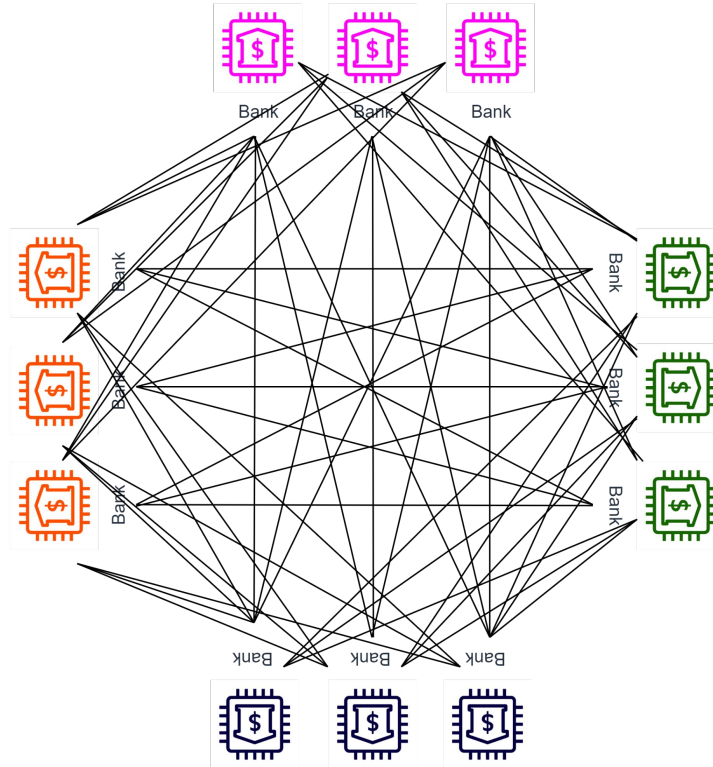
Proposed Solution

- **Banking Network Comparison**
- **Proposed Solution Features**
- **AWS Deployment**
- **General Tech Stack**

Illustrative Model of Correspondent Banking Network



Illustrative Model of Banking Network with Blockchain



Proposed Solution - **Panda**Borderless

Existing Panda Bank
Platform

DeFi Cross-border Payment
Platform using Blockchain



Improve cross-border
transfer speed from
multiple days to near
real-time

Reduced
cross-border
fees

Powers transactions that are
traceable and unchangeable to
improve transparency

Minimized risks of
security breaches

Features

Smart Contract

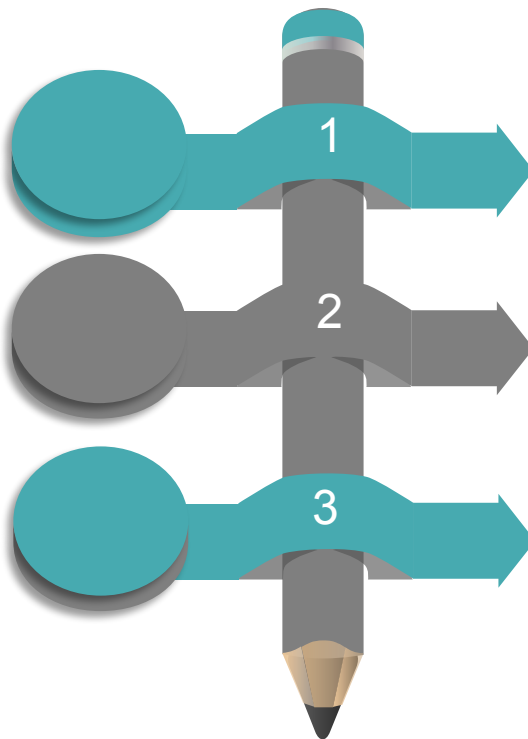
Token transactions

Panda Coin

Self-issued ERC20 Token on the Ethereum blockchain

Hyperledger Besu

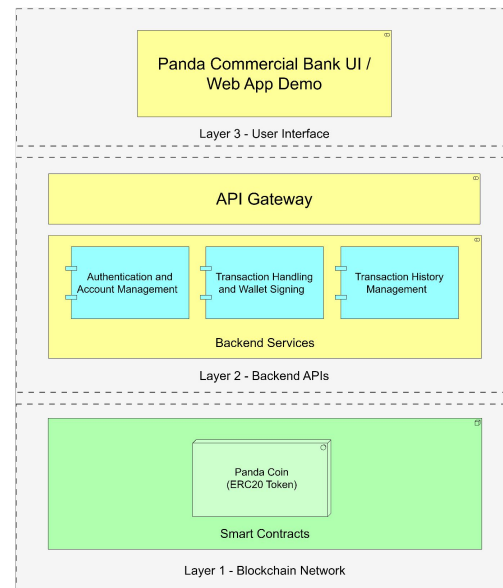
Deploy private or consortium networks, provide privacy, high performance, network access permission settings or incident support



System Architecture



Panda Commercial Bank

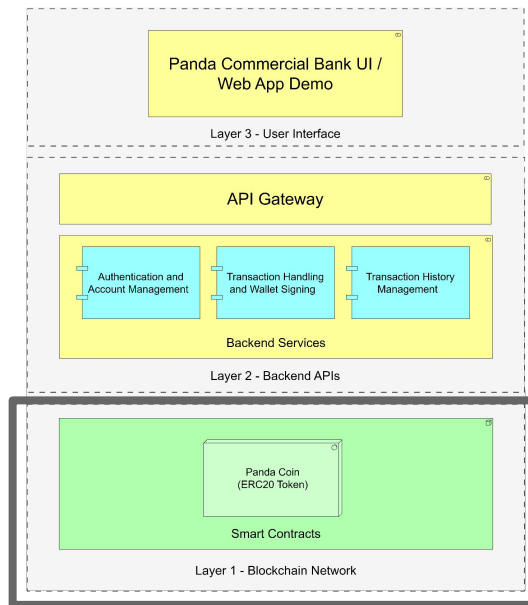


Layer 1 - Blockchain Network

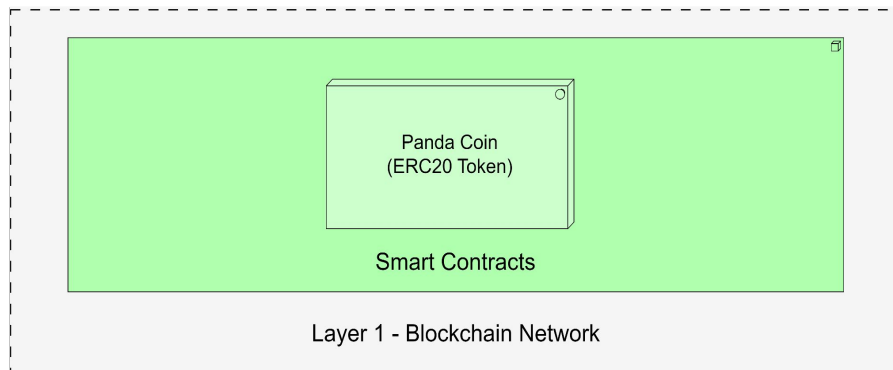
Layer 1 - Blockchain Network



Panda Commercial Bank



Layer 1 - Blockchain Network



ERC20 (Ethereum Request for Comment 20)

- the implemented standard for fungible tokens created using the Ethereum blockchain
- guides the creation of new tokens on the Ethereum blockchain so that they are interchangeable with other tokens used within smart contracts
- technical standard used in many new tokens created using the Ethereum ecosystem
- contains several functions and events that a token must implement for user/token implementation

TotalSupply

BalanceOf

Transfer

TransferFrom

Approve

Allowance

Transfer Event

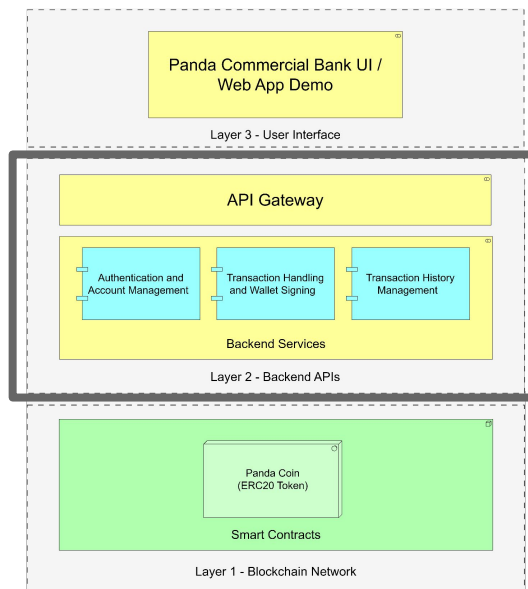
Approval Event

Layer 2 - Backend APIs

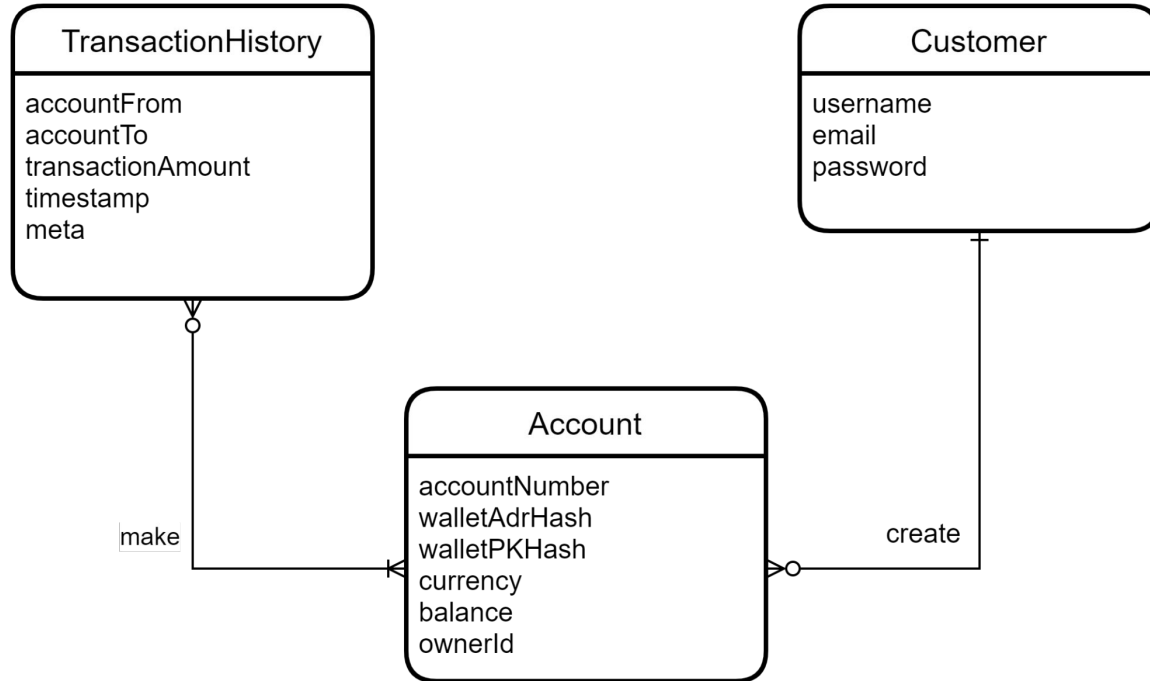
Layer 2 - Backend APIs



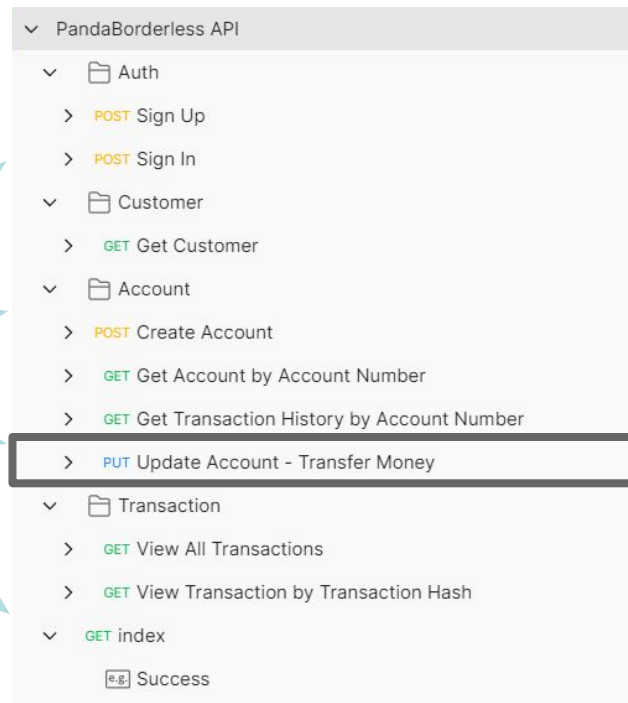
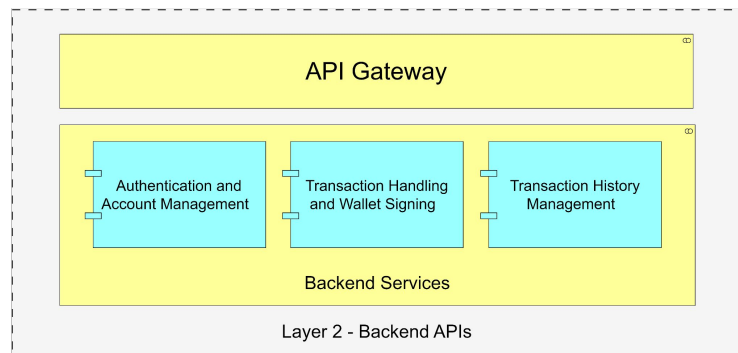
Panda Commercial Bank



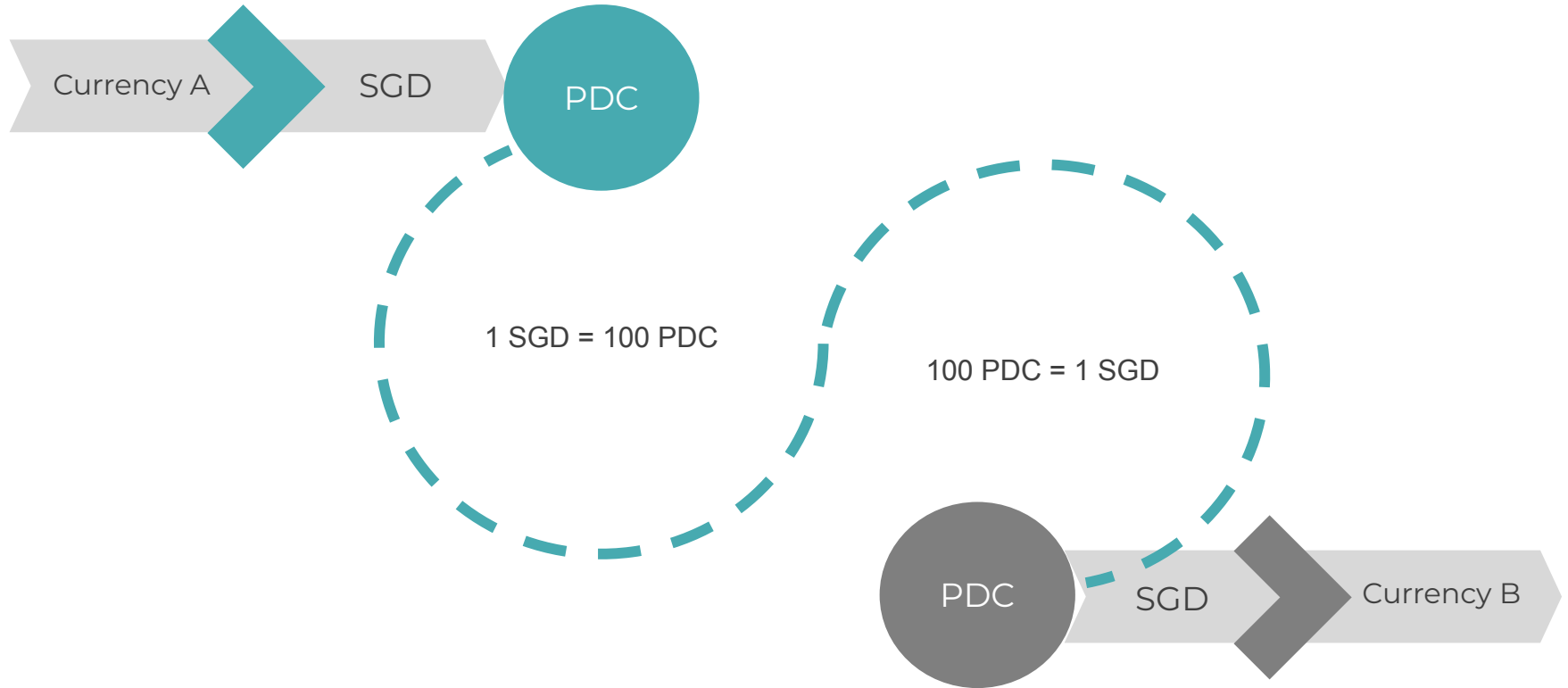
Layer 2 Database Design



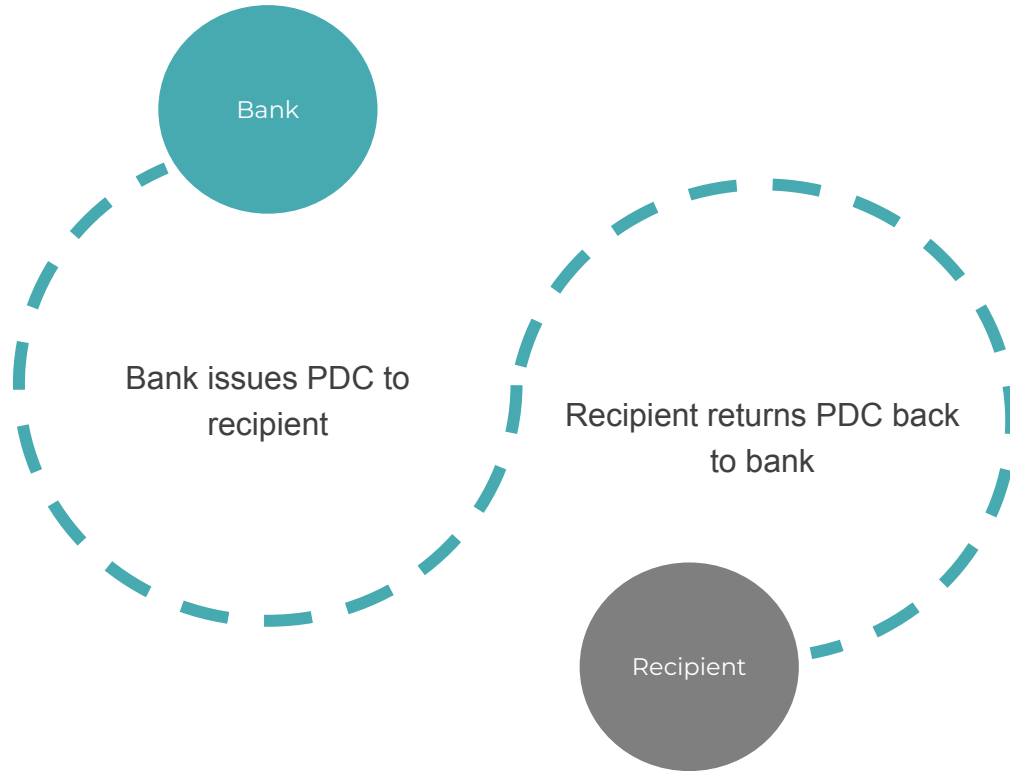
Layer 2 - Backend APIs



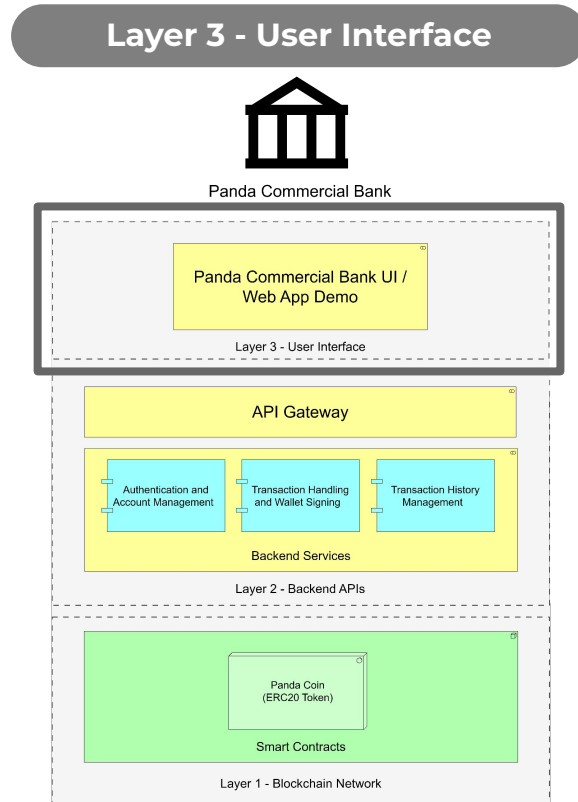
Layer 2 - Backend APIs



Layer 2 - Backend APIs



Layer 3 - User Interface



Layer 3 - User Interface

Panda Commercial Bank UI / Web App Demo

Layer 3 - User Interface

Transaction Summary



Re-check the details & confirm transfer request.

RATE: 1 SGD = 0.786 USD

SGD

1,000

↓

USD

786

RECIPIENT INFORMATION

Account Type

Savings

Account Number

123-654-7890

Electronic (ACH) Routing Number

0000123456

First name

Billy

Last name

Jeans

Mobile Number

+65 91234567

Address

1 Apple Road

Province

Pineapple

City

Utopia

CONFIRMATION

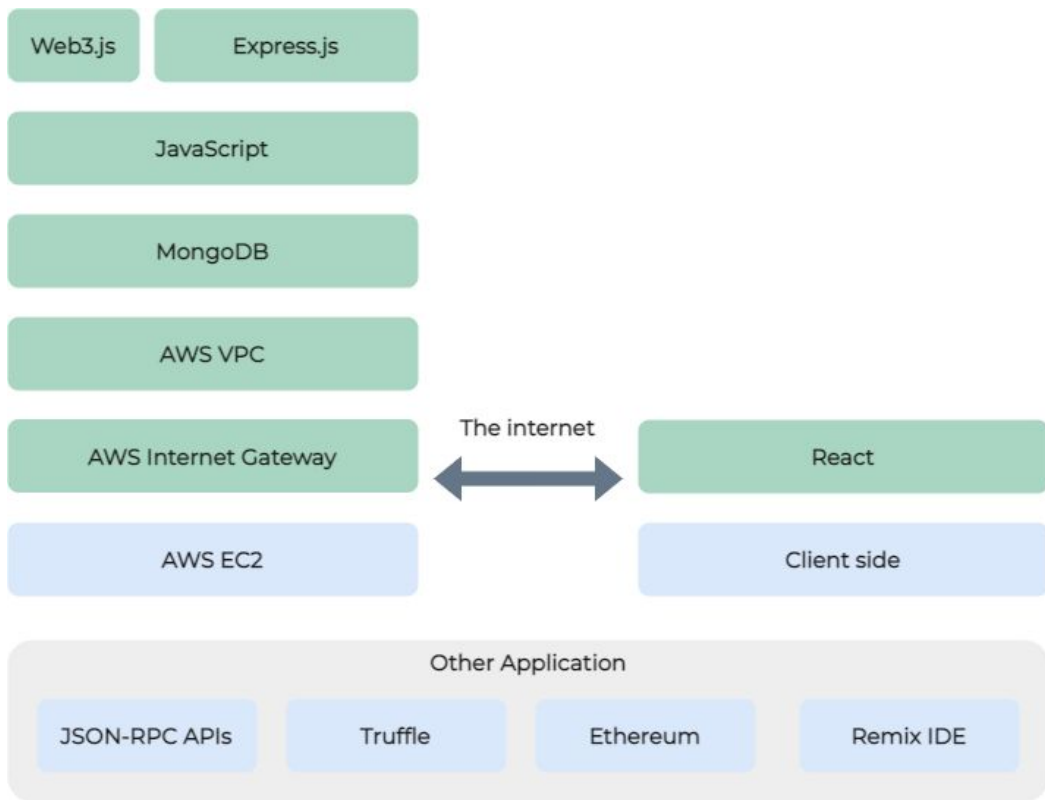
☒ I have confirmed the above information and agree to make the transaction.

* Additional information & documents may be requested by our local partner.

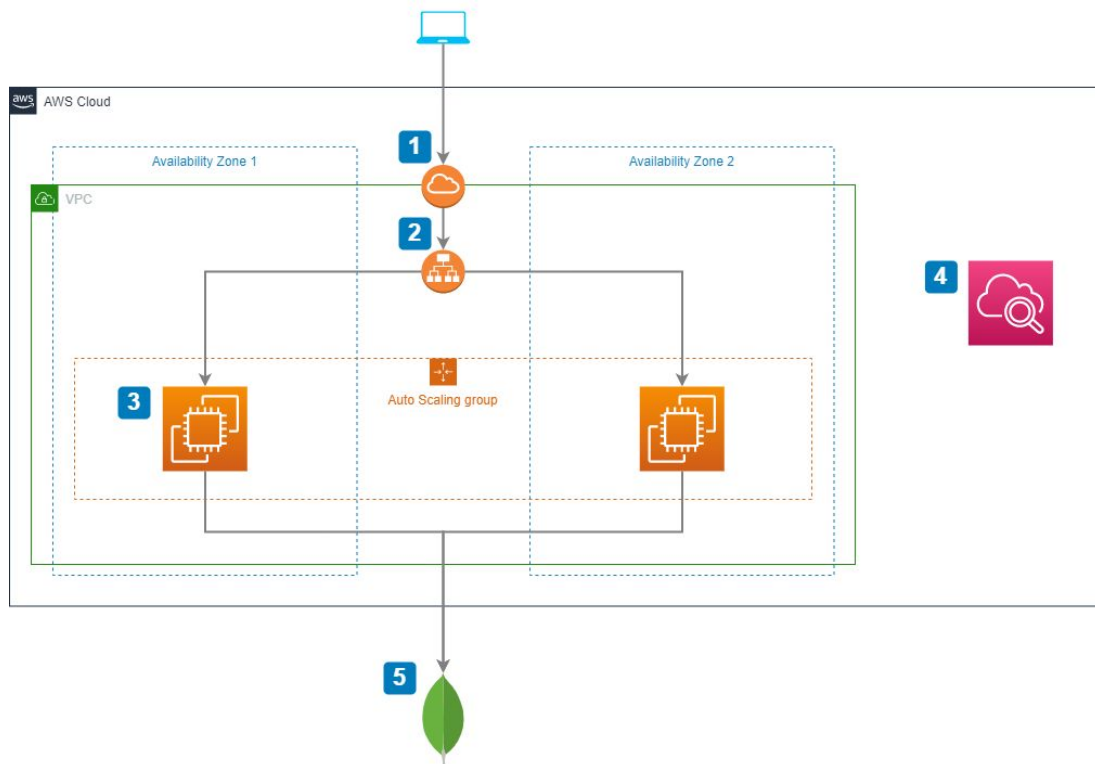
Back

Submit

General Tech Stack



AWS Deployment



1 Internet Gateway

A VPC component that allows communication between instances in the VPC and the Internet. An Amazon VPC (Virtual Private Cloud) is a logically-isolated section of the AWS Cloud where we launched AWS resources in a virtual network that we've defined. Together, the Internet Gateway and Amazon VPC provide a secure and scalable networking infrastructure for the application.

2 Application Load Balancer

A Layer 7 load balancer routes HTTP/HTTPS traffic to the correct target, such as an EC2 instance. It distributes incoming requests to multiple EC2 instances in different availability zones, improving the availability and scalability of the application.

3 Auto Scaling Group

Automatically increases or decreases the number of instances in response to changes in demand. This group contains 2 EC2 instances that run the services of the application.

4 Amazon CloudWatch

Monitoring service that provides data and operational insights for various AWS resources. It monitors the performance of the application and EC2 instances, set alarms, and takes automated actions based on CloudWatch alarms. This can help you ensure the high availability and performance of the application.

5 MongoDB cloud

External databases that the EC2 instances will be interacting with.



04

Demo

- Database Design
- Project Demo

Project Demo

Github Repository

<https://github.com/xinle1030/pandaborderless-git>

Web App Demo

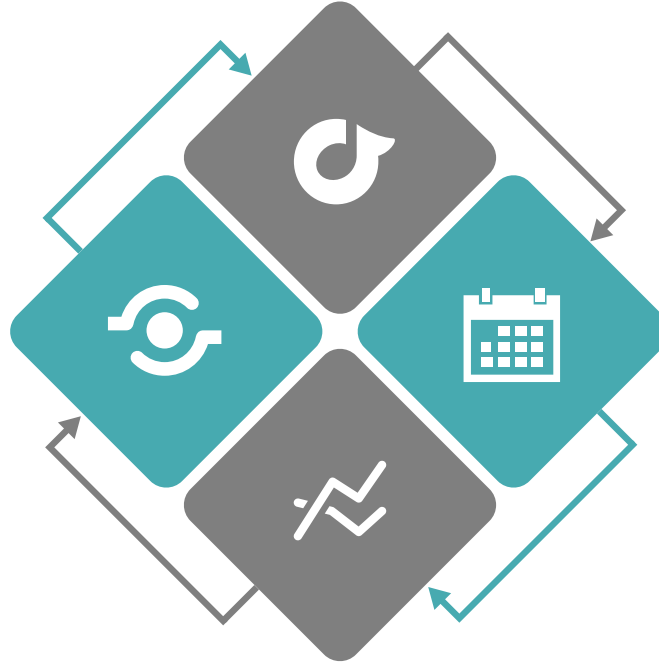
<https://pandaborderless-git.vercel.app/>

Postman Collection JSON

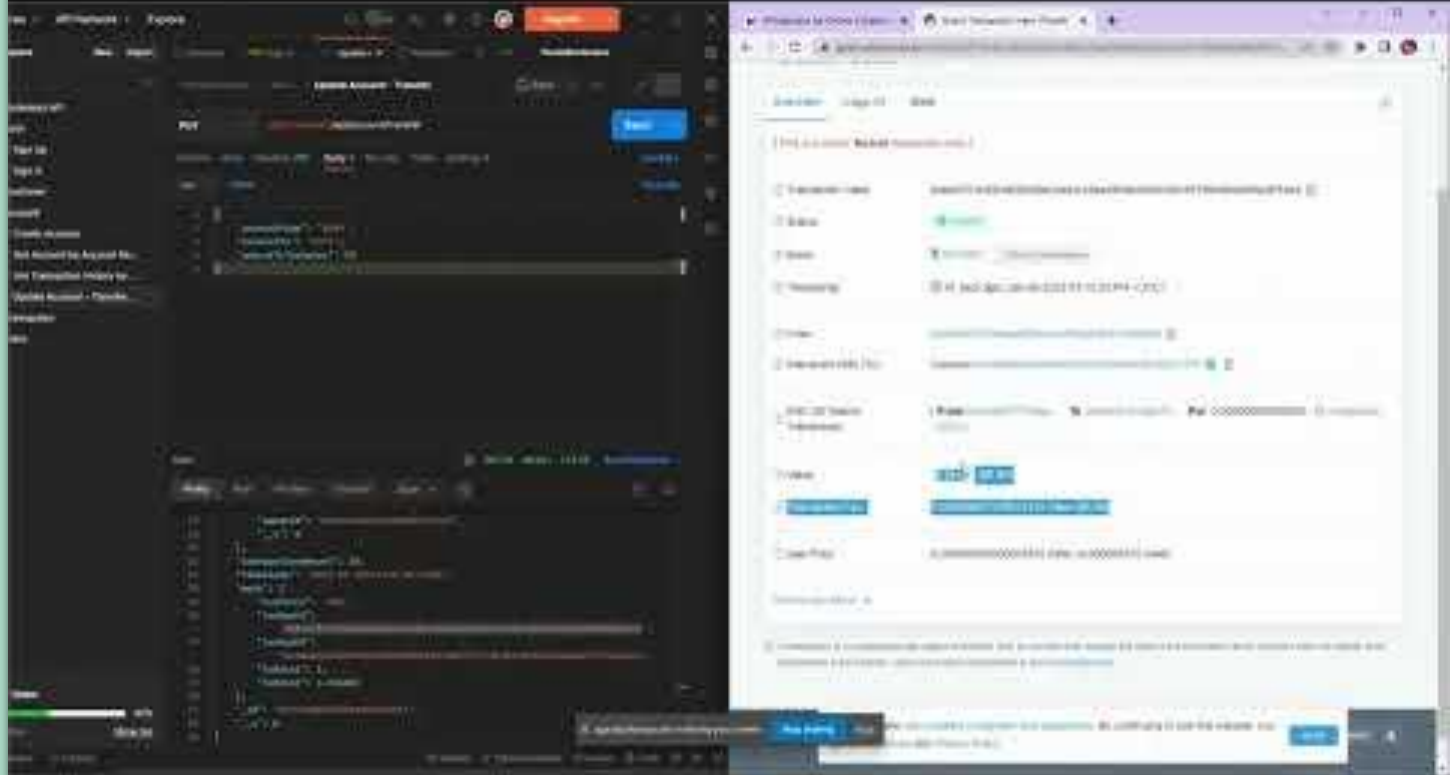
https://drive.google.com/file/d/1TcYEuqF8d_p2hmSCKyEPNW7BOyNmG8wD/view?usp=sharing

Backend API

<http://panda-alb-279443553.ap-south-east-1.elb.amazonaws.com/>



API Demo





05

Q&A



Thank You

PANDA BORDERLESS

Team TakoHackies

Try out the app!

