Ecosystem Service Department Talent Growth and Learning Project:

Payment

1. Overview

Payment is a vital part for an e-commerce business. The customer wants fast, easy and - most importantly - secure payments. Requiring credit card details for every payment will prevent the customer from using the service when they don't have time to re-enter all the details, but storing credit card details requiers us to comply with very strict security standards (PCI/DSS). Some credit card processing services (like Stripe) can take care of both processing credit cards and securely storing the card details for us.

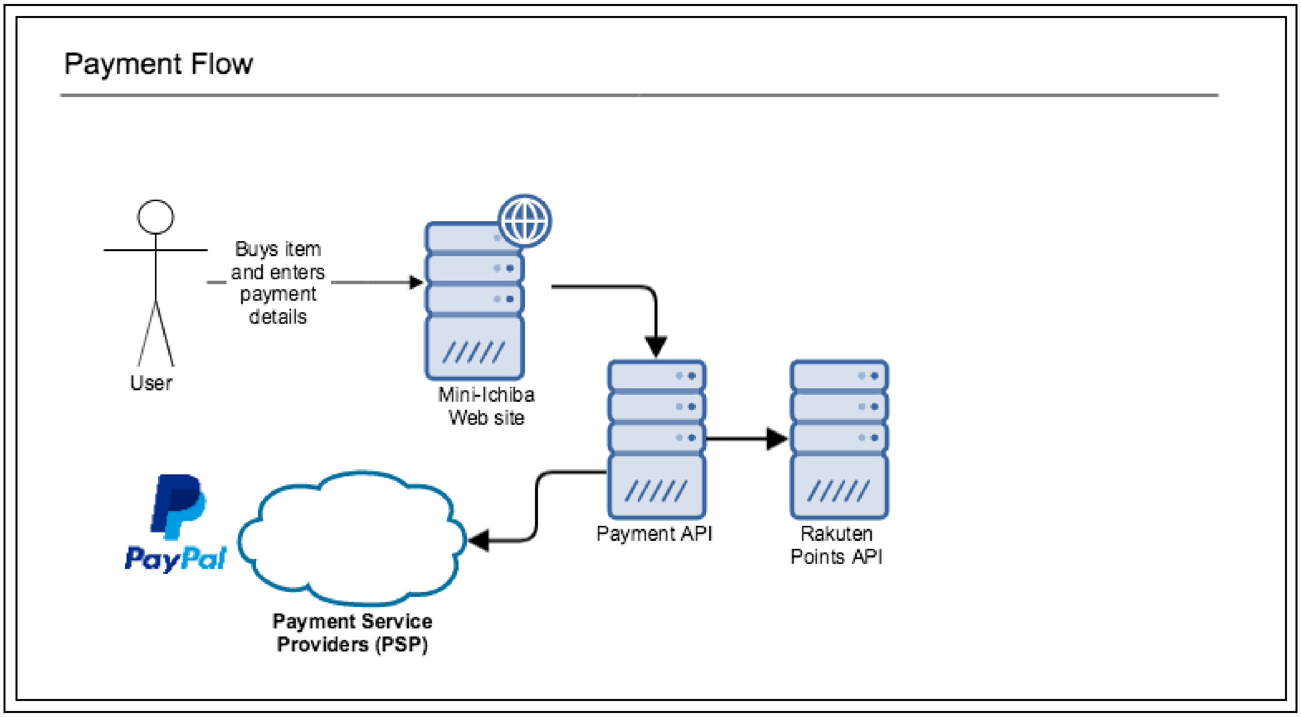
2. Tasks

1. Integrate different payment providers:
    1. Points (mandatory)
    2. At least one credit card provider (e.g. Paypal, Stripe) - use sandbox accounts and test cards
    3. (optional) Bitcoin
    4. Other ideas
2. Authorize and create transaction (mandatory)
    1. Provide amount
    2. (optional) Consider different currencies?
    3. Validating card details: number, expiry date, name, CVV2
    4. Validating available points for point backend.
    5. (optional) 3D Secure.
3. API for Finalizing transaction (mandatory)
4. (optional) Cancel transaction API
    1. Optional: consider when should cancel a transaction
5. (optional) API for changing amount of money
6. (optional) Check and save card numbers
    1. Validate card details without an amount.
    2. Save card number according to PCI/DSS standards (encryption, etc.)
    3. Create card ID.
    4. API for users to use card ID directly for payment.
    5. Optional: consider a separate service for card detail storage (PayVault).

3. Requirements

1. Should be scalable up to a peak rate of 100 transactions per second, regardless of payment services being used (as long as these services support the workload).
2. Scalability should be close-to-linear, i.e. doubling the numbers of servers should increase the capacity by close to 100%.
3. Transaction reliability should be over 99.99% percent. Transaction could fail due to payment service errors, but we need to properly track their status. A transaction that was charged to the user's credit card but not recognized by our system is something we really want to avoid.

4. Architecture


Payment Flow
User
Buys item and enters payment details
Mini-Ichiba Web site
Payment API
Rakuten Points API
PayPal
Payment Service Providers (PSP)