

Digital Payments

Let's discuss

- What do you think Digital Payment is?
- Tell me some important terms associated with Digital Payments

Important Terms

2FA or AFA	<p>Two-factor authentication (2FA) or Additional Factor Authentication (AFA) provides unambiguous identification of users by means of a combination of two different components:</p> <p>What you have - Card (number, expiry date and CVV that is printed on card)</p> <p>What you know - PIN (either static or One Time Password, OTP)</p>
3D Secure	<p>3-D Secure is an XML-based protocol designed to be an additional security layer for online card transactions. It was originally developed by Arcot Systems, Inc. It is also known as Verified by Visa or MasterCard Secure Code or American Express SafeKey.</p>
ACS	<p>Access Control Server is 3D Secure protocol and there are entities that provide 3DS solution for the issuing bank. Basically, these entities send and validate the OTP for the issuing bank.</p>
Issuing Bank	<p>Bank that issues cards to consumers or corporates.</p>

Important Terms

Acquiring Bank	Bank that processes card transactions of different card schemes.
Card Association	Card Scheme or Card network is payment networks linked to cards. By becoming a member of the scheme, the member can issue or acquire cards operating on the network of that card scheme.
API	Application Programming Interface is a set of functions and procedures that allow two systems to communicate and exchange data
Credit Cards	Cards that work on credit line of issuing bank (entity). Spend amount is limited to the credit line. Customer is obliged to repay the spent amount after free credit period.

Important Terms

Debit Cards	Cards that work through the automatic deduction of available funds in a bank account to make a purchase or withdraw cash.
Prepaid Cards	Cards work on preloaded amount and the spend is limited to available balance. Prepaid cards are issued by PPI licenced entities. Depending on acceptance, prepaid card can be closed, semi-closed and open loop. Forex cards are also prepaid cards that can be loaded with non-INR currencies.
Mobile Wallet	These are digital prepaid instruments with intangible form factor otherwise they have all attributes of a prepaid cards.
Authentication, Authorization and Capture	Three steps of card transaction: (a) Authentication - Card is authenticated with OTP validation (b) Authorization - Transaction is authorized based on balance & risks (c) Capture - Transaction is captured, and the settlement process begins.

Important Terms

BIN	Bank Identification Number is assigned by a card scheme to each of its member financial institutions, banks, and processors. Usually, first 6 digits of the card number (Visa is upgrading it to 8 digits)
Card number	String of digits printed on the front face of the card (these digits signify bank identification number, category, currency etc.).
	Visa, MasterCard, RuPay: 16 digits Amex: 15 digits
Card Details	Attributes of the card that includes card number, expiry date and CVV (1,2)

Important Terms

CVV	<p>Card Verification Value (CVV) or CVC (Card Verification Code) or CSC (Card Security Code) is 3 (Visa, MasterCard, RuPay) or 4 (Amex) digits on back of the card that is used for transaction.</p> <p>CVV1: Part of magnetic stripe or EMV CVV2: 3 or 4 digits on the reverse of the card</p>
CNP	<p>Card Not Present transaction is done remotely by the user (basically, online transaction). CNP transactions are risky, so additional layer of security (2nd Factor Authentication) is mandatory.</p> <p>MDR for CNP transactions is higher compared to CP transactions.</p>
CP	<p>During transaction the cardholder or card is present at point of sale (Card swipe done at a grocery store).</p>

Important Terms

EMV	Euro Pay, MasterCard and Visa, is a microchip-based technology designed to reduce fraud at the point-of-sale.
NFC	Near Field Communication technology allows users to make secure transactions with a tap.
Card Vaulting	Process of storing the card details (number and Expiry Date) by PCI-DSS certified entity.
Chargeback	A dispute raised by a credit cardholder with an issuing bank. A merchant can provide proofs to defend the chargeback or amount is reversed to the customer.

Important Terms

Escrow Account	A special purpose non-interest paying account used by intermediaries to move funds. Regulation for escrow account is bit relaxed compared to nodal account.
GTV or GMV	<u>Gross Transaction Value or Gross Merchandise value is the value of transaction processed.</u>
KYC	Know Your Customer, set documents establish a business entity or person's credentials.
Merchant	The business entity that sells goods or services to customers or businesses.

Important Terms

MCC	Merchant Category Codes assigned by card scheme for a particular sector or business. (E.g., Airline, Hospital, retail, Education etc.). MDR varies based on MCC.
MDR	Merchant Discount Rate is fee charged by acquiring bank to merchant. Sometimes, same is called as TDR (Transaction Discount Rate).
MID	Merchant Identification Number is a unique number assigned to each member merchant by an acquiring bank or partner bank. MID is used for identifying the merchant throughout the payment cycle (transaction, settlement, refund, chargeback).
NACH	National Automated Clearing House is Recurring payment platform managed by NPCI. NACH has offline (paper based) and online variants.

Important Terms

NEFT	National Electronic Funds Transfer is interbank transfer service managed by RBI. NEFT works in 30 mins batches and recently upgraded to 24x7.
RTGS	Real Time Gross Settlement is interbank transfer service managed by RBI. RTGS works 24x7 and allows for transfers above Rs. 2,00,000.
IMPS	Immediate Payment Service is interbank transfer service managed by NPCI. IMPS works in real time and 24x7. Limited to INR 2,00,000 per transfer.
Nodal Account	Nodal accounts are non-interest-bearing special purpose accounts used by intermediaries to move funds. Nodal account comes with strict governance and has limit that funds should leave the account in 3 days.

Important Terms

NPCI	National Payments Corporation of India is founded in 2008, is a not-for-profit organization owned by a consortium of banks and promoted by RBI (Reserve Bank of India).
P2P	Person to Person transfer of funds.
Payment Aggregator	An entity that combines various payment processors and service providers (acquiring bank, banks, wallets etc.) on a single platform and offer payment services to merchants. E.g., PayU, BillDesk, RazorPay
PG	Payment Gateway is a piece of software that processes the card transactions. E.g., CyberSource, ISG, MIGS, FSS. An acquiring bank uses PG for processing.

Important Terms

PCI	Payments Council of India is a non-Profit organization of payments companies (payment aggregators, wallets, and PSPs) in India.
PCI-DSS	Payment Card Industry Data Security Standard is a proprietary information security standard for managing cards (storing, processing etc.)
POS	Point of Sales is a machine used to process card present scenario (fixed POS at retail store or mobile POS device).
Refund	A request posted by the merchant (on behalf of customer) for returning the transaction amount to the customer's source account or card. A refund can be the full or partial.

Important Terms

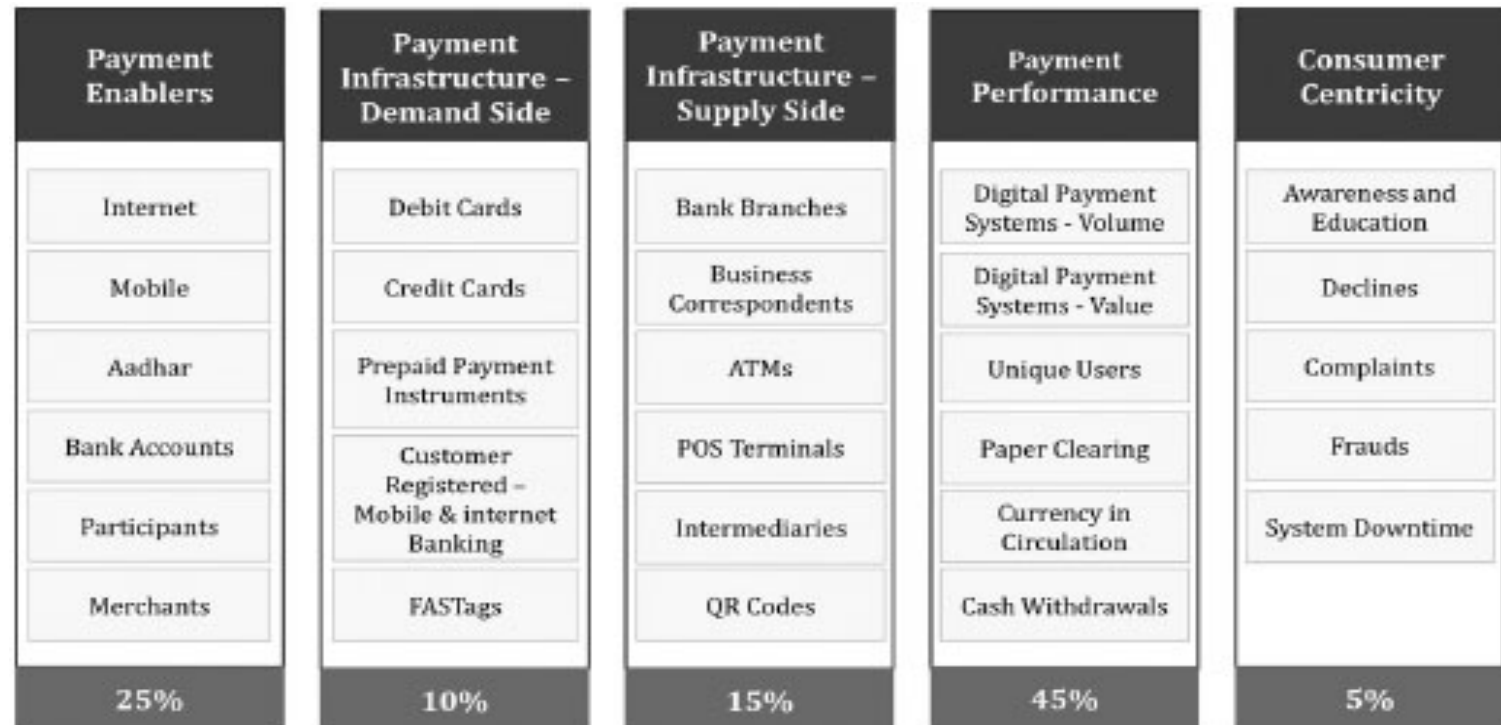
RBI	Reserve Bank of India is central bank of India that is responsible for managing monetary policies including digital payments
UPI	Unified Payments Interface is a mobile based digital payment product by NPCI to facilitate P2P (Person to Person) as well as P2M (Person to merchant) transactions.

RBI Guidelines


- RBI issues guidelines. Below are some of the important guidelines related to payments.
 - Payments and Settlement
 - Act PA/PG Guidelines
 - Prepaid Payment Instruments (PPI)
 - Inward and Outward remittance
 - Card and SI on Cards guidelines
 - Master KYC guideline

RBI relevant Fintech Innovations

- [RBI Regulatory Sandbox](#)
- We all know that digital payments are growing big but, have you ever wondered:
 - How big is it?



Source: <https://rbidoes.rbi.org.in/rdoes/content/pdfs/PR87401012021.pdf>

A stack of several credit cards is shown on the right side of the image, fanned out slightly. The cards have various colors like black, red, gold, and blue. The background is a dark, blurred gradient with a purple-to-orange hue at the bottom left.

Payment Players (Digital Payment Ecosystem)

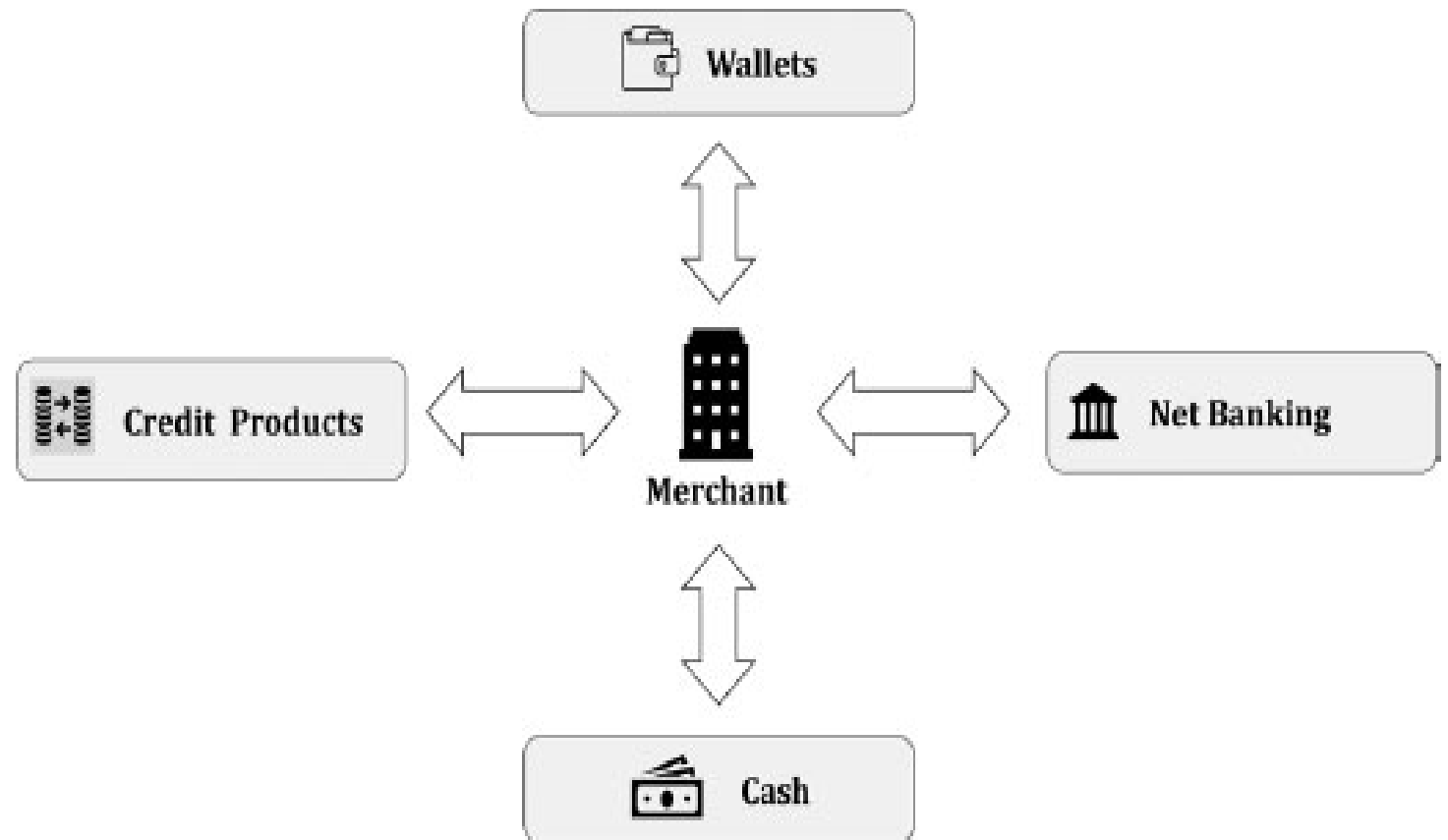
Payment Instrument Issuers

- Cards (Credit Card, Debit card, prepaid card)
- Bank account
- Unified Payments Interface (UPI)
- Wallet
- Alternate credit product (cardless EMI and pay later products)
- Cheque and Demand Drafts
- Cash (Yes, it is also payment instrument) Crypto Currencies

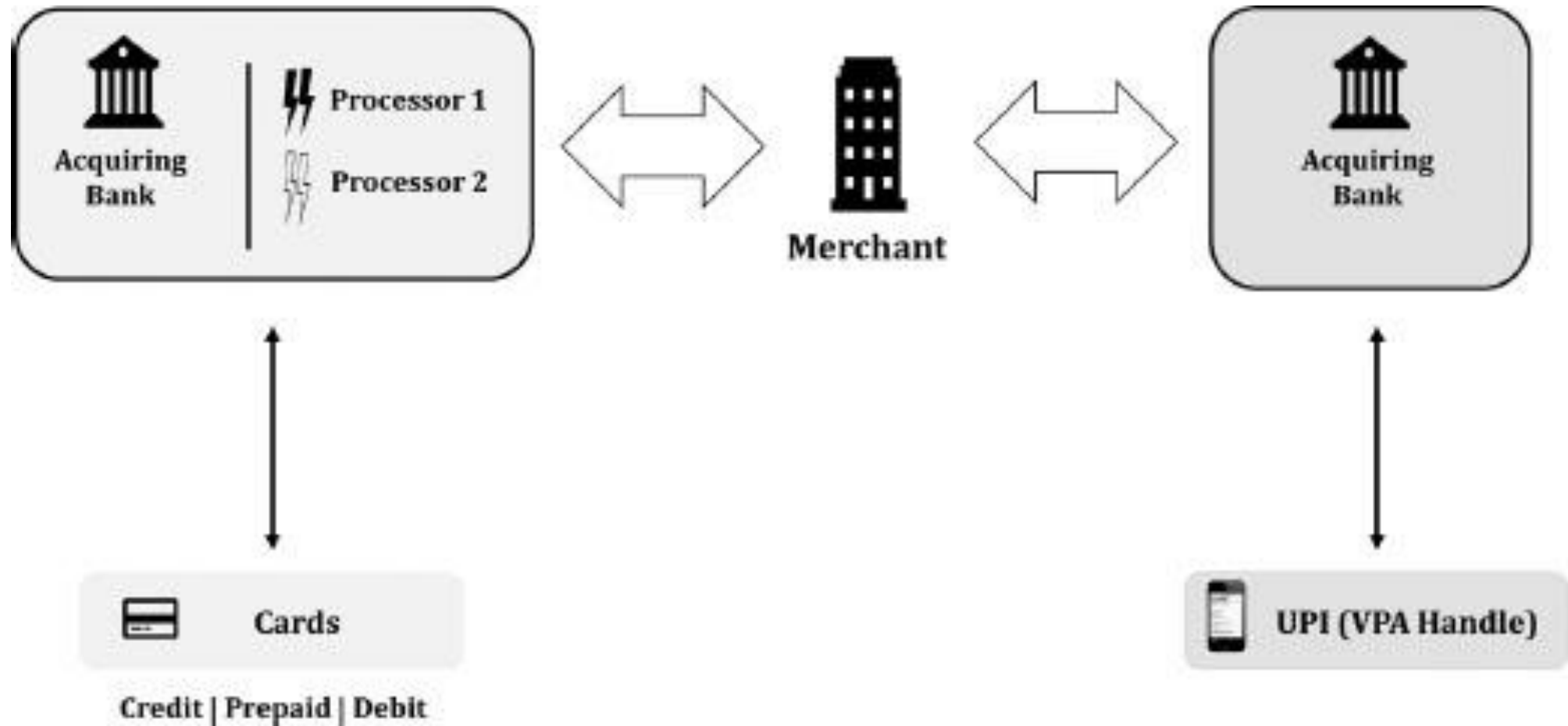


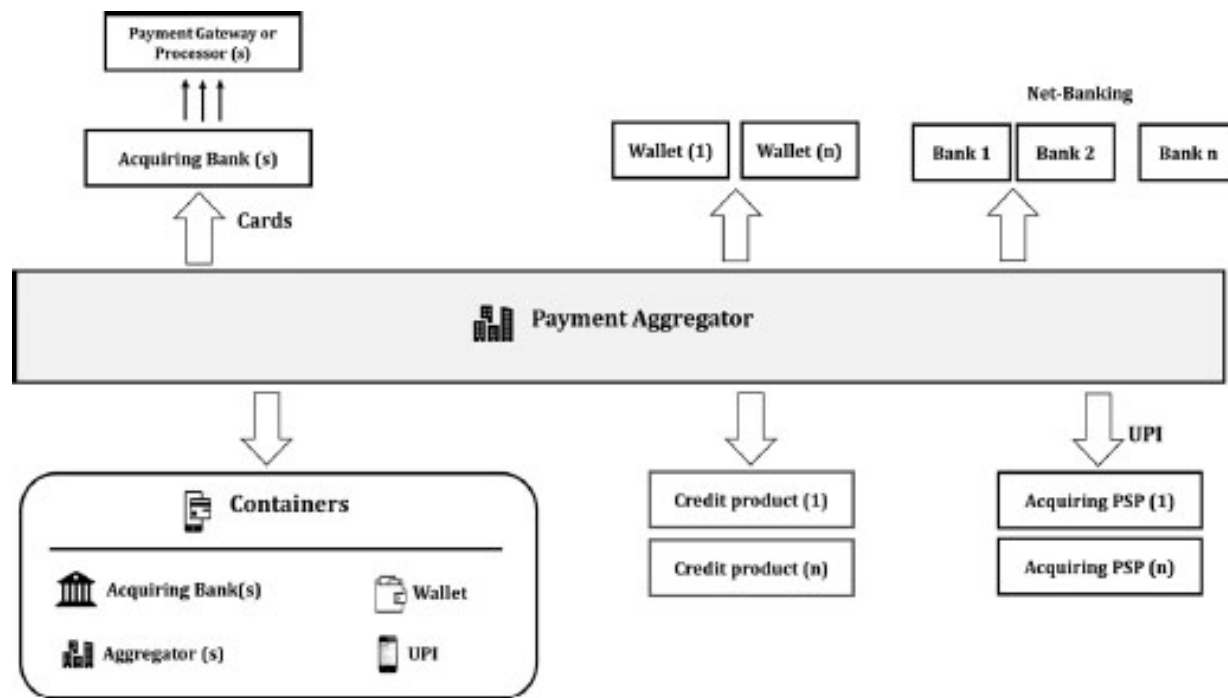
Payment Service Providers

- A payment instrument issuer can ONLY process that instrument. Merchant needs to have direct integration with these entities.
- Example: Wallets, Net-banking, alternate credit products (pay later product), Amex cards.



Acquiring Banks





Payment Aggregators

- They aggregate multiple payment processing entities (acquiring banks, net-banking, wallets, and credit products) on a single platform and offer bundled solutions to merchants that increase payment coverage and reduce integration effort while doing single settlement for all types of transactions.

- BillDesk, PayU, Ingenico ePayments, CC Avenue, RazorPay



Payment Containers

- Considered as 'lite-payment aggregators'; they also partner with acquiring banks, aggregators, acquiring PSP and wallets on a single platform.
- A container can enable user to create UPI ID, vault cards and have wallet. And use these payment instruments to do P2P (person to person) or P2M (person to business) transactions.
- The primary difference between an Aggregator and Payment Container is that the user has to create an account with the Payment Container and login to that account every time before accessing the payment instrument to make the payment.
- PayPal, AmazonPay, PhonePe

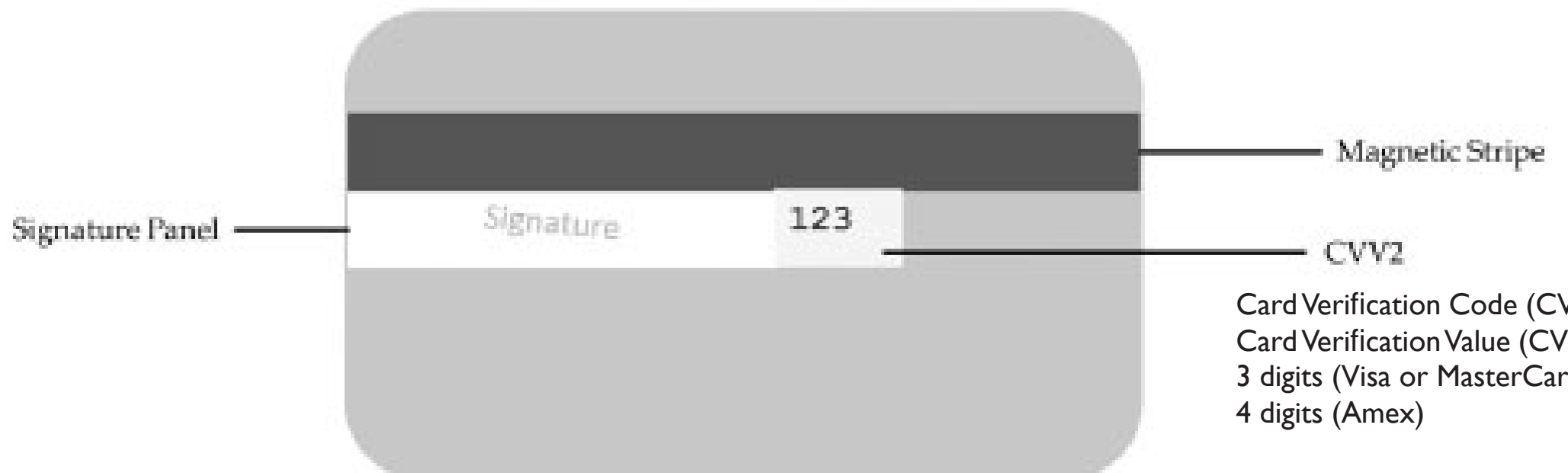
TSP (Technical Service Provider)/Wrapper

- These entities provide a platform for merchants to integrate with multiple Payment Aggregators, Payment Containers, Wallets, and other types of payment processors along with additional features such as unified 'card vault', unified dashboard, routing engines etc.
- These TSPs bring technical advantages that ease integration and routing activities but stay away from settlements.

Payment Instruments

Payment Instruments

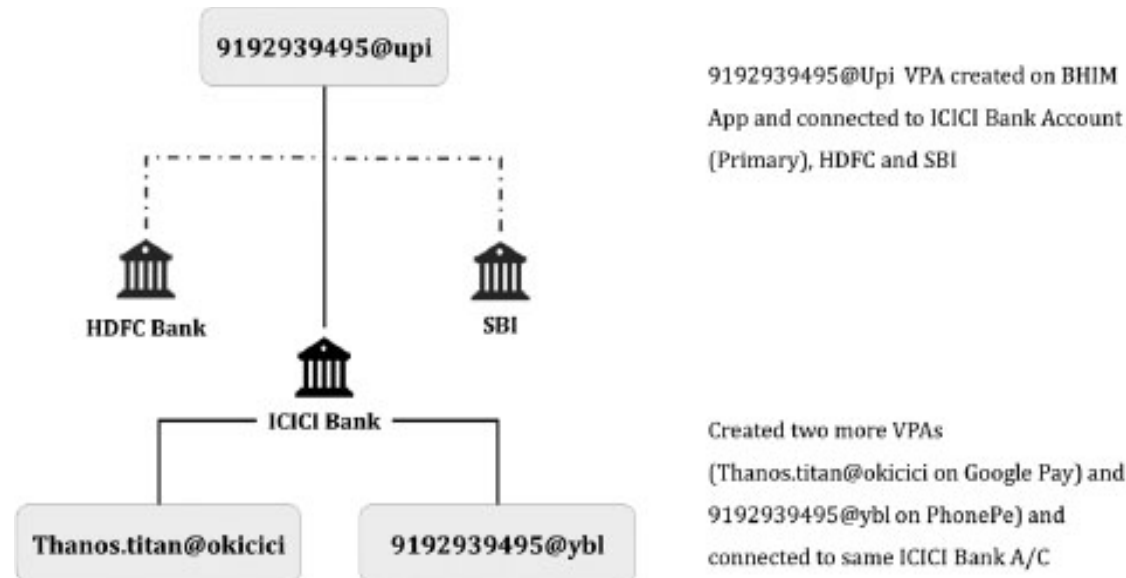
- Credit Cards and Debit Cards
- Prepaid Cards and Wallets
 - Non-reloadable: Gift Cards
 - Reloadable: PayTM wallet, Meal card, Forex card
- Net-banking
 - Net-banking is one of the biggest value propositions that Payment Aggregators bring to the table
 - Payment Aggregators bundle all these banks together and offer them to merchants on a single platform
- Buy Now Pay later
 - Idea behind these products is to give 'small credit' to users for a particular period (couple of weeks)
 - Ola Money Post-paid, Simpl, ePaylater, LazyPay



Card Verification Code (CVC)
Card Verification Value (CVV) is
3 digits (Visa or MasterCard)
4 digits (Amex)

UPI (Unified Payments Interface)

- P2P (C2C), P2M (C2B), B2C (P2M), B2B, G2C and C2G (P=Person, C=Consumer, M=Merchant, B=Business, G=Government).
- Students to explore more on this using the [link](#)



Payment Aggregators

- Is it payment Gateway?
- Payment Gateway (PG) is a piece of software that is used by acquiring banks to process card transactions.
- Payment Aggregator (PA) brings multiple payment options (Credit cards, Debit Cards, prepaid cards, Net-Banking, UPI, Wallets, Alternate Credit products etc.) on a single platform by integrating with various payment processing entities.
 - BillDesk, Ingenico (Earlier TechProcess), CC Avenue, RazorPay, PayU, Cashfree, ZaakPay

Charges by PA

- Payment Aggregator will charge MDR (merchant discount rate) to its merchants (which merchant can choose to absorb or pass it on to the customer).
- Typical charges will be:
 - Percentage (%) of successful transaction value (E.g., 1.80% of transaction value)
 - Flat fee per successful transaction (Rs. 10 per transaction)
 - Mixed pricing i.e., combination of % of value + Fixed Fee (E.g., 1.80% + Rs. 1)

Payment Aggregator – Integration

- Payment Page is the page where the customer selects the payment method (cards, net-banking, wallet, payment container, UPI, credit products etc.) to start the transaction.
- When the customer clicks on the 'pay' button, the customer is redirected to Payment Aggregator's page to select the payment method and proceed with the transaction

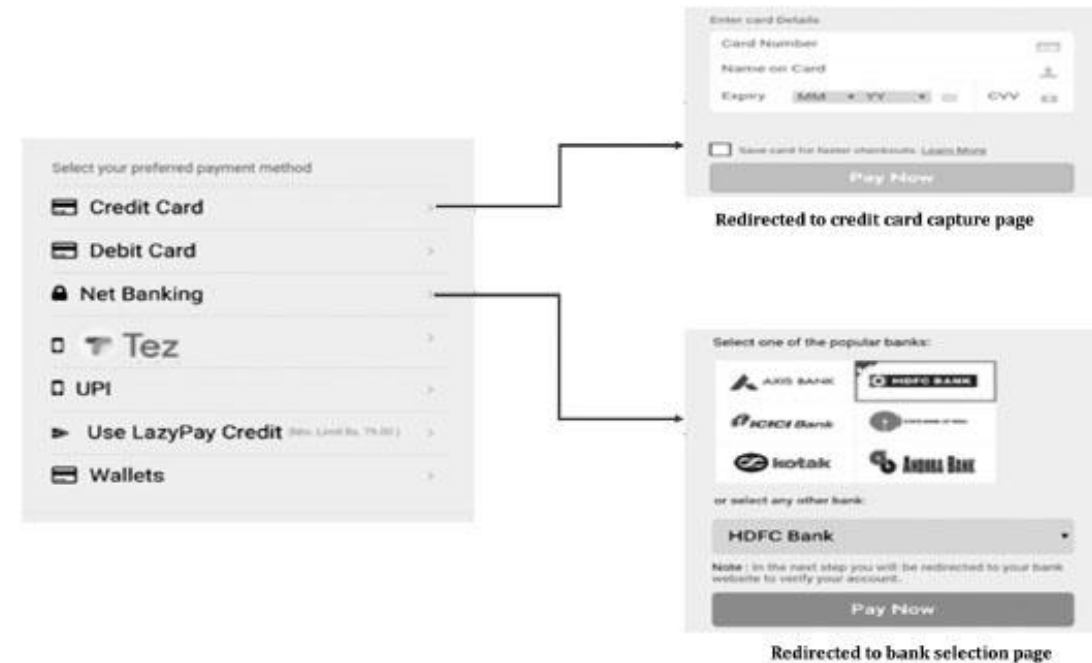


Illustration: Payment Aggregator Hosted Page (PayU)

Payment Aggregator – Integration

Payment page can be hosted by a merchant where the merchant will list the payment methods.

The screenshot displays a 'PAYMENT OPTIONS' interface. At the top, there's a dark header with a white '4' and the text 'PAYMENT OPTIONS'. Below this, several payment methods are listed, each with a radio button for selection. The methods include: 'Axis Bank Debit Card' (with card number 42xx xxxx xxxx 9134), 'Citibank Debit Card' (with card number 54xx xxxx xxxx 7505), 'Flipkart Pay Later' (marked with a 'NEW' badge), 'Credit / Debit / ATM Card', 'PhonePe / BHIM UPI', and 'Net Banking' (which is currently selected). Under 'Net Banking', there are two sections: 'Popular Banks' and 'Other Banks'. The 'Popular Banks' section lists 'HDFC Bank', 'ICICI Bank', 'State Bank of India', 'Axis Bank', and 'Kotak Bank'. The 'Other Banks' section features a dropdown menu labeled '--Select Bank--'. A large, dark 'PAY ₹501' button is positioned below the net banking options. At the very bottom, there is an option for 'Cash on Delivery'.

Illustration: Merchant hosted page (Flipkart)

Cashfree Payment Gateway Integration



**Payment link creation through
Python using Cashfree Payment
Gateway**

Card | UPI | Netbanking | Paypal

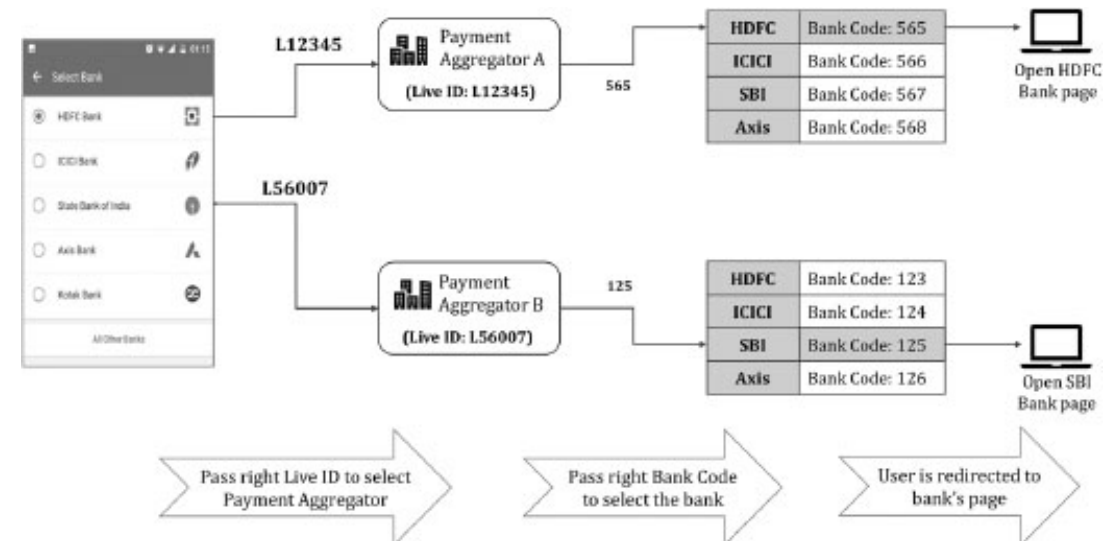


Task

- Form group of 2 members
- Identify popular payment gateway in India
- Find methods to integrate payment gateway

Payment Aggregator – Integration

- Each Payment Aggregator, wallet, and banks issue a unique MID for merchants. Each bank, wallet or Payment Aggregator also has unique code (e.g., bank code). So, with a combination of Live Id and Bank Code, merchants can route transactions.

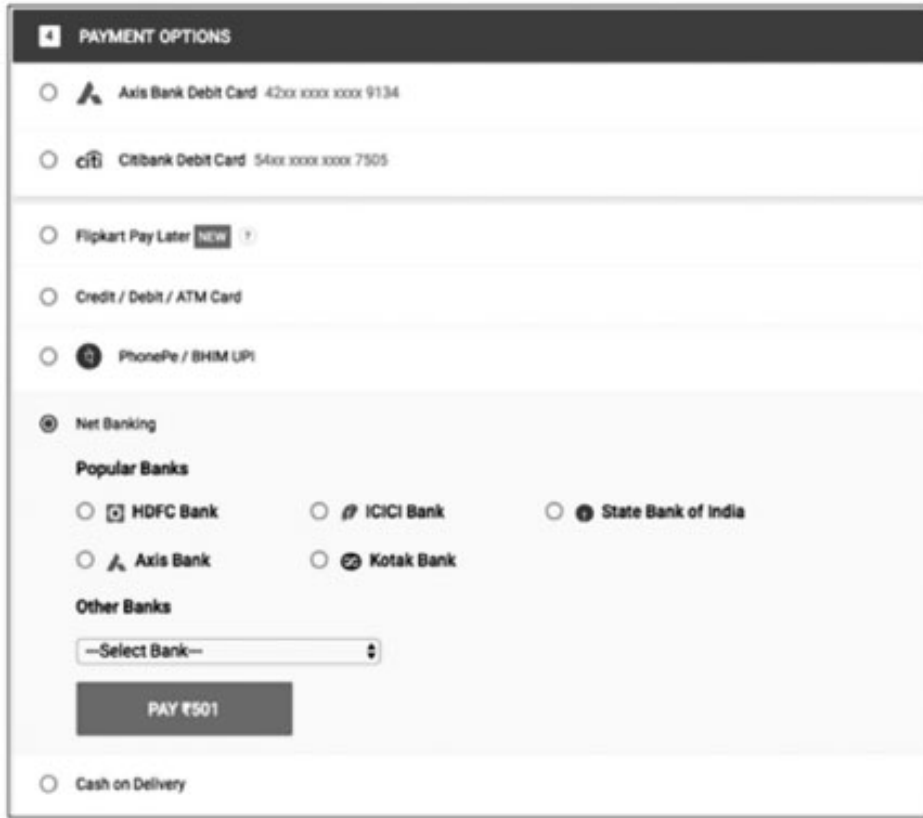


iFrame in merchant's site

- Merchants can embed the Payment Aggregators checkout page into the merchant's website as an iFrame.
- Overall look of the page is in the merchant's control except the iFrame part.
 - Pros: Slightly better control on page look
 - Cons: Cannot add multiple Payment Aggregators or add radio button for each Payment Aggregator.

Merchant hosted page (Seamless)

Payment page can be hosted by a merchant where the merchant will list the payment methods.



The screenshot displays a 'PAYMENT OPTIONS' interface. At the top, there's a dark header with the title. Below it, several payment methods are listed with radio buttons: Axis Bank Debit Card, Citibank Debit Card, Flipkart Pay Later (marked as 'NEW'), Credit / Debit / ATM Card, and PhonePe / BHIM UPI. The 'Net Banking' option is selected, leading to a section for 'Popular Banks' which includes HDFC Bank, ICICI Bank, State Bank of India, Axis Bank, and Kotak Bank. Below this is a section for 'Other Banks' with a dropdown menu labeled '--Select Bank--'. A 'PAY ₹501' button is positioned below the bank selection. At the bottom, the 'Cash on Delivery' option is also visible.

Illustration: Merchant hosted page (Flipkart)

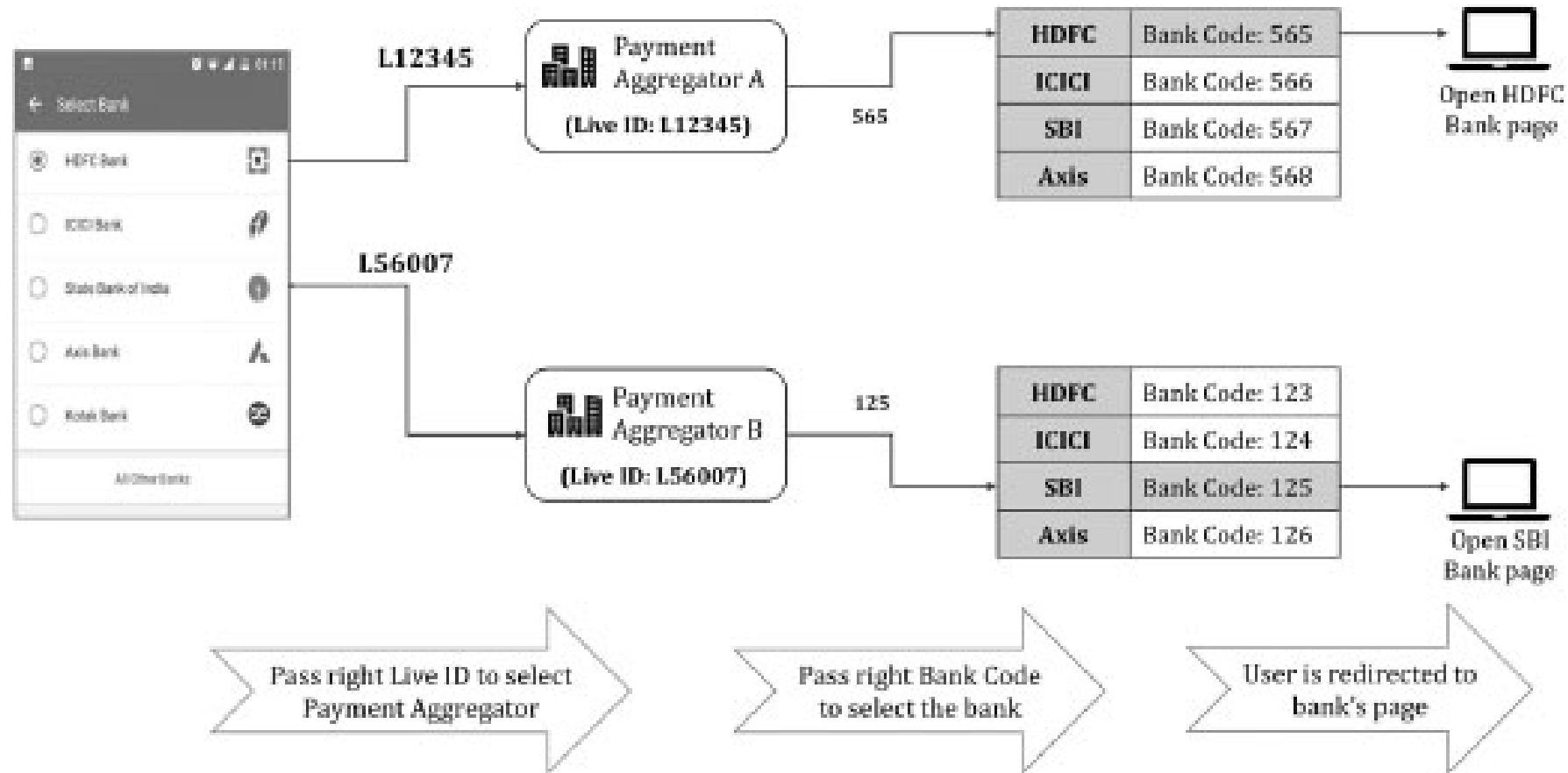
Pros

- Better control on page designs
- Flexibility to add multiple Payment Aggregators, banks, wallets etc.
- With routing logics, merchant can optimise performance and commercials

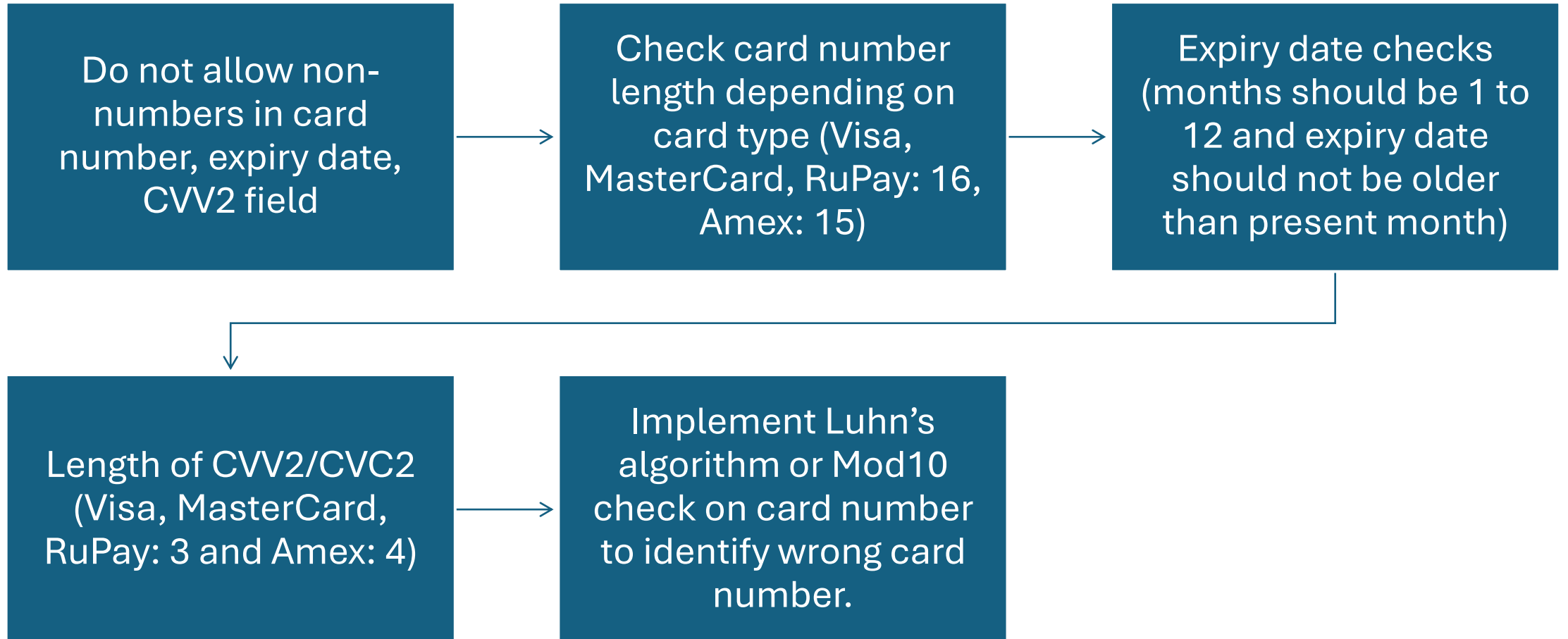
Cons

- Effort to maintain the page and manage routing logics
- Integration effort when new PSP is added
- Need to have card vault strategy to provide uniform user experience

Merchant hosted page (Seamless)



Points to be considered while developing card capture page



Save Cards or Card Vault

- Do you want users to save their cards?
 - Frequency of purchase
 - Mobile App is dominant channel
 - Lock-in with one Payment Aggregator
- Consent to save
 - No specific guidelines

Transactions

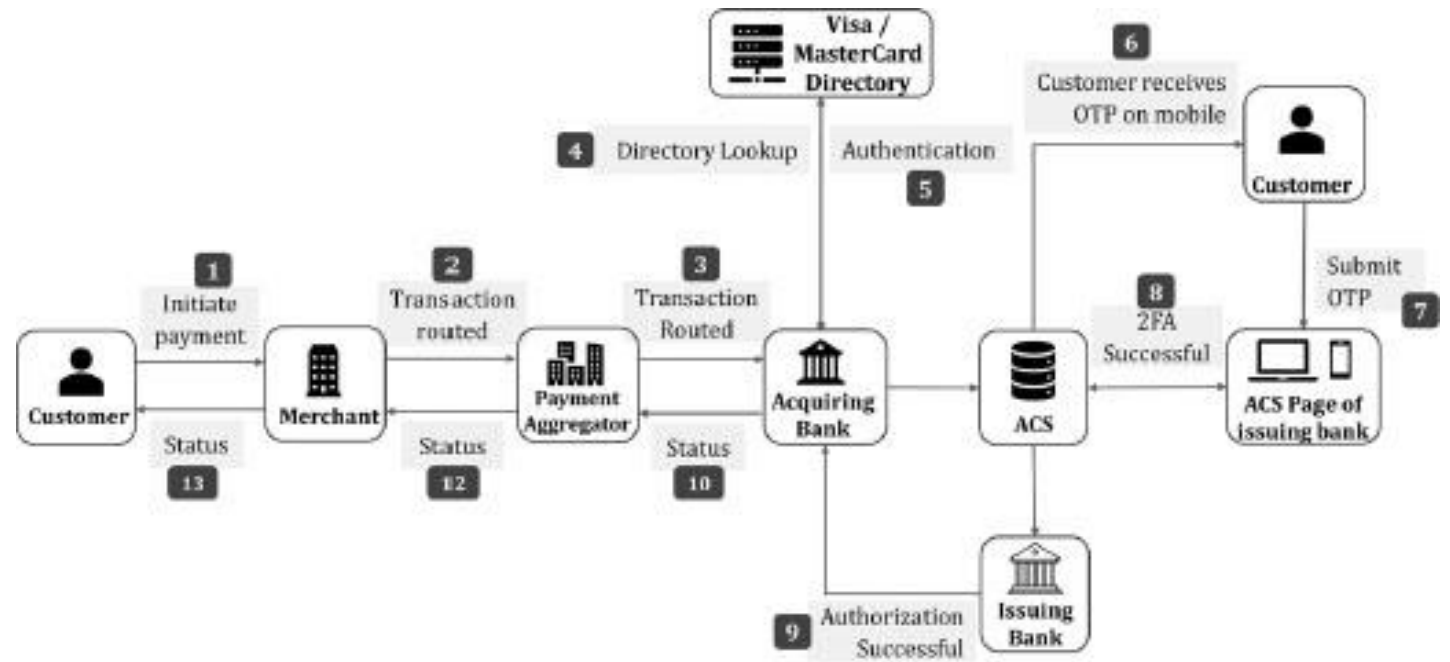


Illustration: Card Transaction Process