Common Payment Systems
- Who takes what slice of the pie and why?

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What to Expect from this Talk

- This is not a technical talk
- This is not a talk about cryptocurrencies
- This is not a talk about cash as a payment instrument
- This is a talk about which actors in traditional non-cash payment systems have which incentives, and why
- The focus will be on credit cards and consumer online payments
  - U.S. focus
  - VISA, MasterCard, PayPal
  - Briefly touching on Apple Pay & MCX/CurrentC
Four Corners Model:
Credit Cards, Checks, & Most Instruments
## Principals and Intermediaries

<table>
<thead>
<tr>
<th>Merchants</th>
<th>PSPs, ISOs, Gateways</th>
<th>Acquirers</th>
<th>Acquirers’ Processors</th>
<th>Card Networks</th>
<th>Issuers’ Processors</th>
<th>Issuers</th>
<th>Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Millions</td>
<td>• CyberSource • Authorize.net • Square • Stripe • Clover Payments</td>
<td>• B of A • Chase • Wells Fargo</td>
<td>• First Data • Global Payments • Total Systems</td>
<td>• VISA • MasterCard • Discover • AMEX • China Union Pay</td>
<td>• First Data • EDS • Total Systems</td>
<td>• B of A • Chase • Citigroup • Wells Fargo • US Bankcorp</td>
<td>• Billions</td>
</tr>
</tbody>
</table>
Who Issued the Credit Card?

<table>
<thead>
<tr>
<th>541275</th>
<th>123412345</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 digit Bank Identification Number (BIN)</td>
<td>Account Number</td>
<td>Checksum</td>
</tr>
</tbody>
</table>
What Makes Apple Pay Different?

- **Virtual Credit Card Number**
- **Device Account Number**
- **VCN/DAN-to-PAN Mapping DB**
- **“Tokenization Server”**

<table>
<thead>
<tr>
<th>Year</th>
<th>Term</th>
<th>Actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>~2006</td>
<td>“Virtual Credit Card Number”</td>
<td>Various Issuers</td>
</tr>
<tr>
<td>2014</td>
<td>Apple Pay “Device Account Number”</td>
<td>Various Issuers, VISA</td>
</tr>
</tbody>
</table>
Card Networks - Clearing & Settlement

Collect Batches from Acquirers
Calculate Acquirer Fees
Sort by BIN
Calculate Issuer Fees
Calculate Net Positions
Send Batches to Issuers
Who Pays What?

Rule-of-thumb: the merchants pay

Merchants then will raise prices to recover the costs from the consumer
Interchange Fees

- Transfer price between the Acquirer and the Issuer
- Originally intended to reimburse issuers for costs
  - Authorization, Clearing, and Settlement
- Revenue to Card Issuer, cost to Merchant via Acquirer
- The issuers always collect the lion’s share

**Fees Paid by Merchant**

- Issuer: 89%
- Acquirer: 7%
- Card Network: 4%
Credit Card Issuers -
Customer Terminology Definition

<table>
<thead>
<tr>
<th>Customer Payment Patterns</th>
<th>Industry Term of Art</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not pay off credit card balance in full each month</td>
<td>“Revolvers”</td>
</tr>
<tr>
<td>(Origin: “revolving credit line”)</td>
<td></td>
</tr>
<tr>
<td>Pays off credit card balance in full each month</td>
<td>“Deadbeats”</td>
</tr>
<tr>
<td>(Since the issuer does not get to collect interest payments)</td>
<td></td>
</tr>
</tbody>
</table>
Card Networks - Clearing & Settlement
Example: VISA Signature Card Transaction

- Issuer collects $100 for a purchase from the Consumer
  - Plus interest and potential overdraft fees from Revolvers
- Issuer pays Network $98.15, retaining $1.85 Interchange
- Network (VISA) pays Acquirer $98.12, retaining $0.03
- Acquirer pays Merchant $98.00
  - Discount or fixed transaction fee
Dispute Processing Mechanics

- Merchant typically will see the charges reversed
- Detailed steps:
  - Copy or Retrieval Request
  - Chargebacks
  - Pre-Arbitration and Arbitration
  - Merchant is assessed an additional dispute processing fee
Myth: Credit Card Fraud Represents a Loss to Issuers or Networks

- Fact: Credit card fraud is a profit center for everybody but the Merchant
  - And potentially to the consumer, but the consumer doesn’t care
- Scenario 1: Fraud remains undiscovered
  - “I can’t remember what that $2.56 charge was for. Oh well, who cares.”
  - Value chain collects discounts, fees, interchange, and profits
- Scenario 2: Fraud is discovered
  - Merchant is charged back full amount
  - Merchant pays chargeback processing fees
  - Acquirers, Networks, Issuers profit
- Payment systems that reduce fraud have to compensate the existing value chain for fraud-related profits to be of interest to the incumbents
Traditional Non-credit Card Backed Systems - Automated Clearing House (ACH)

- Payments are pulled directly out of your checking account
- Indicator: you provided a routing number and account number from a check
- Notable ACH-based payment providers
  - PayPal (ACH is default funding option, credit card-based funding options exist)
  - MCX/CurrentC (backed by Walmart, CVS, other major retailers)
- Impact on Merchants & Cybercriminals
  - Lower fees: 0.05% vs. 1.5-2.5%
  - Overnight settlement
  - Chargebacks are (mostly) at the good graces of the merchant
  - Few transaction limits, up to entire balance in your (or 40 million other) checking accounts
- Impact on Consumers
  - No “cash back”
  - Challenging/lengthy dispute resolution process
  - Theoretical cost savings to Merchant unlikely to be passed on to Consumer
What Matters to Payment Ecosystems?

- Transaction Friction
- Fraud/Losses
- Transaction Fees
Transaction Friction Dominates

- Major online payment provider
  - Over 120 million users
  - Over 100 fulltime staff dedicated to tuning the risk engine
- Average user makes 3-4 transactions per year
  - Mainly between Thanksgiving and Christmas
- Requires “complex password”
  - Likelihood of Granny not remembering the complex password she last used 10 months ago: virtually certain
- Shopping cart abandonment rate at checkout if user cannot remember the password: 40%
- Total loss rate (not all due to fraud): 0.33%
- Industry outsiders often focus on reducing the 0.33% rather than reducing the 40%.
Transaction Fees

- Desirable to Issuers, Networks, and Acquirers
- Desirable to Consumers, if camouflaged
  - 1% cash back credit card
- Despised by Merchants
  - But acceptable if transaction friction is reduced
Lessons to Alternative Payment System Designers

- Optimize for transaction friction reduction
  - Faster in-store than swiping a credit card
  - Faster online than paying by PayPal
  - Include onboarding friction

- Transaction costs are a distant second concern
  - The merchants will care, the consumers may not

- Fraud reduction is a very distant third goal
  - PayPal let fraud rates go up by 0.05%
  - 29% increase in volume on which to collect 3.45% “take rate” in the same time period