

## Lesson 2: Payments Fundamentals

Mini-Lecture Version (30 min)

Digital Finance

**Learning Objectives:** Understand key concepts and applications

## What is a Payment?

- Transfer of monetary value from payer to payee
- Settlement of obligation or exchange
- Requires: Authorization, clearing, settlement
- Involves multiple intermediaries

## Payment Ecosystem Participants:

- Payer (consumer/business)
- Payee (merchant/recipient)
- Issuing bank (payer's bank)
- Acquiring bank (merchant's bank)
- (See full lecture for details)

## Key Payment Characteristics:

- Speed (real-time vs batch)
- Cost (fees and FX spread)
- Security (fraud prevention)
- Finality (irrevocable vs reversible)
- (See full lecture for details)

## Payment Types:

- Push: Payer initiates (credit transfer)
- Pull: Payee initiates (direct debit)
- Card: Network-based (Visa/MC)
- A2A: Account-to-account (open banking)

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This concept is fundamental to understanding Payments Fundamentals.

## 1. Authorization:

- Merchant requests payment approval
- Issuer checks funds/credit availability
- Response: Approve or decline
- Duration: 1-3 seconds
- (See full lecture for details)

## 2. Authentication:

- Verify cardholder identity
- 3D Secure (3DS): Password/OTP
- Strong Customer Authentication (SCA, PSD2)
- Biometrics (fingerprint, face ID)
- (See full lecture for details)

## 3. Clearing:

- Batch processing of transactions
- Exchange of transaction details
- Calculation of net positions
- Typically occurs daily (end-of-day)

## 4. Settlement:

- Actual movement of funds
- Issuer pays acquirer (via network)
- Merchant receives funds (minus fees)
- T+1 to T+3 for card payments
- (See full lecture for details)

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## Transaction Steps:

- 1 Customer presents card at merchant POS/online
- 2 Merchant sends authorization request to acquirer
- 3 Acquirer routes to card network (Visa/MC)
- 4 Network routes to issuing bank
- 5 (See full lecture for details)

## Messaging Standards:

- ISO 8583: Card transaction messaging
- EMV: Chip card standards
- 3D Secure: Online authentication protocol
- PCI DSS: Security standards for card data

## Approval Rate Factors:

- Sufficient funds/credit limit
- Card not blocked/expired
- Fraud screening passed
- Correct CVV and address
- (See full lecture for details)

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## Visa Inc:

- Founded: 1958 (BankAmericard) \$674B (Dec 2025)
- Cards in circulation: 4.2B globally \$17T total payments/cash volume (FY2025) \$36.80B (FY2024)
- Net margin: 51%

## Mastercard Inc:

- Founded: 1966 (Interbank Card) \$513.87B (Dec 2025)
- Cards in circulation: 3.1B globally \$10T (2024) \$28.16B (FY2024)
- Net margin: 46%

## Business Model:

- Four-party scheme (issuer, acquirer, network, cardholder)
- Do NOT issue cards or acquire merchants
- Revenue from transaction fees
- License brand to financial institutions
- (See full lecture for details)

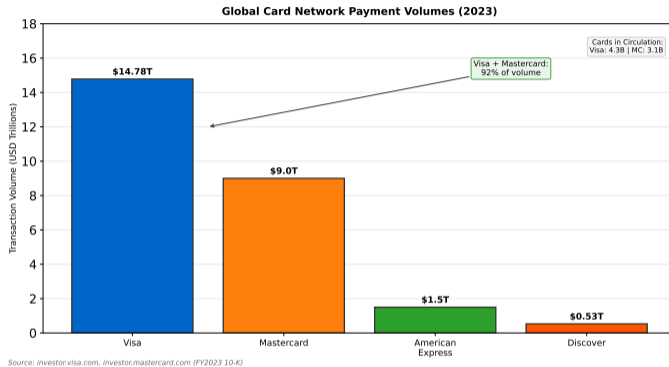
## Revenue Streams:

- Service fees: 0.13
- Cross-border assessment fees: 1.0
- Volume-based rebates and incentives
- Value-added services (fraud, analytics)
- (See full lecture for details)

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# Card Network Payment Volumes (2023)



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## What is Interchange?

- Fee paid by acquirer to issuer
- Compensation for fraud risk, funding, processing
- Set by card networks (Visa, Mastercard)
- Largest component of merchant fees
- (See full lecture for details)

## Interchange Rate Factors:

- Card type (debit vs credit, premium)
- Merchant category code (MCC)
- Transaction type (card-present vs online)
- Region (EU capped, US market-driven)
- (See full lecture for details)

## Typical Interchange Rates (EU):

- Consumer debit: 0.2% (capped by regulation)
- Consumer credit: 0.3% (capped by regulation)
- Commercial cards: Uncapped (1.5%-2.5%)
- Cross-border: Additional 0.4%-0.8%

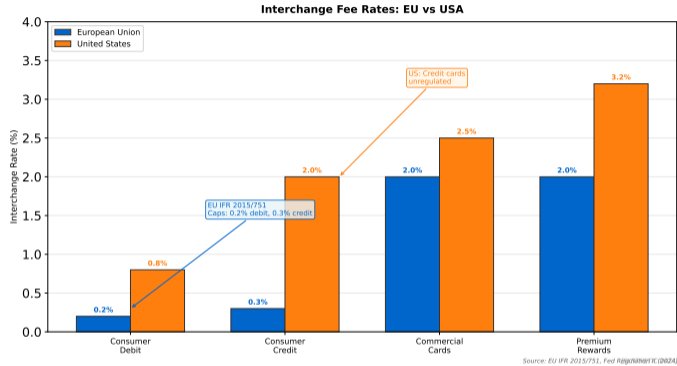
## Typical Rates (USA, unregulated):

- Debit card: 1.0%-1.5%
- Credit card: 1.5%-3.0%
- Premium rewards cards: 2.5%-3.5%
- Example: \$100 purchase = \$2-\$3 interchange

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# Interchange Fee Rates: EU vs USA



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# Merchant Discount Rate (MDR): Total Cost

## MDR Components:

- Interchange fee (70%-80% of MDR)
- Card network fee (0.13%-0.15%)
- Acquirer markup (0.10%-0.50%)
- Payment processor fee (if applicable)

## Total MDR Examples (EU):

- Debit card: 0.5
- Credit card: 0.8
- American Express: 2.0
- Large merchants: Negotiate lower rates
- (See full lecture for details)

## Merchant Cost Analysis:

- Interchange:
- Network fee:
- Acquirer margin:
- Total MDR:
- (See full lecture for details)

## Impact on Business:

- Low-margin sectors (supermarkets: 2%-3%)
- Payment fees = significant cost
- Incentive for cash or A2A payments
- Volume discounts for large merchants

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## Key Takeaways

- ① Transfer of monetary value from payer to payee
- ② Settlement of obligation or exchange
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**Bottom Line:** Payments Fundamentals is transforming how financial services operate and compete.

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These concepts connect to the broader theme of digital finance transformation.

# Payments Fundamentals in Visual Perspective



*Technology view*



*Application view*



*Future view*

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**Visual representations help reinforce key concepts of payments fundamentals.**

# Concrete Examples: Making It Real

## Technical Examples

- Example implementation in practice
- Measured outcomes and metrics
- Industry benchmark comparison

## Case Study

- Real-world deployment scenario
- Quantifiable results achieved

## Industry Leaders

- Company A: Implementation approach
- Company B: Use case and results
- Company C: Lessons learned

## Market Data

- Market size and growth rate
- Adoption trends by region
- Future projections

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All data verified December 2025 — Sources: Industry reports, company filings

## Quiz Questions (1–5)

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- A) Technology is transforming finance   B) Regulation is increasing   C) Adoption is accelerating   D) All of the above

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**Answer: D** – All these trends are interconnected.