

Lesson 6.1 Quiz: Payment Rails and Clearing Infrastructure

Module 6: The Infrastructure Problem

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Digital Finance — BSc Course

Q1: Payment Rail Definition

What is the best description of a **payment rail**?

- A A physical cable connecting banks to the central bank
- B The underlying network, rules, and settlement mechanisms through which money moves between institutions
- C A government-issued license to process consumer payments
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Answer: (B) A payment rail is the network and system (including rules, message formats, and settlement mechanisms) through which interbank money movement occurs.

Which statement about SWIFT is **correct**?

- A SWIFT transfers money between banks in real time
- B SWIFT is a messaging network that sends payment instructions; it does not move money
- C SWIFT is a central bank that settles cross-border payments
- D SWIFT operates the ACH system in the United States

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Answer: (B) SWIFT is a messaging network connecting 11,000+ institutions. It transmits payment instructions (e.g., MT103 messages), but the actual money moves through RTGS systems and correspondent bank accounts.

Q3: Clearing vs. Settlement

What is the key difference between **clearing** and **settlement**?

- A Clearing moves money; settlement calculates obligations
- B Clearing calculates mutual obligations; settlement is the actual transfer of funds
- C Clearing is done by the central bank; settlement is done by commercial banks
- D Clearing applies only to securities; settlement applies only to payments

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Answer: (B) Clearing determines who owes what to whom (including netting). Settlement is the actual, often final and irrevocable, transfer of money or securities to discharge those obligations.

Which of the following is a defining characteristic of a **Real-Time Gross Settlement (RTGS)** system?

- A Payments are accumulated and netted at end of day
- B Each payment is settled individually and immediately in central bank money
- C Payments can be reversed within 60 days
- D Settlement occurs only during overnight batch windows

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Answer: (B) RTGS settles each payment individually (gross), in real time, using central bank money. Once processed, the payment is final and irrevocable.

Q5: Nostro vs. Vostro

Deutsche Bank maintains a USD account at JPMorgan to facilitate dollar payments. From Deutsche Bank's perspective, this account is called a:

- A Vostro account
- B Settlement account
- C Nostro account
- D Reserve account

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Answer: (C) A nostro account ("our account at your bank") is Deutsche Bank's USD account held at JPMorgan. From JPMorgan's perspective, the same account is a vostro account ("your account at our bank").

Q6: Payment Finality

In which payment system does the payer face the **highest risk** of the payment being reversed after apparent completion?

- A Fedwire (RTGS)
- B ACH direct debit
- C CHAPS (RTGS)
- D TARGET2 (RTGS)

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Answer: (B) ACH payments have deferred finality — returns can occur for 2–60 days depending on the reason. RTGS systems (Fedwire, CHAPS, TARGET2) provide immediate, irrevocable finality.

Q7: Bilateral Netting Calculation

Bank A owes Bank B \$800,000 and Bank B owes Bank A \$550,000. After bilateral netting, what is the single transfer required?

- A \$1,350,000 (A to B)
- B \$800,000 (A to B)
- C \$250,000 (A to B)
- D \$550,000 (B to A)

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Answer: (C) Net = \$800,000 – \$550,000 = \$250,000 from A to B. Netting reduced the total transfer volume from \$1,350,000 to \$250,000.

Q8: Netting Efficiency

A CCP clears trades with gross obligations totaling \$50 billion. After multilateral netting, only \$3 billion in net transfers are required. What is the netting efficiency?

- A 6%
- B 47%
- C 94%
- D 97%

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Answer: (C) Netting efficiency = $(\$50B - \$3B) / \$50B = \$47B / \$50B = 94\%$. The CCP reduced the gross obligations by 94%.

Q9: Correspondent Banking Chain

A bank in Kenya wants to send USD to a bank in Vietnam. Neither bank has a direct correspondent relationship with the other. What is the **minimum number of intermediary banks** typically required?

- A Zero — the central banks settle directly
- B One — a single global correspondent bank
- C Two — one USD correspondent for each bank
- D Four — two for each currency in the chain

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Answer: (C) Each bank needs a USD correspondent (often a large US bank). The Kenyan bank's correspondent pays the Vietnamese bank's correspondent via Fedwire, then each leg settles locally. Minimum chain: 2 intermediaries.

Q10: DvP Failure Scenario

In a securities transaction **without** DvP, Bank A delivers \$10 million in bonds to Bank B, but Bank B fails to pay. What is Bank A's loss?

- A Zero — the bonds are automatically returned
- B The transaction fee only
- C The full \$10 million principal
- D Half the principal (\$5 million)

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Answer: (C) Without DvP, delivery and payment are separate. If Bank A delivered the bonds but Bank B did not pay, Bank A loses the full \$10 million principal. This is exactly the risk DvP eliminates.

Q11: T+1 Working Capital

A broker-dealer settles \$200 million in equity trades daily. Under T+2, what was the approximate counterparty risk exposure at any time? How does this change under T+1?

- A T+2: \$200M, T+1: \$100M — risk halved
- B T+2: \$400M, T+1: \$200M — risk halved
- C T+2: \$400M, T+1: \$400M — no change
- D T+2: \$200M, T+1: \$200M — no change

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Answer: (B) Under T+2, two days of trades are unsettled: $\$200\text{M} \times 2 = \400M exposure. Under T+1, only one day is unsettled: \$200M. The move to T+1 halves counterparty risk exposure.

Q12: Herstatt Risk Timing

It is 3:00 PM in Frankfurt (9:00 AM in New York). A German bank pays EUR in an FX trade. Why is this the moment of maximum **Herstatt risk**?

- A Because EUR is worth more than USD at this time of day
- B Because the EUR leg has settled but the USD leg has not yet settled due to time-zone difference
- C Because the New York Fed is closed at 9:00 AM
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Answer: (B) The EUR payment was made during Frankfurt hours, but the corresponding USD payment in New York has not yet occurred. If the counterparty fails between these times, the German bank loses its EUR payment without receiving USD — classic Herstatt risk.

Q13: DNS vs. RTGS Trade-off

A central bank is designing a new national payment system. It must choose between DNS and RTGS. Which statement best describes the **core trade-off**?

- A DNS is faster; RTGS is cheaper
- B DNS requires less liquidity but carries more credit risk; RTGS requires more liquidity but eliminates credit risk
- C DNS is for domestic payments; RTGS is for cross-border payments
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Answer: (B) DNS nets payments, reducing liquidity needs but creating credit risk (if a participant defaults before settlement, positions unwind). RTGS settles each payment individually in central bank money, eliminating credit risk but requiring participants to hold more liquidity.

Q14: CCP Concentration Risk

After the 2008 crisis, G20 mandated central clearing for standardized derivatives. What is the **unintended consequence** of this mandate?

- A It eliminated all counterparty risk from derivatives markets
- B It concentrated systemic risk in CCPs, making them “too important to fail”
- C It made bilateral trading more popular
- D It reduced the need for initial margin requirements

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Answer: (B) While CCPs reduce bilateral counterparty risk, they concentrate systemic risk. If a major CCP were to fail, it could trigger cascading defaults across the financial system — making CCPs critical infrastructure that cannot be allowed to fail.

A CCP interposes itself between parties via novation. Why does this improve **multilateral netting** compared to bilateral arrangements?

- A Novation reduces the number of contracts, so there is less to net
- B With novation, all participants face the CCP, enabling a single net position per participant across all counterparties
- C Novation eliminates the need for netting entirely
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Answer: (B) Without a CCP, netting is bilateral (A vs. B, A vs. C, etc.). With novation, every participant faces only the CCP, which can calculate a single net position per participant across all its trades — dramatically reducing total obligations.

SWIFT's migration from MT to ISO 20022 (MX) messages is expected to improve cross-border payments. Which improvement is **most directly** attributable to richer message data?

- A Lower interchange fees for card payments
- B Fewer manual repairs and exceptions due to structured, unambiguous payment data
- C Elimination of correspondent banking entirely
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Answer: (B) ISO 2022 carries richer, more structured data (e.g., full address, purpose codes, LEIs). This reduces the manual intervention needed to repair incomplete or ambiguous payment instructions, speeding up straight-through processing.

A company issues 1 million new shares. Which entity maintains the **definitive record** of who owns those shares after they are distributed?

- A The stock exchange where the shares are listed
- B The company's transfer agent or the Central Securities Depository (CSD)
- C The company's CFO
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Answer: (B) The CSD (or the transfer agent on behalf of the CSD) maintains the definitive register of securities ownership and processes book-entry transfers when shares change hands.

CLS Bank settles FX trades using Payment vs. Payment (PvP). What does PvP **specifically** eliminate?

- A Market risk (the risk that exchange rates move)
- B Principal risk (the risk that one leg settles but the other does not)
- C Operational risk (the risk of sending the wrong amount)
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Answer: (B) PvP ensures both currency legs of an FX trade settle simultaneously or not at all, eliminating principal risk (Herstatt risk). Market risk, operational risk, and liquidity risk remain.

Q19: Blockchain as Settlement Infrastructure

A proposal suggests replacing RTGS systems with a permissioned blockchain for interbank settlement. What is the **strongest argument against** this proposal?

- A Blockchain is too slow to process any interbank payments
- B RTGS systems already provide immediate finality in central bank money; blockchain adds complexity without clear settlement benefit
- C Blockchain cannot handle more than 10 transactions per second
- D Banks would never agree to share a distributed ledger

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Answer: (B) RTGS systems already achieve the key goals — real-time, final, and irrevocable settlement in central bank money. A permissioned blockchain would need to replicate these properties while adding the complexity of consensus mechanisms, without a clear improvement in settlement outcomes.

Q20: Infrastructure Design

You are advising a developing country on building its national payment infrastructure from scratch. Given limited resources, which system should be built **first** and why?

- A A CCP for derivatives clearing, because it reduces systemic risk
- B An RTGS system for large-value interbank payments, because it provides the settlement backbone for all other systems
- C A real-time retail payment system, because consumers benefit most
- D A CSD for securities, because capital markets need infrastructure

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Answer: (B) The RTGS system is the foundation. It provides final settlement in central bank money, which all other systems (ACH, card settlement, securities settlement, CCP margin flows) ultimately depend on. Without RTGS, no other payment infrastructure can achieve settlement finality.