PAYMENTS SIGNAL REFERENCE ARCHITECTURE
SYNTHETIC / TRAINING ONLY

Instant-payment processing, settlement, timeout, and 24 7 operations architecture

Makes the service clock, bounded controls, funded settlement, receiver response, late-status ordering, and 24 7 recovery responsibilities explicit.

Version: Payments Signal reference architecture v1
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REFERENCE POSTURE

The blueprint uses one time-budgeted route to explain common instant-payment responsibilities. Exact execution clocks, response codes, prefunding, finality, return rights, maintenance, and participant obligations differ by rail and current rulebook.

COMPONENTS

01 Payer channel and confirmation [channel]
Owner: Digital channel
Captures an always-available payment intent and tells the payer what is known within a short time budget.

02 Sending instant-payment engine [application]
Owner: Sending payment product and technology
Completes validation, controls, posting intent, routing, and submission inside the service time budget.

03 Real-time fraud, sanctions, and payee controls [control]
Owner: Fraud and financial crime teams
Returns a clear, reasoned outcome without letting a control timeout become an accidental approval.

04 Instant clearing and routing service [external-network]
Owner: Instant-payment infrastructure operator
Validates and routes the payment or settlement instruction continuously under the rail s timeout rules.

05 Instant settlement accounts [ledger]
Owner: Central bank or instant-settlement operator
Moves central-bank or designated settlement asset per transaction or under the rail s funded model.

06 Receiving instant-payment engine [application]
Owner: Receiving payment product and technology
Validates the beneficiary and posts funds once the rail s conditions and settlement evidence are satisfied.

07 Status, exception, and reconciliation service [operations]
Owner: Instant-payment operations
Connects customer status, network outcome, settlement, participant posting, return, and investigation evidence.

08 24 7 service operations and continuity [operations]
Owner: Participant and infrastructure service operations
Maintains round-the-clock observability, capacity, failover, change, and incident ownership.

INTERFACES

01 Confirmed instant request

instant-payer -> instant-sender | api | synchronous

02 Bounded control request
instant-sender -> instant-controls | control | synchronous

03 Instant payment submission
instant-sender -> instant-network | message | asynchronous

04 Per-payment settlement
instant-network -> instant-settlement | settlement | synchronous

05 Routed payment and response
instant-network -> instant-receiver | message | asynchronous

06 Settlement evidence
instant-settlement -> instant-receiver | event | asynchronous

07 Beneficiary outcome
instant-receiver -> instant-reporting | event | asynchronous

08 Customer outcome
instant-reporting -> instant-payer | api | synchronous

09 Service-clock telemetry
instant-network -> instant-resilience | operator | asynchronous

TRACES AND STRESS CASES

TRACE: One funded instant credit transfer

1. Payer confirms once - Customer confirmed
2. Sender validates and funds - Participant accepted
3. Controls clear - Controls cleared
4. Network admits the payment - Network accepted
5. Settlement moves - Settled final
6. Beneficiary posts - Beneficiary credited
7. Outcome reconciles - End-to-end confirmed
8. Payer sees the proven result - Customer informed

STRESS: Timeout with a late positive outcome

Settlement: Unknown until the settlement service returns authoritative evidence.
Funds: The payer’s debit or reservation stays under pending-outcome control; no second payment is created.
Owner: Sending participant instant-payment operations
Safe action: Show a truthful pending or timed-out status, enquire with the original reference, and accept a late final outcome in state order.

STRESS: Insufficient prefunding

Settlement: Not settled unless the rail explicitly permits queueing and later confirms it.
Funds: Receiver has no settled funds; sender must apply the rail-defined rejection or liquidity treatment.
Owner: Participant treasury and instant-payment operations
Safe action: Apply the documented liquidity response and do not report completion.

STRESS: Settlement final, receiver core unavailable

Settlement: Final under the rail’s settlement rules.
Funds: The receiving participant holds settled funds and owes controlled resolution to the beneficiary.
Owner: Receiving participant payment and core-ledger operations
Safe action: Repair the beneficiary posting idempotently; do not resend or reverse the interbank payment without the formal exception path.