PAYMENTS SIGNAL REFERENCE ARCHITECTURE
SYNTHETIC / TRAINING ONLY

Batch credit-transfer, ACH, direct-debit, mandate, and file-processing architecture

Connects file-level integrity, item-level validation, mandate authority, cut-offs, clearing cycles, net settlement, returns, and multi-level reconciliation.

Version: Payments Signal reference architecture v1
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REFERENCE POSTURE

The blueprint combines recurring batch responsibilities across credit transfers, automated clearing house entries, and direct debits. File formats, submission windows, mandate law, return and refund rights, clearing cycles, settlement timing, and provisional posting differ by rail and current rulebook.

COMPONENTS

01 Corporate, biller, or channel originator [actor]
Owner: Corporate treasury, biller, or bank channel
Creates a bulk credit-transfer or direct-debit instruction and its control totals.

02 Managed file and batch-ingestion service [gateway]
Owner: Corporate channels and payment platform
Authenticates, scans, validates, counts, and stores the immutable inbound batch.

03 Mandate and authorisation service [control]
Owner: Collections product and mandate operations
For direct debit, proves the creditor s authority and applies scheme-specific mandate conditions.

04 Cut-off, calendar, and batch scheduler [service]
Owner: Payment product and batch operations
Assigns accepted items to the correct clearing window and value date.

05 Batch clearing and item validation [external-network]
Owner: Clearing-system operator
Validates participant batches, calculates obligations, and returns file and transaction outcomes.

06 Batch net-settlement service [ledger]
Owner: Central bank or designated settlement institution
Settles participant net obligations in the designated settlement asset.

07 Receiving-bank posting and returns [application]
Owner: Receiving payment and account operations
Posts accepted credits or debits, produces returns, and preserves the original clearing references.

08 File, item, settlement, and customer reconciliation [operations]
Owner: Payment operations and finance control
Proves that every accepted item has one final business, settlement, and ledger outcome.

INTERFACES

01 Authorised payment file
batch-originator -> batch-ingestion | file | batch

02 Collection mandate check
batch-ingestion -> batch-mandate | control | batch

03 Accepted credit items

batch-ingestion -> batch-scheduler | event | batch
04 Mandate-valid debit items
batch-mandate -> batch-scheduler | event | batch
05 Clearing batch
batch-scheduler -> batch-clearing | file | batch
06 Net obligations
batch-clearing -> batch-settlement | settlement | batch
07 Cleared items and statuses
batch-clearing -> batch-receiver | file | batch
08 Cycle settlement evidence
batch-settlement -> batch-receiver | event | batch
09 Postings, rejects, and returns
batch-receiver -> batch-reconciliation | file | batch
10 Immutable intake totals
batch-ingestion -> batch-reconciliation | event | batch

TRACES AND STRESS CASES

TRACE: One payroll file through clearing and settlement

1. Corporate approves the payroll file - File authorised
2. Bank accepts the immutable batch - File accepted
3. Items enter the permitted cycle - Scheduled
4. Clearing accepts eligible items - Cleared
5. Net obligations settle - Cycle settled
6. Beneficiary items post - Customer items posted
7. Every level reconciles - Batch closed

STRESS: Duplicate file with changed filename

Settlement: Depends on the original batch; the duplicate itself has no separate settlement authority.
Funds: Do not create a second set of customer or settlement postings.
Owner: Corporate channel and batch operations
Safe action: Compare business identifiers, control totals, and content checksum; reject or hold the duplicate under the channel contract.

STRESS: Participant cannot fund net obligation

Settlement: Not settled until the default or liquidity process completes.
Funds: Customer availability must follow the scheme’s provisional/final treatment and participant policy.
Owner: Clearing operator, settlement institution, and participant treasury
Safe action: Apply the documented funding, default, or unwind process; do not edit obligations manually.

STRESS: Return cannot match the original item

Settlement: Original cycle settlement remains final; return is a new linked transaction when valid.
Funds: No customer recredit or debit occurs until the return is matched and authorised.
Owner: Payment reconciliation and exceptions operations
Safe action: Hold the return in an exception queue and match by permitted original references and value evidence.