

# Process Definition Document (PDD)

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## Bank Statement Reconciliation Automation

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### Document Information

<b>Document Title</b>	Process Definition Document
<b>Process Name</b>	Bank Statement Reconciliation
<b>Version</b>	1.0
<b>Author</b>	RPA Developer_Riley Liao
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<b>Status</b>	Approved

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## 1. Executive Summary

This document defines the business process for **Bank Statement Reconciliation**, which matches bank transactions against ERP ledger entries. The process is targeted for automation using UiPath RPA to eliminate manual data entry, reduce errors, and accelerate month-end close.

### Key Metrics:

- Current processing time: 2-4 hours per statement
  - Target processing time: < 5 minutes
  - Expected accuracy improvement: 90%+ error reduction
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## 2. Process Overview

### 2.1 Business Context

Item	Description
<b>Business Owner</b>	Finance/Accounting Department
<b>Process Owner</b>	Accounts Payable & Receivable Manager
<b>Frequency</b>	Daily / End of Month
<b>Volume</b>	~20 statements/month, ~50 transactions/statement
<b>Business Criticality</b>	High - Impacts month-end close timeline

### 2.2 Process Scope

#### In Scope:

- PDF bank statement processing (single bank format)
- AP (Accounts Payable) transaction matching
- AR (Accounts Receivable) transaction matching
- Exact match by Invoice Number
- Fuzzy match by Amount ( $\pm \$30$ ) and Date ( $\pm 3$  days)
- BATCH payment matching (multiple invoices to one payment)
- SPLIT payment matching (one invoice to multiple payments)
- Exception flagging and email notification

### Out of Scope:

- Multiple bank statement formats
- Automatic bank statement download
- Machine learning-based matching

**⚠ Implementation Note:** Due to the unavailability of a live SAP environment, this solution uses a **Local SQL Database** to simulate ERP behavior. In production, the architecture is designed to switch to **SAP BAPI** or **SAP GUI Scripting**. See Section 8 for details.

## 3. As-Is Process (Manual)

### 3.1 Process Flow

```

Step 1: Receive Bank Statement
      ↓
Step 2: Open PDF and manually extract data to Excel
      ↓
Step 3: Login to ERP System
      ↓
Step 4: For each transaction:
        - Search by Invoice Number
        - If found → Update status to "Matched"
        - If not found → Flag for investigation
      ↓
Step 5: Generate reconciliation report
      ↓
Step 6: Email report to stakeholders
  
```

### 3.2 Time Analysis

Step	Description	Average Time
1	Receive bank statement	1 min
2	Manual data entry to Excel	30 min
3	Login to ERP	5 min
4	Search & match (per item)	10 min × 50 = 500 min

Step	Description	Average Time
5	Generate report	20 min
6	Email report	5 min
<b>Total</b>		<b>~2.5 hours</b>

### 3.3 Pain Points

Issue	Impact	Frequency
Manual data entry errors	Incorrect matching, audit risk	5-10% of transactions
Slow processing	Delayed month-end close	Every cycle
No audit trail	Compliance risk	Always
Staff dependency	Knowledge loss risk	Always
Volume spikes	Overtime required	Quarter-end

## 4. To-Be Process (Automated)

### 4.1 High-Level Flow

```
[Dispatcher Process]
PDF Bank Statement → OCR Extraction → Regex Parsing → Orchestrator Queue

[Performer Process]
Queue Item → SQL Matching → ERP Update → Reconciliation Log
```

### 4.2 Dispatcher Process Steps

Step	Action	Technology
1	Read PDF bank statement from folder	UiPath File Activities
2	Extract text using OCR	UiPath OCR Activities
3	Parse transactions using Regex	VB.NET System.Text.RegularExpressions
4	Validate extracted data	Business Rules
5	Add valid items to Orchestrator Queue	UiPath Orchestrator API
6	Log invalid items as exceptions	Orchestrator Logging

### 4.3 Performer Process Steps

Step	Action	Technology
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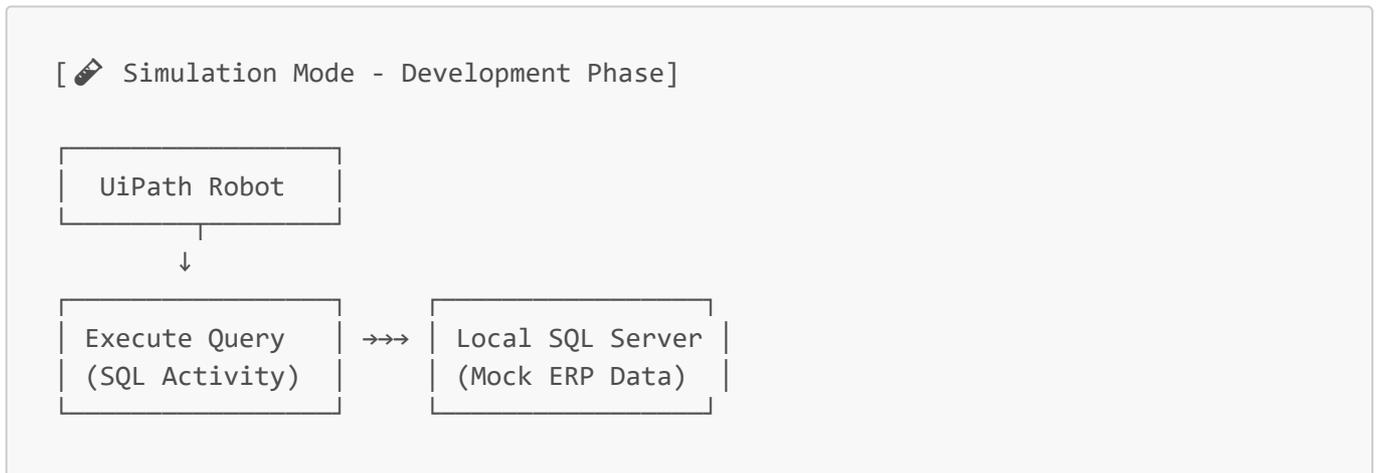
Step	Action	Technology
1	Get transaction from Queue	UiPath Get Transaction Item
2	Determine transaction type (AP/AR)	Invoice prefix analysis
3	Query ERP via Integration Layer	See 4.4 ERP Integration Strategy
4	Apply matching logic	Exact → Fuzzy → BATCH → SPLIT
5	Insert result to Reconciliation_Log	SQL INSERT
6	Update Queue Item status	UiPath Set Transaction Status
7	Handle exceptions	Daily Summary Report

#### 4.4 ERP Integration Strategy (Critical Architecture Decision)

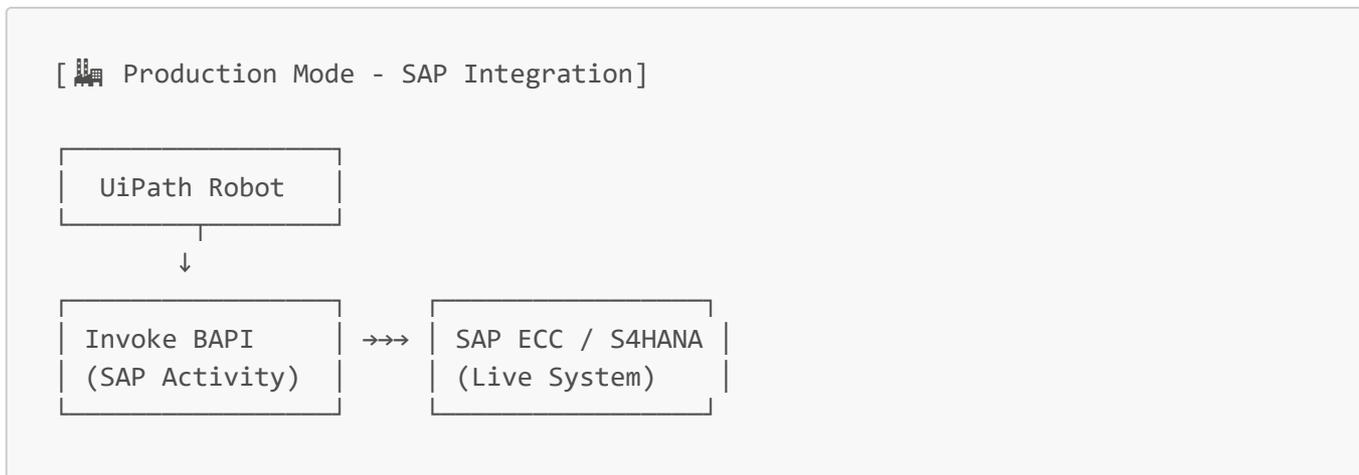
##### Connection Priority (Stability Hierarchy):

Priority	Method	Stability	IT Approval	Use When
<b>1st</b>	SAP BAPI (API)	★★★★★	High	Core transactions, high volume
<b>2nd</b>	SAP GUI Scripting	★★★★	Medium	Standard RPA approach, very stable
<b>3rd</b>	Direct SQL (Read-Only)	★★★	High	Reporting/lookup only
<b>4th</b>	Surface UI (Image/OCR)	★★	Low	Last resort, avoid if possible
<b>✗ Never</b>	Direct SQL Write	-	-	Bypasses ERP business logic

##### Current Implementation (Simulation Mode):



##### Production Target Architecture:



## 5. Business Rules

### 5.1 Matching Rules

Rule ID	Description	Logic
BR-001	Exact Match	Invoice Number matches exactly
BR-002	Fuzzy Match (Amount)	Amount difference $\leq$ \$30
BR-003	Fuzzy Match (Date)	Date difference $\leq$ 3 days
BR-004	BATCH Match	Sum of batch invoices = bank amount ( <b>Unique Sum only</b> )
BR-005	SPLIT Match	Cumulative payments $\geq$ invoice amount
BR-006	Pending Only	Only match against "Pending" status

#### ⚠️ BR-004 Clarification (Subset Sum Problem):

If multiple invoice combinations can produce the same bank amount, the transaction is flagged as **Exception** requiring manual review. Without a Remittance Advice, permutation matching is not attempted.

Example: Bank shows "\$10,000 from Client A" but Client A has invoices: \$2000, \$3000, \$5000, \$4000.

- $\$2000 + \$3000 + \$5000 = \$10,000$  ✓
- $\$5000 + \$4000 + \$1000 = \$10,000$ ? (if another invoice exists)
- **Action:** If not unique, throw BusinessRuleException.

### 5.2 Exception Rules

Exception	Condition	Action
EX-001	No matching ERP record	Flag as BusinessRuleException, email alert
EX-002	Amount exceeds tolerance	Log as Mismatch, manual review
EX-003	Database connection failure	Retry 3 times, then System Exception

### 5.3 Configurable Parameters

Parameter	Default	Description
Tolerance_Amount	\$50	Amount variance allowed
Tolerance_Days	3	Date variance allowed
MaxRetryNumber	3	System exception retry count
Report_Email_To	finance@company.com	Exception notification

## 6. Data Requirements

### 6.1 Input Data

Source	Format	Fields
Bank Statement	PDF	Date, Reference, Description, Amount
ERP_Ledger	SQL Table	ERP_ID, Invoice_No, Amount, Posting_Date, Payment_Type
ERP_Receivables	SQL Table	AR_ID, Invoice_No, Amount, Posting_Date, Deposit_Type

#### 6.1.1 Bank Narrative Sample Patterns (Regex Acceptance Criteria)

Bank description fields vary significantly. The following patterns have been validated:

Pattern ID	Bank Narrative Example	Regex Pattern	Extracted Invoice
P-001	INV-12345 Payment	INV-\d+	INV-12345
P-002	Payment for 12345 / 12346	\d{5,}	12345, 12346
P-003	REF: INV2024-001	INV\d{4}-\d+	INV2024-001
P-004	Merchant Dep Capture DEP-001	DEP-\d+	DEP-001
P-005	TRF FROM CLIENT X	(No match)	→ Secondary Matching

 **Note:** Pattern P-005 (no invoice reference) triggers Secondary Matching Logic (Vendor + Amount + Date) as defined in the SDD.

### 6.2 Output Data

Destination	Format	Purpose
Orchestrator Queue	JSON	Transaction state management
Reconciliation_Log	SQL Table	Audit trail and reporting
Email Report	HTML	Exception notification

## 7. Success Criteria

<b>Metric</b>	<b>Target</b>	<b>Measurement</b>
Processing Time	< 5 min/statement	Timer
Accuracy Rate	> 99%	Reconciliation_Log analysis
Exception Rate	< 10%	Queue failed items
Availability	99.5%	Orchestrator monitoring

## 8. Assumptions & Dependencies

### 8.1 Assumptions

- Bank statement format remains consistent
- Network connectivity is stable
- PDF quality is sufficient for OCR
- **ERP Access:** This project uses a simulated SQL database. Production deployment requires IT approval for one of:
  - SAP BAPI access (RFC user permissions)
  - SAP GUI Scripting enabled
  - Read-only SQL View access to ERP tables

### 8.2 Dependencies

<b>Dependency</b>	<b>Owner</b>	<b>Risk</b>	<b>Notes</b>
SQL Server availability	IT Infrastructure	Medium	Simulation environment
Orchestrator uptime	RPA Team	Low	
Bank statement delivery	Finance	Low	
ERP data accuracy	Finance	Medium	
<b>SAP BAPI Access</b>	IT Security	High	Required for production
<b>RFC User Permissions</b>	SAP Basis Team	High	Required for BAPI calls

## 9. Approval

<b>Role</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Process Owner			
IT Manager			
RPA Lead			
Business Analyst			

Document End