Technical Design Document:
AI-Automated Batch Credit Processing

1. Project Overview

This project aims to automate the manual "Batch Credit Request" process using AI agents. The system will ingest requests via Salesforce (SFDC) tickets, validate them against contract policies and work instructions, calculate correct credit amounts, and prepare the necessary files for SAP integration (ZMEMO).

2. Process Workflow & AI Mapping

The following table maps the manual activities to the proposed AI automation modules.

#	Activity Name	AI Component / Automation Logic	Fake Data / Policy Needs
1	**Confirm Promotion/Contract Eligibility**	**Validation Agent:** Compares request against active contracts (e.g., CuCo vs. APEX).	**MOCK POLICY:** "CuCo Definition 2025" (PDF).
2	**Check for Exceptions**	**Validation Agent:** Cross-references request reason against the Work Instruction Document.	**GROUND TRUTH:** "Work Instruction Document" (PDF).
3	**Extract SAP Reports**	**Integration Hub:** Simulates API calls to SAP to fetch raw invoice details via SO reference.	**FAKE SAP DATA:** "Billing History" (CSV).

4	**Validate Prior Credits/Rebills**	**Logic Engine:** Cross-references invoices against history to prevent duplicate credits.	**FAKE CREDIT LOG:** "Credit History Report" (CSV).
5	**Prepare Discount Calculation Sheet**	**Calculation Agent:** Applies percentage logic (55%/54%/52%) to SAP net amounts.	**CALC LOGIC:** Embedded rules.
6	**Create Multiple Credit Request Ticket**	**Salesforce Agent:** Auto-populates the SFDC ticket with a structured summary.	**MOCK TICKET:** SFDC Case Record (JSON/PDF).
7	**Upload ZMEMO File to SAP**	**SAP Connector:** Generates the specific .csv or .txt format required for batch upload.	**TEMPLATE:** Standard ZMEMO format.
8	**Review Output Accuracy**	**QA Agent:** Cross-checks generated ZMEMO against original input from SFDC ticket.	N/A
9	**Upload Documentation to SFDC**	**Salesforce Agent:** Attaches audit trails and logic logs to the ticket.	N/A
10	**Notify Requester & Close Ticket**	**Communication Agent:** Drafts and sends a final outcome summary via email.	N/A

3. Agent Architecture & Tool Definitions

A. Intake Agent (Orchestrator)

- **Role:** Primary entry point. Extracts data from SFDC tickets and their attachments.
- **Instruction Update:** Must validate if the request meets the **Scope** defined in the Work Instructions (e.g., group of 10+ invoices, same EMEA region).
- **Tools:** `PDFParser`, `AttachmentExtractor`, `NamedEntityRecognizer`.

B. Validation & Policy Agent

- **Role:** Enforces business logic and contract compliance.
- **Instruction Update:** Uses the "Reason for Credit" table in the **Work Instruction Document** to categorize incoming requests (e.g., mapping "PSA" to "Clinical & Product Deficiency").
- **Tools:** `PolicySearch` (RAG-based using **ChromaDB**), `ContractLookup`.

C. SAP Integration Agent (Data Fetcher)

- **Role:** Interface with billing data.
- **Tools:** `SAP_Query_SO`, `History_Check_Tool`.

D. Calculation Agent

- **Role:** Mathematical accuracy and file generation.
- **Tools:** `MathEngine`, `ZMEMO_Formatter`.

E. Salesforce & Communication Agent

- **Role:** System of record update and user notification.
- **Tools:** `SFDC_Ticket_Update`, `Audit_Log_Generator`, `Email_Sender`.

4. Ground Truth / Mock Data Requirements

A. Intake Request Examples (Inputs)

- **File 1: SFDC Credit Request Ticket (PDF)**
  - **Structure:** `TicketNumber`, `Status`, `Priority`, `Description`, `OrderType`, and attached SO list.
  - **Content:** Description should include the reason (e.g., "Dr mistakenly signed APEX agreement") and required discount tiers (55%, 54%, 52%).

    - **Requirement:** Must include an attached spreadsheet or PDF with columns: SO#, D/LID, Sold to Name, Product affected, INV Date, INV Number, INV Amount, Currency.

B. Policy & Procedural Documents (RAG Reference)

- **File 2: "CuCo-2025" Master Policy (PDF)**
    - **Structure:** Defines eligible regions (Benelux) and product codes.
- **File 3: EMEA Work Instruction Document (PDF)**
    - **Structure:** Defines Scope (10+ invoices), Procedure, Reason Categories, and Attachment Template requirements.
    - **Requirement:** AI must use this to verify if the attachment has the required columns: SO#, INV Number, Net Discount %, Currency, Country.
- **File 4: Exception & Goodwill Approval Matrix (PDF)**
    - **Structure:** Approval hierarchy (CSM <$1k, Manager <$5k).

C. System of Record Mock Data (Validation)

- **File 5: SAP Transactional Export (CSV)**
    - **Columns:** SalesOrder_ID, Account_Name, Material_Number, Invoice_Date, Net_Value, Tax_Amount, Currency.
- **File 6: Prior Credit History Log (CSV)**
    - **Columns:** Original_SO_ID, Credit_Memo_ID, Amount_Credited.

5. Technical Challenges & Implementation Logic

- **Vector Database: ChromaDB** will index both the "CuCo Policy" and the "Work Instruction Document" for RAG.
- **Procedural Compliance:** The system must flag requests that do not adhere to the "Procedure" section of the Work Instructions.
- **Product Normalization:** Mapping SAP material strings to the canonical keys in the policy document.
- **Human-in-the-Loop:** Confidence threshold <95% triggers manual review.

6. Prototype Testing Scenarios

Scenario A: The "Happy Path" (Standard Processing)

- **Input:** SFDC Ticket #61860676.

- **Prompt to Agent:** *"Analyze SFDC Ticket #61860676. Extract the list of Sales Orders and validate them against the CuCo-2025 policy for the Benelux region. Fetch raw data from SAP Export and calculate the credit for all valid, non-duplicated items."*
- **Success Criteria:**
    1. Agent identifies 17 SOs.
    2. Agent maps "Moderate" to Material 9001 and applies 54% discount.
    3. Agent excludes SO 9298095140 (detected as duplicate in File 6).
    4. Agent generates a ZMEMO row for the remaining 16 items.

Scenario B: Threshold Violation (Escalation)

- **Input:** Same as Scenario A, but with 50+ invoices.
- **Prompt to Agent:** *"Evaluate the total credit amount for Ticket #61860676. Determine the required approval level based on the Exception & Goodwill Approval Matrix."*
- **Success Criteria:**
    1. Agent calculates total batch value (e.g., €9,200).
    2. Agent identifies this exceeds the Manager's €5,000 threshold.
    3. Agent flags the ticket for **Finance Director** approval.

Scenario C: Rejection (Policy Mismatch)

- **Input:** A new ticket requesting 60% discount for "Moderate" products.
- **Prompt to Agent:** *"Validate the requested 60% discount for Material 9001 against the CuCo-2025 Master Policy."*
- **Success Criteria:**
    1. Agent identifies that Policy only allows 54% for Moderate.
    2. Agent rejects the request or flags it with a "Policy Violation" warning.

7. Technical Implementation Logic

- **Vector DB:** ChromaDB stores Files 2, 3, and 4 for RAG-based query resolution.
- **Normalization:** AI must use a lookup table to map "Invisalign First" → "FIRST-COMP"→ "2120".
- **Output:** The final result must be a CSV file with the 30+ columns required by the SAP ZMEMO loader.