### **1. MT103 Rules**

#### **a. Rule: Inconsistent Beneficiary vs. Ordering Account**

* **Fields**:
  1. Field 59 (Beneficiary Name/Account)
  2. Field 50K (Ordering Customer)
* **Algorithm**:
  1. Extract entity types from both fields (e.g., "personal" vs. "corporate").
  2. Flag if:
     + Personal account (50K) sends to corporate beneficiary (59) *without prior history*.
     + Mismatched country codes (e.g., 50K = Germany, 59 = Nigeria).
  3. **Threshold**: Trigger alert after **1 occurrence** if country risk is high.

#### **b. Rule: High-Risk MCC in Transaction Narrative**

* **Fields**:
  1. Field 77 (Narrative)
* **Algorithm**:
  1. Use regex to extract Merchant Category Codes (MCCs) from unstructured text.
  2. Cross-reference with a dynamic high-risk MCC list (e.g., crypto: 6051, gambling: 7995).
  3. **Weighted Scoring**:
     + Base score = 1.0 for high-risk MCC.
     + Add +0.5 if amount > $10k.

#### **c. Rule: Round-Amount Testing**

* **Fields**:
  1. Field 32B (Currency/Amount)
* **Algorithm**:
  1. Check if amount is divisible by round numbers (e.g., $1,000, $5,000).
  2. Compare to historical behavior:
     + New beneficiary + round amount = higher risk.
  3. **Threshold**: Flag if >2 round-amount transfers in 24 hours.

### **2. MT940 Rules**

#### **a. Rule: Mule Account Velocity**

* **Fields**:
  1. Field 61 (Transaction Details)
* **Algorithm**:
  1. Group transactions into **1-hour windows**.
  2. Calculate:
     + Inbound/outbound ratio (e.g., $10k in → $9.5k out).
     + Transaction count per window.
  3. **Threshold**:
     + 10 transactions/hour **OR**
     + Outflow ≥90% of inflow.

#### **b. Rule: Dormant Account Reactivation**

* **Fields**:
  1. Field 62F (Closing Balance)
  2. Field 61 (Transaction Timestamps)
* **Algorithm**:
  1. Calculate account inactivity period (e.g., 180+ days).
  2. If reactivated:
     + Sum all transactions in first 72 hours.
     + Compare to historical average (e.g., $50k vs. $500).
  3. **Threshold**: Activity >10x historical average.

### **3. Hybrid Rules (MT103 + MT940)**

#### **a. Rule: Layering Detection**

* **Logic**:
  1. **MT940**: Identify rapid inbound transfers (Field 61).
  2. **MT103**: Match outbound transfers to high-risk jurisdictions (Field 57A).
  3. **Threshold**:
     + Inbound-outbound time gap <1 hour.
     + Aggregate amount mismatch >5% (e.g., $100k in → $105k out).

#### **b. Rule: Structuring/Smurfing**

* **Logic**:
  1. **MT940**: Detect multiple transactions just below reporting thresholds (e.g., $9,900).
  2. **MT103**: Cluster beneficiaries by BIC (Field 57A) to find linked accounts.
  3. **Threshold**:
     + 3+ transactions between $9k–$10k in 7 days.
     + Shared beneficiary bank across small/large transfers.