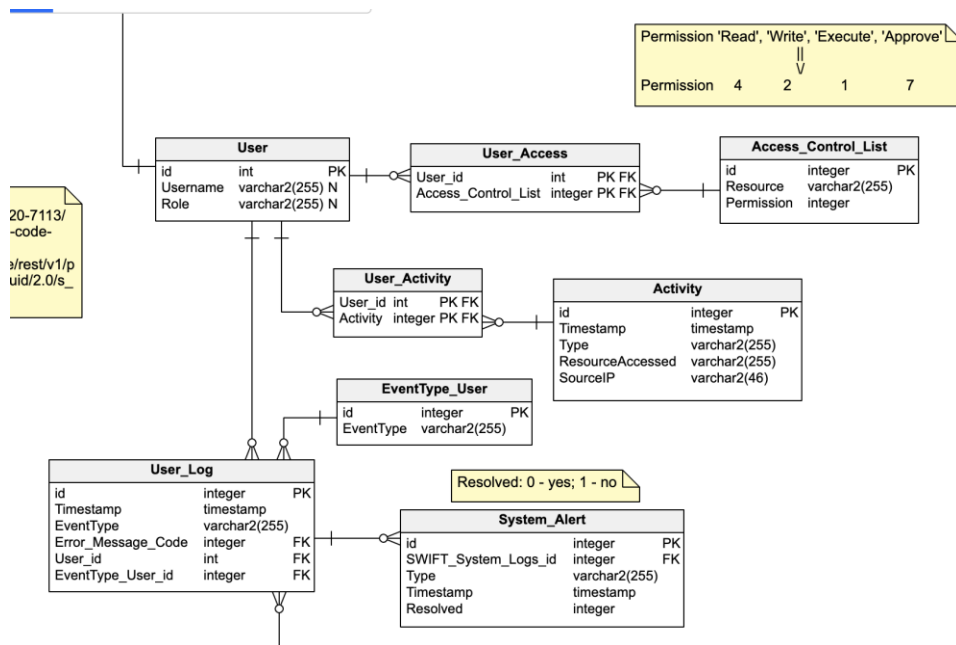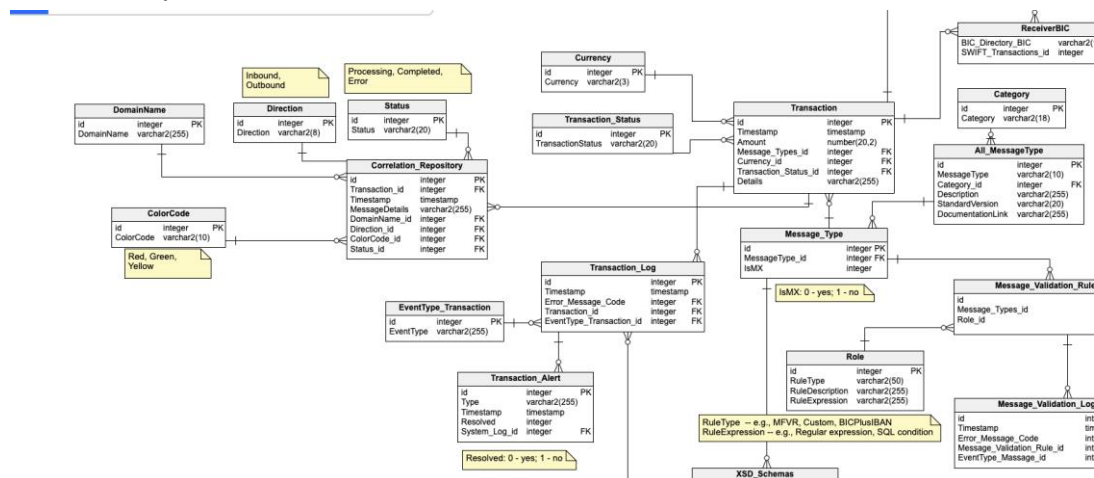# SWIFT Integration and Monitoring System

The goal of this project is to create a reliable and all-inclusive system for integrating, verifying, and tracking SWIFT (Society for Worldwide Interbank Financial Telecommunication) transactions and associated system operations. The system will offer a **centralized platform** for data integrity, security policy enforcement, SWIFT message processing management, and the creation of thorough audit trails for compliance.
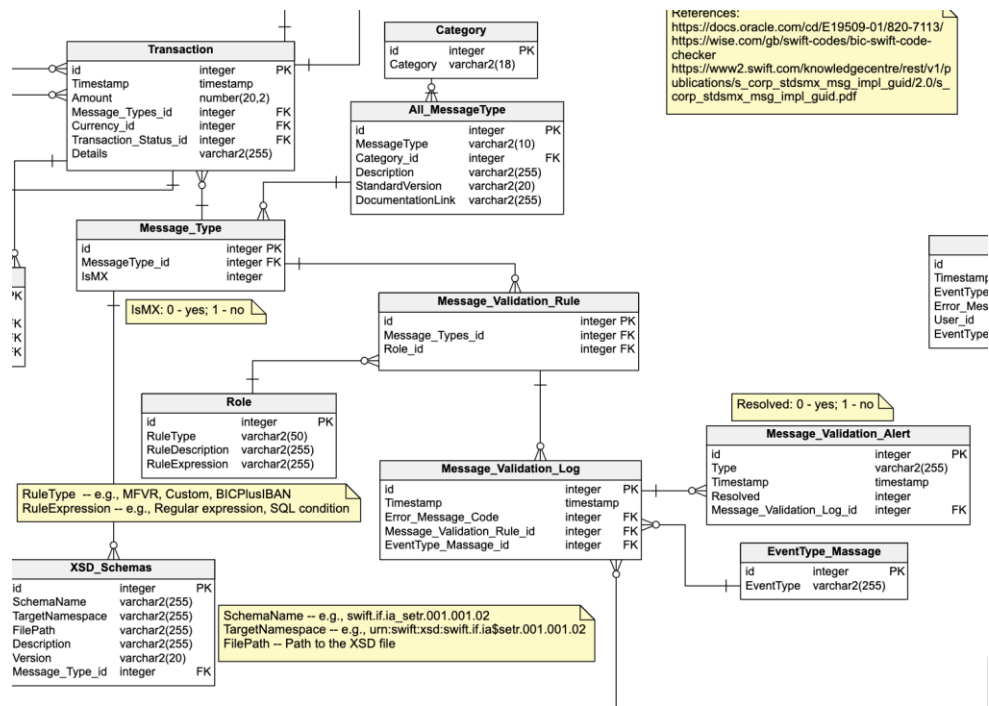
Principal Goals:

- Logging of System and User Activity:
    - To guarantee accountability and traceability, thorough logs of user activities, system events, and transaction processing will be kept.
    - A thorough audit trail will be provided by these logs, which will contain timestamps, event types, source components, and error messages.

Note: Permission 'Read', 'Write', 'Execute', 'Approve'
Permission   4   2   1   7

User
id	int	PK
Username	varchar2(255) N	
Role	varchar2(255) N	

User_Access
| User_id | int | PK FK |
| Access_Control_List | integer PK FK | |

Access_Control_List
id	integer	PK
Resource	varchar2(255)	
Permission	integer	

User_Activity
| User_id | int | PK FK |
| Activity | integer PK FK | |

Activity
id	integer	PK
Timestamp	timestamp	
Type	varchar2(255)	
ResourceAccessed	varchar2(255)	
SourceIP	varchar2(46)	

EventType_User
| id | integer | PK |
| EventType | varchar2(255) | |

User_Log
id	integer	PK
Timestamp	timestamp	
EventType	varchar2(255)	
Error_Message_Code	integer	FK
User_id	int	FK
EventType_User_id	integer	FK

Resolved: 0 - yes; 1 - no

System_Alert
id	integer	PK
SWIFT_System_Logs_id	integer	FK
Type	varchar2(255)	
Timestamp	timestamp	
Resolved	integer	

- Access control and security:
  - Only authorized users will be able to carry out particular tasks thanks to the system's stringent access control policies.
  - To protect data and stop unwanted access, it will manage user roles, permissions, and access control lists.
- Monitoring Transactions in Real Time:
  - Users will be able to track transaction statuses, spot possible problems, and create alerts for questionable activity thanks to the system's real-time SWIFT transaction monitoring.
  - To visualize transaction flows and enable effective problem solving, it will make use of correlation repositories and color-coded indicators.
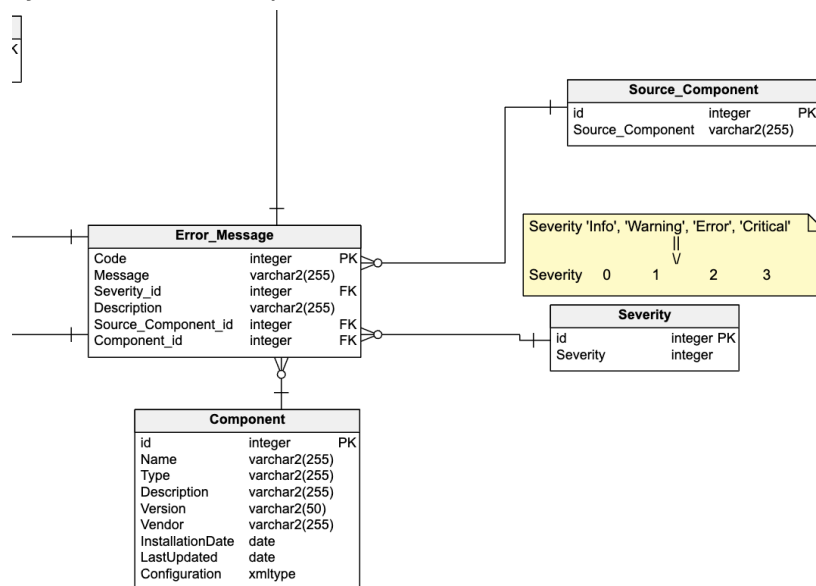

- Processing and Verification of SWIFT Messages:
  - Different SWIFT message types (MT and MX) will be processed by the system, which will make sure they follow internal validation guidelines and SWIFT standards.
  - To ensure data accuracy and consistency, it will apply Message Format Validation Rules (MFVRs) and integrate XSD schema validation for MX messages.

Transaction

id	integer	PK
Timestamp	timestamp	
Amount	number(20,2)	
Message_Types_id	integer	FK
Currency_id	integer	FK
Transaction_Status_id	integer	FK
Details	varchar2(255)	

Category

id	integer	PK
Category	varchar2(18)	

All_MessageType

id	integer	PK
MessageType	varchar2(10)	
Category_id	integer	FK
Description	varchar2(255)	
StandardVersion	varchar2(20)	
DocumentationLink	varchar2(255)	

Message_Type

id	integer PK	
MessageType_id	integer FK	
IsMX	integer	

IsMX: 0 - yes; 1 - no

id		
Timestamp		
EventType		
Error_Mes		
User_id		
EventType		

Message_Validation_Rule

id	integer	PK
Message_Types_id	integer	FK
Role_id	integer	FK

Role

id	integer	PK
RuleType	varchar2(50)	
RuleDescription	varchar2(255)	
RuleExpression	varchar2(255)	

RuleType -- e.g., MFVR, Custom, BICPlusIBAN
RuleExpression -- e.g., Regular expression, SQL condition

Resolved: 0 - yes; 1 - no

Message_Validation_Alert

id	integer	PK
Type	varchar2(255)	
Timestamp	timestamp	
Resolved	integer	
Message_Validation_Log_id	integer	FK

Message_Validation_Log

id	integer	PK
Timestamp	timestamp	
Error_Message_Code	integer	FK
Message_Validation_Rule_id	integer	FK
EventType_Massage_id	integer	FK

EventType_Massage

id	integer	PK
EventType	varchar2(255)	

XSD_Schemas

id	integer	PK
SchemaName	varchar2(255)	
TargetNamespace	varchar2(255)	
FilePath	varchar2(255)	
Description	varchar2(255)	
Version	varchar2(20)	
Message_Type_id	integer	FK

SchemaName -- e.g., swift.if.ia_setr.001.001.02
TargetNamespace -- e.g., urn:swift:xsd:swift.if.ia$setr.001.001.02
FilePath -- Path to the XSD file

- Handling and Notifying Errors:
    - The system will gracefully handle errors, producing alerts for serious problems and informative error messages.
    - It will enable effective troubleshooting and resolution by classifying errors according to their severity and source component.

Source_Component

id	integer	PK
Source_Component	varchar2(255)	

Error_Message

Code	integer	PK
Message	varchar2(255)	
Severity_id	integer	FK
Description	varchar2(255)	
Source_Component_id	integer	FK
Component_id	integer	FK

Severity 'Info', 'Warning', 'Error', 'Critical'

Severity	0	1	2	3

Severity

id	integer PK	
Severity	integer	

Component

id	integer	PK
Name	varchar2(255)	
Type	varchar2(255)	
Description	varchar2(255)	
Version	varchar2(50)	
Vendor	varchar2(255)	
InstallationDate	date	
LastUpdated	date	
Configuration	xmltype	

- Management of Components and Configurations:
    - Every component of the system, along with its versions and configurations, will be tracked by the system. This will make it simpler to track changes and maintain the system.
- Analysis and Reporting:
    - Reports on transaction volumes, error rates, user activity, and other pertinent metrics will be produced by the system.
    - These reports will offer insightful information about system compliance and performance.

DomainName

id	integer	PK
DomainName	varchar2(255)	

Direction

id	integer	PK
Direction	varchar2(8)	

Inbound, Outbound

Status

id	integer	PK
Status	varchar2(20)	

Processing, Completed, Error

ColorCode

id	integer	PK
ColorCode	varchar2(10)	

Red, Green, Yellow

Correlation_Repository

id	integer	PK
Transaction_id	integer	FK
Timestamp	timestamp	
MessageDetails	varchar2(255)	
DomainName_id	integer	FK
Direction_id	integer	FK
ColorCode_id	integer	FK
Status_id	integer	FK

Benefits:

- Improved oversight and management of transactions.
- Enhanced compliance and data integrity.
- Decreased chance of mistakes and fraud.
- Simplified support and troubleshooting.
- Enhanced accountability and security of the system.
- Enhanced maintainability of the system.

For managing SWIFT transactions, maintaining compliance, and lowering operational risks, this system will offer a safe, dependable, and effective platform.

DomainName
- id — integer — PK
- DomainNa — varchar2(255)

ColorCode
- id — integer — PK
- ColorCod — varchar2(10)

Red, Green, Yellow

Direction
- id — integer — PK
- Directio — varchar2(8)

Inbound, Outbound

Status
- id — integer — PK
- Statu — varchar2(20)

Processing, Completed, Error

Correlation_Repository
- id — integer — PK
- Transaction_id — integer — FK
- Timestamp — timestamp
- MessageDeta — varchar2(255)
- DomainName_id — integer — FK
- Direction_id — integer — FK
- ColorCode_id — integer — FK
- Status_id — integer — FK

EventType_Transaction
- id — integer — PK
- EventTy — varchar2(255)

Transaction_Status
- id — integer — PK
- TransactionStat — varchar2(20)

Currency
- id — integer — PK
- Currenc — varchar2(3)

Transaction_Alert
- id — integer — PK
- Type — varchar2(255)
- Timestamp — timestamp
- Resolved — integer
- System_Log_ — integer — FK

Resolved: 0 - yes; 1 - no

Transaction_Log
- id — integer — PK
- Timestamp — timestamp
- Error_Message_Code — integer — FK
- Transaction_id — integer — FK
- EventType_Transaction_id — integer — FK

Transaction
- id — integer — PK
- Timestamp — timestamp
- Amount — number(20,2)
- Message_Types_id — integer — FK
- Currency_id — integer — FK
- Transaction_Status_id — integer — FK
- Details — varchar2(255)

Message_Type
- id — integer — PK
- MessageType_id — integer — FK
- IsMX — integer

IsMX: 0 - yes; 1 - no

Role
- id — integer — PK
- RuleType — varchar2(50)
- RuleDescripti — varchar2(255)
- RuleExpressi — varchar2(255)

RuleType -- e.g.. MFVR, Custom, BICPlusIBAN
RuleExpression -- e.g.. Regular expression, SQL

XSD_Schemas
- id — integer — PK
- SchemaName — varchar2(255)
- TargetNamesp — varchar2(255)
- FilePath — varchar2(255)
- Description — varchar2(255)
- Version — varchar2(20)
- Message_Type_ — integer — FK

SchemaName -- e.g.. swift.if.ia_setr.001.001.02
TargetNamespace -- e.g.. urn:swift:xsd:swift.if.iaSsetr.001.001.02
FilePath -- Path to the XSD file

All MessageType
- id — integer — PK
- MessageType — varchar2(10)
- Category_id — integer — FK
- Description — varchar2(255)
- StandardVersion — varchar2(20)
- DocumentationL — varchar2(255)

Category
- id — integer — PK
- Catego — varchar2(18)

ReceiverBIC
- BIC_Directory_BIC — varchar2(11) — PK FK
- SWIFT_Transactions_ — integer — PK FK

SenderBIC
- BIC_Directory_BIC — varchar2(11) — PK FK
- Transactions_id — integer — PK FK

BIC_Directory
- BIC — varchar2(11) — PK
- InstitutionName — varchar2(255) — N
- Country — varchar2(2) — N

Message_Validation_Rule
- id — integer — PK
- Message_Types_id — integer — FK
- Role_id — integer — FK

Message_Validation_Log
- id — integer — PK
- Timestamp — timestamp
- Error_Message_Code — integer — FK
- Message_Validation_Rule_id — integer — FK
- EventType_Massage_id — integer — FK

EventType_Massage
- id — integer — PK
- EventTy — varchar2(255)

Message_Validation_Alert
- id — integer — PK
- Type — varchar2(255)
- Timestamp — timestamp
- Resolved — integer
- Message_Validation_Log_id — integer — FK

Resolved: 0 - yes; 1 - no

User_Log
- id — integer — PK
- Timestamp — timestamp
- EventType — varchar2(255)
- Error_Message_Co — integer — FK
- User_id — int — FK
- EventType_User_id — integer — FK

User_BIC
- BIC_Directory_BI — varchar2(11) — PK FK
- Users_id — int — PK FK

User
- id — int — PK
- Userna — varchar2(255)
- Role — varchar2(255)

Error_Message
- Code — integer — PK
- Message — varchar2(255)
- Severity_id — integer — FK
- Description — varchar2(255)
- Source_Component — integer — FK
- Component_id — integer — FK

Component
- id — integer — PK
- Name — varchar2(255)
- Type — varchar2(255)
- Description — varchar2(255)
- Version — varchar2(150)
- Vendor — varchar2(255)
- InstallationD — date
- LastUpdated — date
- Configuratio — xmltype

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