
ORACLE®

ORACLE

Accelerator Pack

FCUBS 14.4.0.0.0

SWITCH INTEGRATION GATEWAY

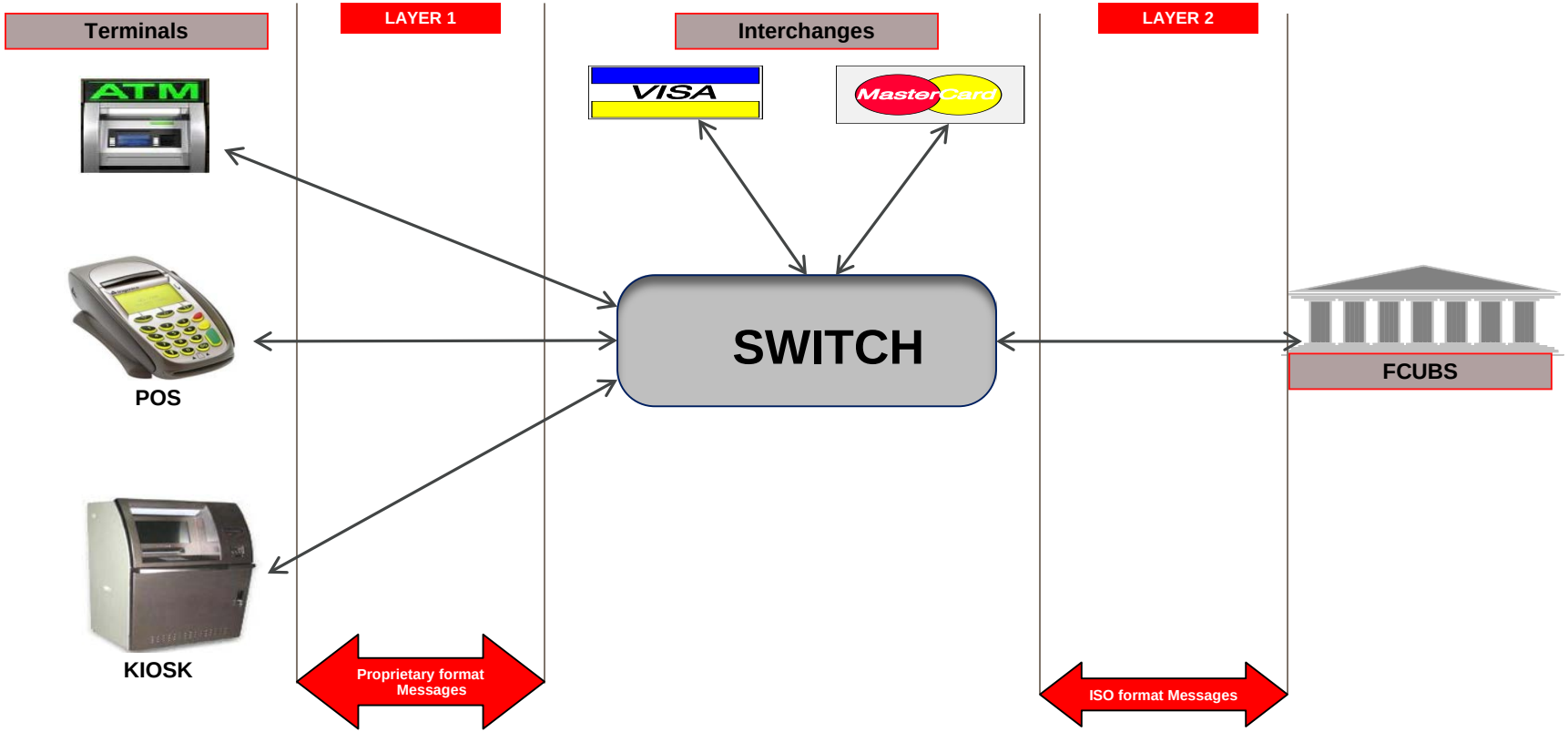
Contents

SWITCH Interface Overview

- The Switch Interface gateway overview depicts the pattern in which various switch domain interacts with the FLEXCUBE Application in the switch centric network. .

  - ATMs and POS Terminals are connected and communicates with Switch Software using proprietary Message protocol, the format which is transmitted from ATM to switch interface.
  - Switch software is also connected with Interchanges like VISA and MasterCard to facilitate the transactions across the banks devices to allow more terminals access to the cards.
  - This forwards the transactions to FLEXCUBE switch interface after converting proprietary protocol into ISO8583 protocol message formats.
  - FLEXCUBE UBS Switch Interface process all transactions sent by Switch Software by validating each request against FLEXCUBE UBS Database and posts the transactions into FLEXCUBE System.

SWITCH Interface Overview – contd…



SWITCH Software

Switch software functions in 2 layers,

As shown in the picture, In Layer1,

- Switch software maintains the terminals viz., ATM / POS interchange information.
- Maintains the card number to account number linkages.
- Verifies the PIN and the card status
- Receives card transactions from ATM / POS terminals

SWITCH Software – contd…

As part of Layer2,

- The switch software Forwards the transactions to Host Banking Systems like FLEXCUBE
- Converts the received proprietary protocol messages from the terminal into ISO8583 protocol.
- Performs “stand-in” authorization incase of Link to application systems is down.
- Refreshes Account balances from Banking Systems .

Transaction Overview

- Given the parties involves viz., Switch, Interchange and FLEXCUBE the transaction flow is facilitated by ISO 8583 protocol.
- ISO 8583 protocol helps to exchange information between Acquirer & Issuer.

  In this scenario, Acquirer, is the bank that has deployed the terminals [ATM/POS] ,with switch software and interchanges connections established.

  Issuer, is typically the bank that issues the cards and responds with Approval / Rejection messages to Acquirers.
- The transactions from the Issuer bank perspective could happen in 3 ways and thus it is categorized into ONUS, Remote ONUS and OFF-US.

Business Overview

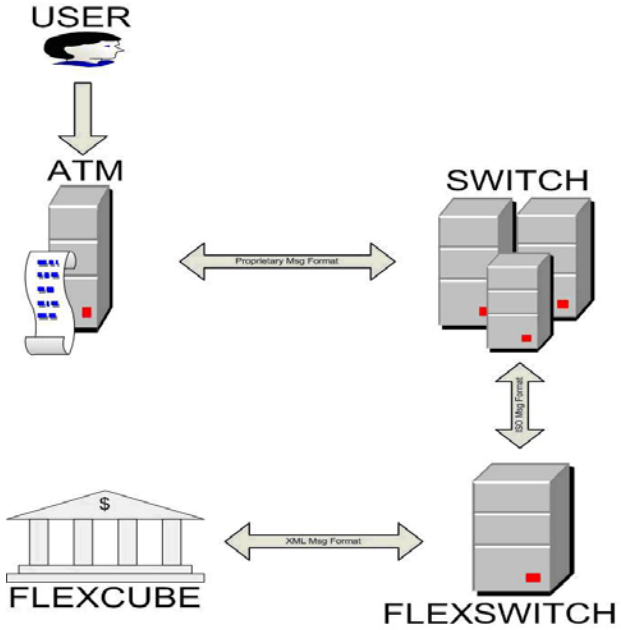
- Following are the typical business flow that happens in banks using ISO8583 Protocol as vehicle :-

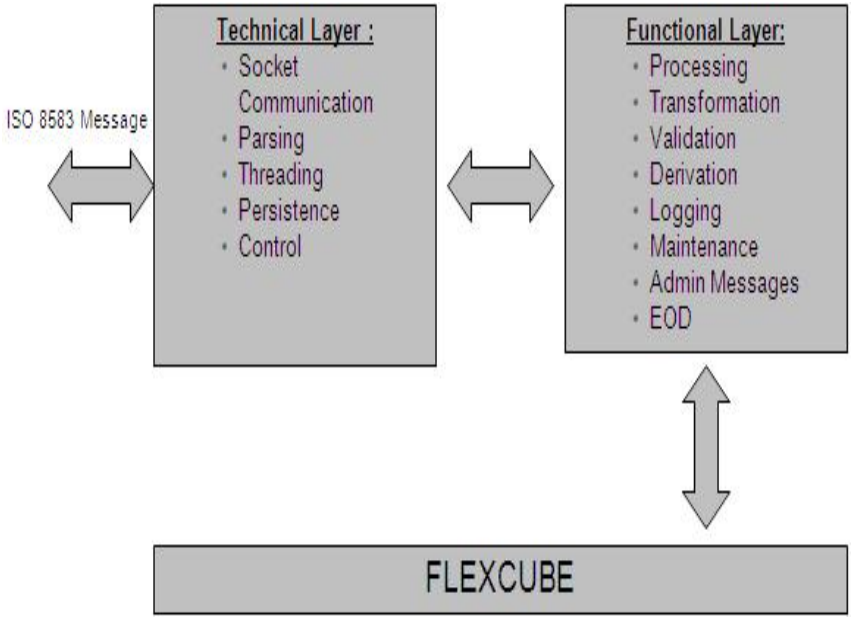
  - The Plastic cards are issued by the “Issuer Banks” referred as "Issuer".
  - The Infrastructure is in place to enable the card transactions
  - Acquiring devices (ATM/POS) installed and connected to Switch software
  - Interchanges (VISA/ MasterCard) connectivity available with Switch software
  - Switch software integrated with Issuing bank software (like FLEXCUBE) using ISO8583 message protocol.
  - The Plastic cards will be used at Acquiring point devices installed by Banks referred as "Acquirer“

Business Overview – contd…

- Depending upon the category of the transaction, Switch software will route the transaction either to Issuing bank (FLEXCUBE) i.e. for ONUS or to Interchanges i.e. for remote ON-US and OFF-US.
- Issuing Bank need to respond to the “ISO messages” and provide ISO response to either honor or reject transactions.
- These transactions gets settled with Interchanges or Merchants following next day or later using batch programs
- In some situations, if the communication link goes down between Switch software and Issuer bank, certain Switch has the facility to authorize those transactions These transactions are called as “Stand-in” or STIP or Offline or SAF” transactions.
- SAF transactions are forwarded to Issuer bank once the link is up or processed as batch file upload at Issuer side. For such stand-in purpose, Switch need to get balance refresh regularly from issuing banks.

SWIFT Interface Architecture





SWITCH Interface Architecture – contd …

- The Interface architecture diagram depicts the components that constitutes the technical and the functional layer for Flexcube to successfully interface with switch software.
- Technical layer would be responsible for switch connection and message format handling - catered by ISO 1987/1993/2003 protocol interface.
- The ISO8583 messages sent over the socket can have the length indicator either in ASCII / hex packed length format and also functions in 3 versions iz., ISO8583 - 1987, 1993 and 2003 version.
- The technical layer address to RAS Requirements i.e Reliable, Available and Scalable.
- Functional layer would be responsible for executing functionalities at Flexcube - i.e to switch transactions authorisation and posting into Flexcube.

Technical approach

- Switch Interface process is subdivided in to two:
  - Communication between SWITCH and Switch Interface - Configuration 1 & Configuration 2
  - Communication between Switch Interface and FLEXCUBE

Configuration 1**:**

- Communication between SWITCH and interface is through sockets
- SWITCH is client and Interface is server
- The configurable parameters will be maintained in a property file.
- When interface is started it reads the '*flexswitch.properties'* file and keeps the information in Global shared memory.
- The Socket server will be started as a POJO.
- It creates the maximum number of threads for Reading, Sending and keeps in the thread pool.[Reader Thread pool, Sender Thread pool]
- This maximum number of threads are configured in ***'flexswitch.properties' .***

Technical approach – contd…

- Interface accept the connection from SWITCH For each connection one reader thread starts reading the socket. A set of sender threads waits on the Sender Memory Q.
- A thread is taken from Reader Thread pool and start receiving the message from socket (say TC1Read)
- If the No of bytes parameter is 0 then the ISO message is read as one block. Else the corresponding length of string stream is read from the socket
- When a Message comes , TC1Read takes a thread from the Sender Pool (say TC1Send) . TC1Send picks up the oldest message and processes further
- TC1Send picks the message from Sender Memory Q and does file logging.
- TC1Send picks then calls the Converter class.
- TC1Send send the message to Gateway EJB
- After getting the response from Gateway the response message is passed to converter class to get ISO format and then sent to Socket.
- The same thread writes the response back to the socket and then returns to the pool.

Technical approach – contd…

Communication between SWITCH and Switch Interface

- Configuration 2 :

– Communication between SWITCH and interface is through sockets

– The interface can be configured to call gateway in an asynchronous fashion also.

– In this mode the TC1Send sends the message to Gateway In MQ.

– Before sending the message in to MQ TC1Send will set the Client Id in the message ID.

– Client id is a combination of port number of the connection and the system timestamp, and a random number thus making it unique per connection.

– A hash map is created with this Client Id as key and Socket Object of this connection as value.

– Response will be received in the Gateway Out MQ.

– To write the message back to the socket threads from the Receiver Thread Pool will have to be used. This Receiver Thread Pool will be initialized on start up.

– Receiving thread (TC1Receive) polls the response from GW out MQ (FIFO method).

– The response message is passed to converter class to get ISO format. It identifies the Client Id of the message from the correlation ID and using the hash map obtains the socket object and writes the response back to this object and then continues to poll the Output MQ.

Technical approach – contd…

Communication between Switch Interface and FLEXCUBE

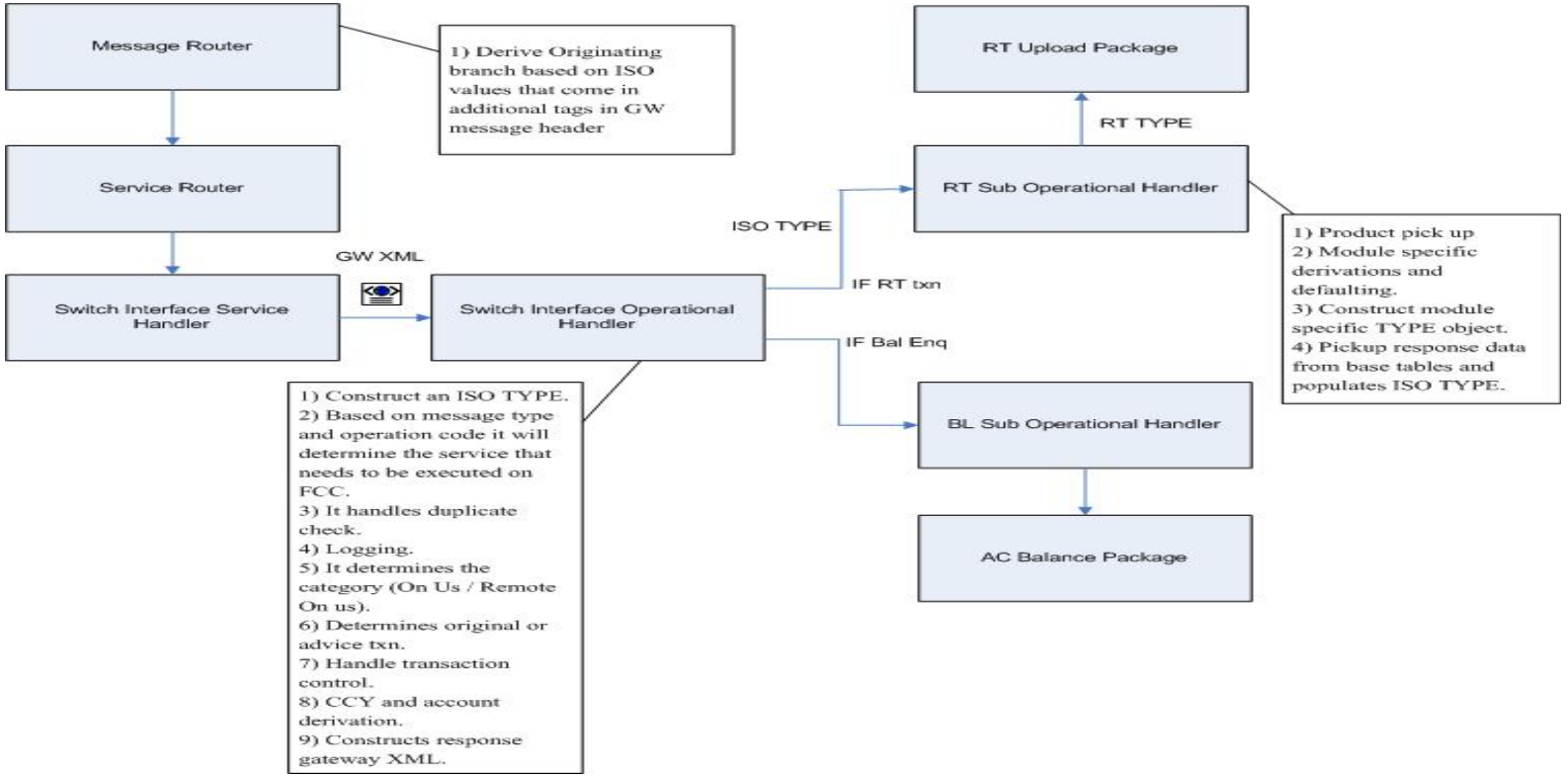
- Communication between Switch Interface and gateway is using the Gateway EJB/MDB that is exposed to the outside world for communication. GW will operate with its own transaction control. Any failure after receiving a response from GW will be handled as a timeout.

Technical approach – contd…

Switch Interface responsibilities

- Accept the socket connection/s from SWITCH
- Read the ISO message from socket
- Write the ISO message into a Memory Queue
- Read the ISO message from Queue and convert it into GW XML
- Send the request XML message to Gateway
- Accept the gateway response XML
- Convert gateway response XML to ISO response message
- Send the ISO response back to SWITCH through socket

Functional Approach



Functional Approach – contd…

- The source will be FLEXSWITCH.
- The originating branch is derived in the messaging schema using the Issuer BIN and Acquirer BIN. These two values are received in the additional parameters tag in the header. The originating branch is used as the BRANCH tag in the header.
- The service, operation received will be FCUBSSwitchService, SwitchTransaction.
- A new gateway service handler for FCUBSSwitchService will be created.
- This new service will have a XSD. The XSD will have all the ISO fields as individual tags.
- There will be an operation handler (switch interface operation handler) that will parse the incoming GW XML and construct an ISO TYPE object . Depending on the ISO version the fields from the GW XML will be mapped to fields in the ISO TYPE. The ISO version will be defined in Switch Integration Parameter table. Based on message class and operation code it will determine the service that needs to be executed on FLEXCUBE and calls the corresponding package (explained in the next point). It handles duplicate check (by logging into a table). It determines the category (On Us / Remote On us).

Functional Approach – contd…

- For each service that will be used by ATM/POS the corresponding operation handler will be duplicated and tailored to meet the ATM/POS requirements
- The response message class is determined in the switch interface operation handler. Using the ISO TYPE that it receives it builds the response XML.
- Product maintenance and upload package will be enhanced to meet new requirements

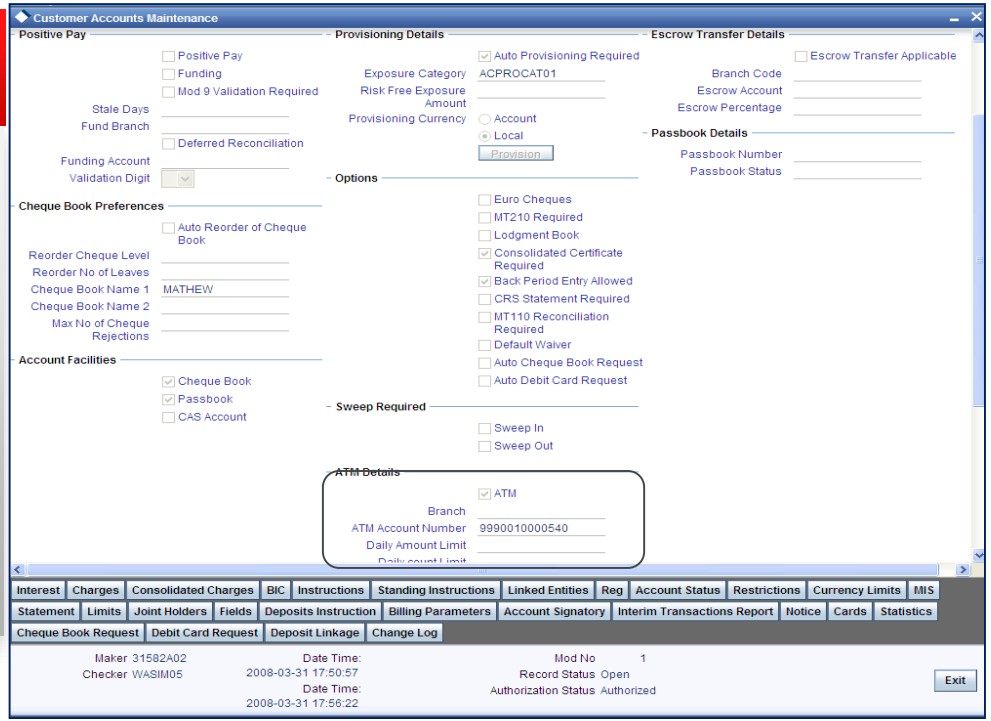
Customer Specific Maintenance

- User needs to Follow the Following set of Maintenance
  - Customer Account Creation
  - Card Customer
  - Card Account Maintenance

Customer Specific Maintenance – contd …

•Customer Account Creation

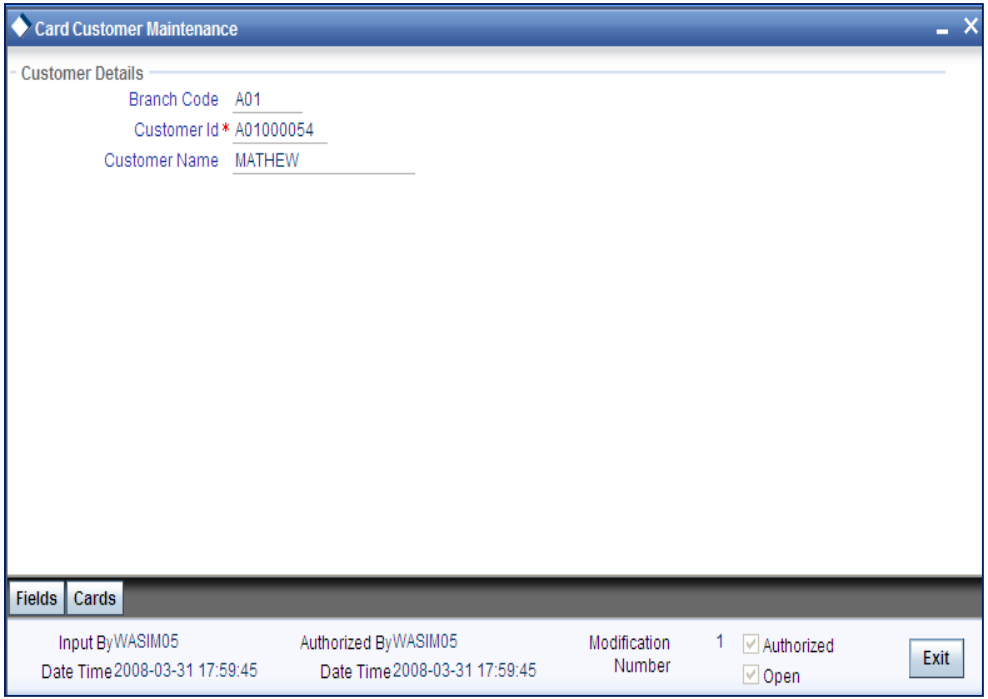
- Create Customer Account for ATM/IVR and POS Operations
- The Checkbox “ATM” under ‘Preference’ tab should be Checked along with ATM Account number.



Customer Specific Maintenance – contd …

- **Card Customer**

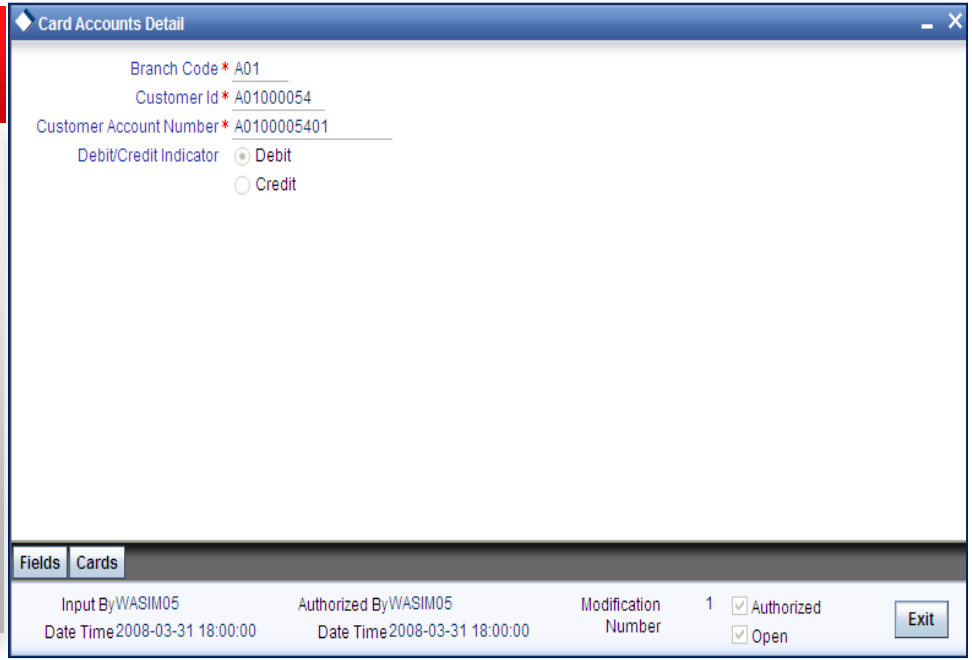
  - Create Card Customer . User needs to create a Card Customer which is identified as a Customer who are Eligible to have cards.



Customer Specific Maintenance – contd …

Card Account Maintenance

- Create Card Account for a Customer . User needs to select the type of Card for the ‘Card Customer’ which is Mapped to a Customer Account



Bank Specific Maintenance

- Bank Specific Maintenance can be Divided into two parts :-
  - General Maintenance
  - Card Specific Maintenance

Bank Specific Maintenance – contd …

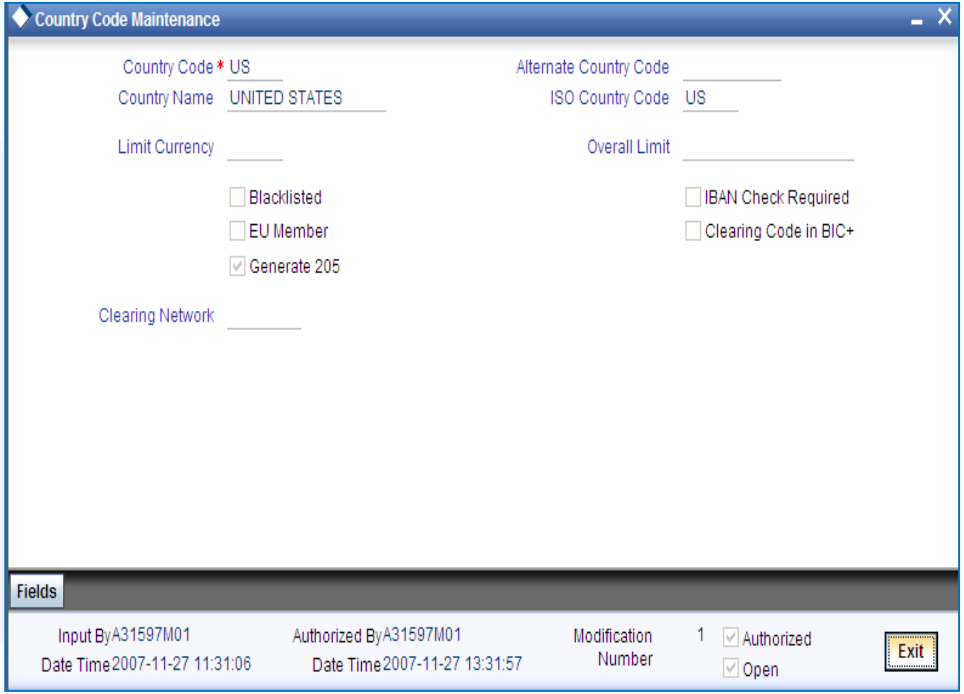
General Maintenance

- **User needs to follow the following set of Maintenance:-**
  - **Country Maintenance**
  - **Currency Maintenance**
  - **Inter-Branch Parameter maintenance**

Bank Specific Maintenance – contd …

Country Maintenance

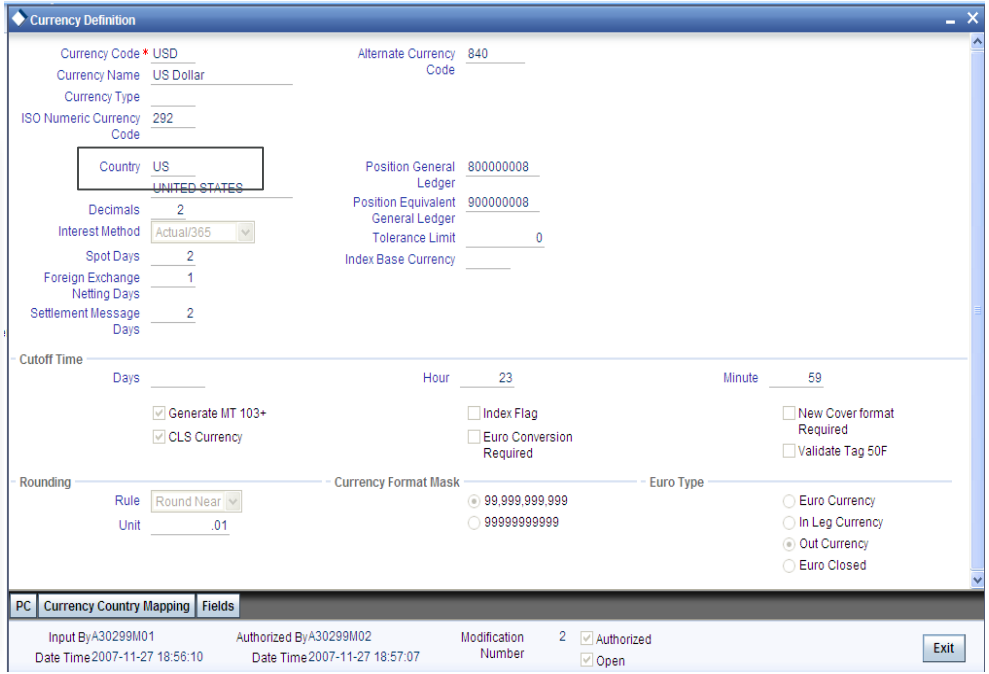
- User needs to Maintain Country as currency needs t o be maintained for Bank which in turn needs to be Linked with the Country



Bank Specific Maintenance – contd …

Currency Maintenance

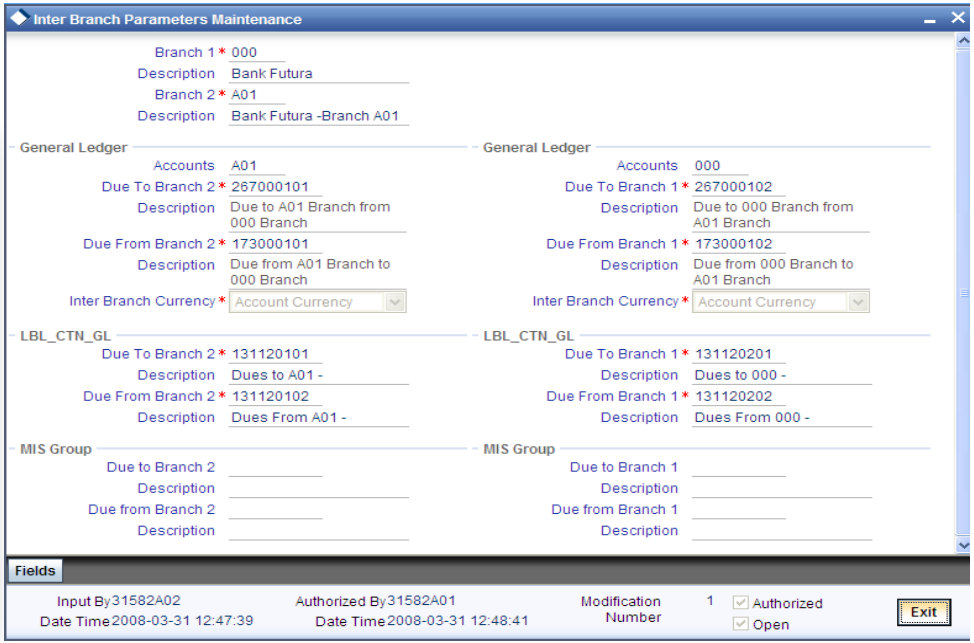
- User needs to Maintain Currency along with ISO Numeric Code .



Bank Specific Maintenance – contd …

- **Inter-Branch Parameter maintenance**

  - User needs to Maintain ‘Inter-Branch Parameter’. The inter-branch parameter is maintained for ATM/IVR and POS transactions between Head office and a Branch.



Bank Specific Maintenance – contd …

Card Maintenance

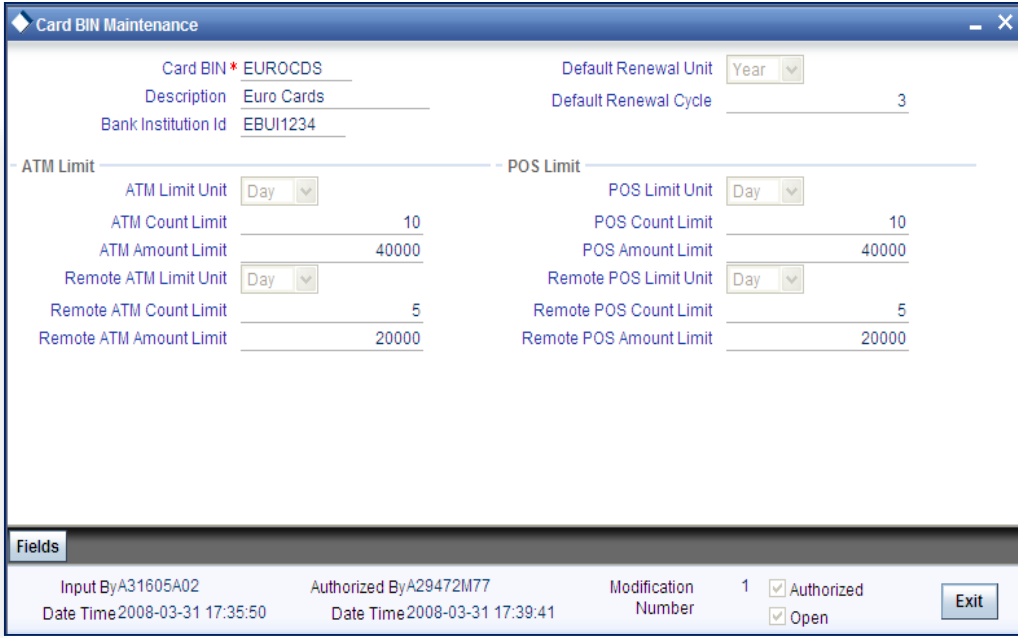
- User needs to follow the following set of Maintenance : -
  - Card Status
  - Card Bin
  - Card Type
  - Card Product
  - Card Master Maintenance

Bank Specific Maintenance – contd …

- **Card Status**
- User needs to maintain Card Statuses . Status can be ‘Issued’ , ‘Activated’ , ‘Blocked’ etc.

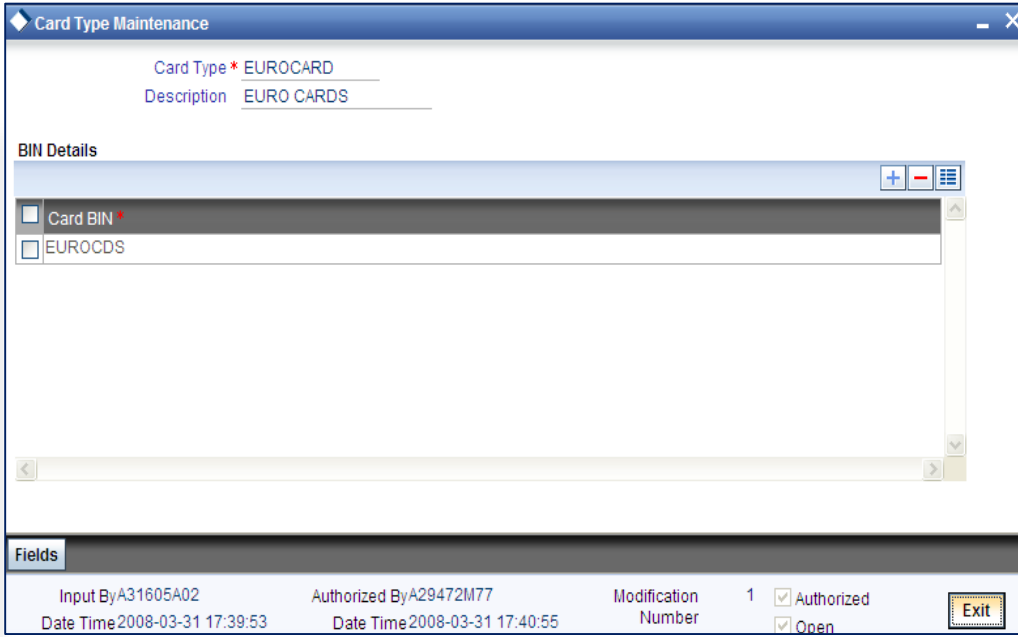
Bank Specific Maintenance – contd …

- **Card BIN Maintenance**
- User needs to Maintain Card BIN . Card BIN hold important details like “ATM count limit” . “POS Amount limit” etc



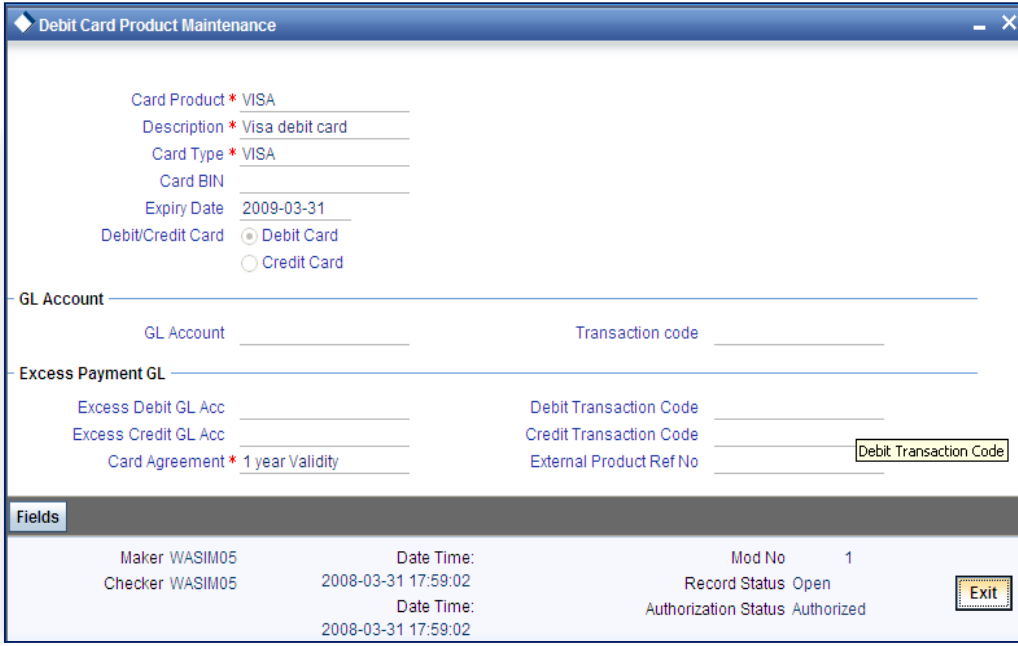
Bank Specific Maintenance – contd …

- **Card Type Maintenance**
- User needs to Maintain Card Types . Card types denotes the types of cards that the bank can provide its Customers , Card types can be unique from one another. The uniqueness is provided in its characteristics like “ATM withdrawal amount” , “No. of POS transactions” etc which are provided in Card BIN , to which the Card type is linked

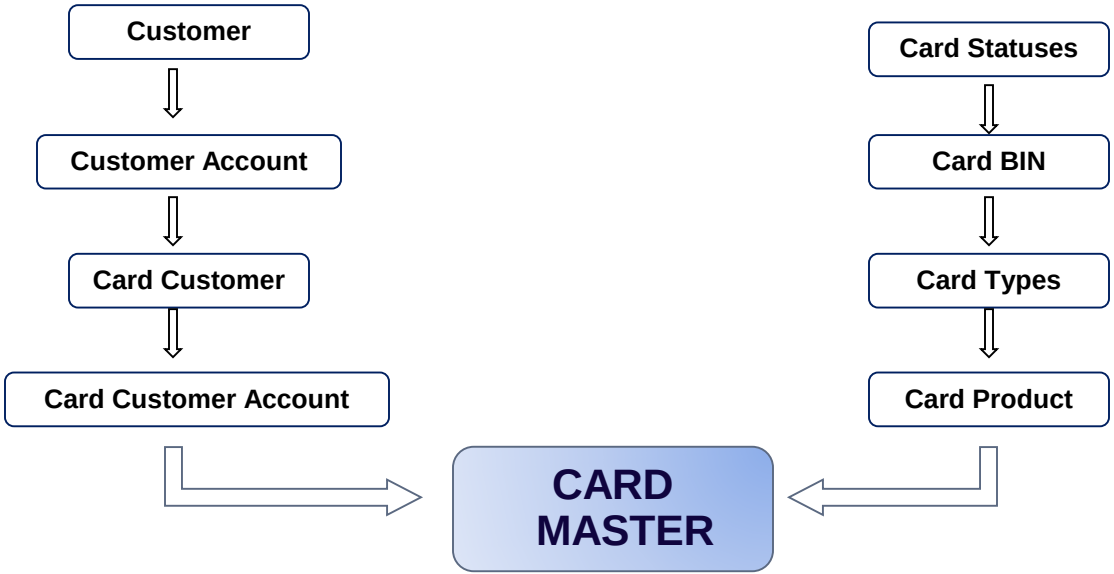


Bank Specific Maintenance – contd …

- **Card Product Maintenance**
- User needs to Maintain Card Products .

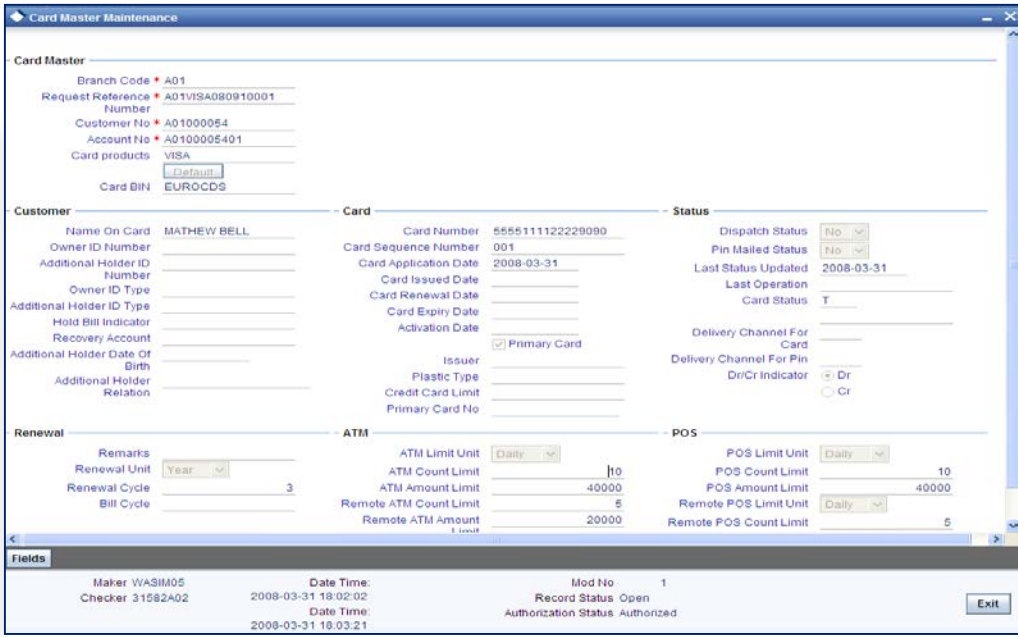


Linkage Between Card specific Maintenance and Customer Maintenace



Bank Specific Maintenance – Card Maintenance

- **Card Master Maintenance**
- User needs to Maintain Card Master Maintenance . Using this maintenance the Customer Account along with the customer is Linked with the Card and Card Specific maintenance. User needs to Select “Card Status” as “Activated”

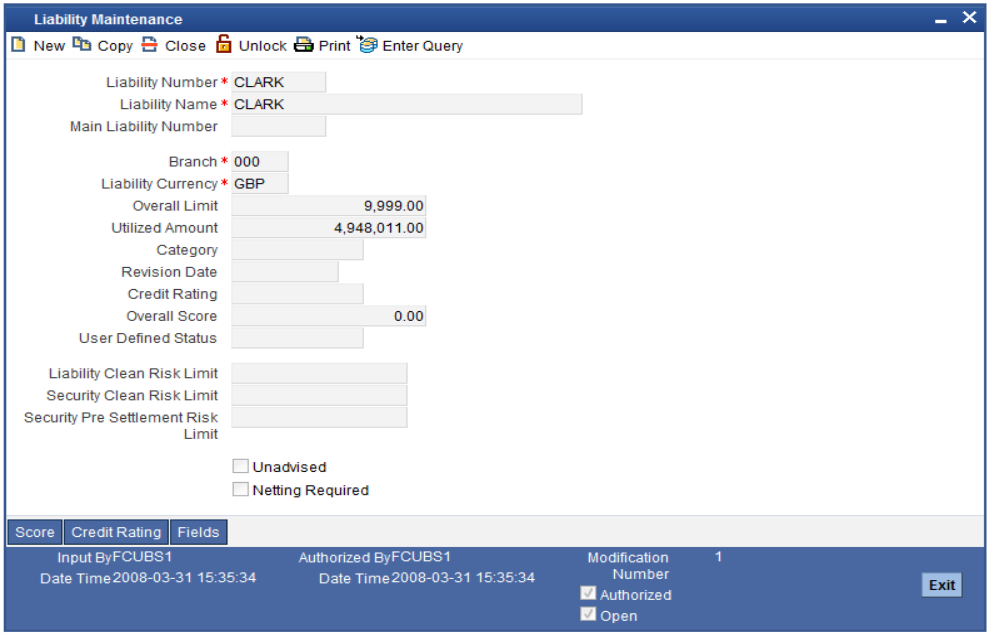


Liability Maintenance

- Every customer of bank who enjoys credit facilities should be assigned or linked to a Liability Code category. Several customers can be linked to the same Liability Code. Liability linkage can be in two ways.
- Single Liability linked to multiple customers (i.e. a Customer Group)
- Single Liability linked to only one customer

User Defined Status

- Path : Limits and Collaterals-> Operations -> Liability Input
- Fast Path : GEDMLIAB



Interface Specific Maintenance

Configurable in Interface(flexswitch.properties)

- Port numbers which is exposed to SWITCH (ATM and POS)
- Connecting POS and ATMs in same or different ports
- Bitmap type (ASCII/Binary) configurable.
- Maximum number of connections from SWITCH
- Maximum number of threads or reading from socket
- Maximum number of threads for calling gateway service.
- Logging required for debug and socket message.
- Log file path and file names
- ISO Version for the purpose of picking up the corresponding config file.
- RMI information for calling FLEXCUBE Gateway
- Head office branch code
- User id of interface to communicate to FLEXCUBE
- No of bytes that indicate length

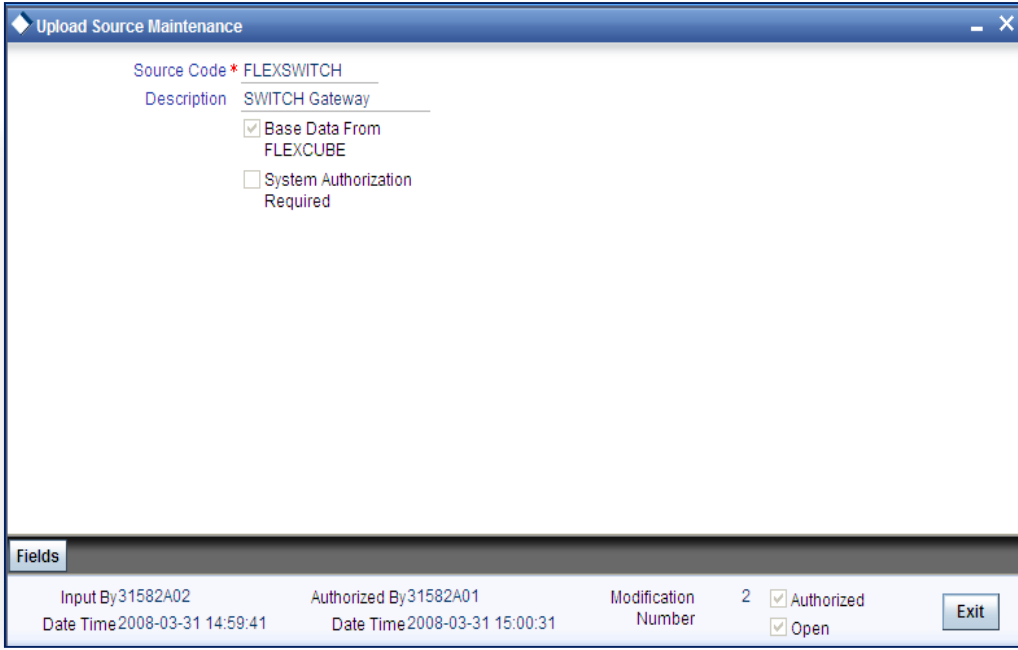
Interface Specific Maintenance – contd…

- User needs to follow the following set of Maintenance : -
  - Upload Source Maintenance
  - External System Maintenance
  - External System Function Maintenance
  - Upload Source Preferences maintenances
  - User Maintenance
  - Retail Teller Product Maintenance
  - ARC Maintenance
  - ATM/Debit Card FCC Account Mapping
  - Network Details
  - Terminal Details
  - Product Type Maintenance
  - Process Code Mapping

Interface Specific Maintenance – contd …

- **Upload Source Maintenance**

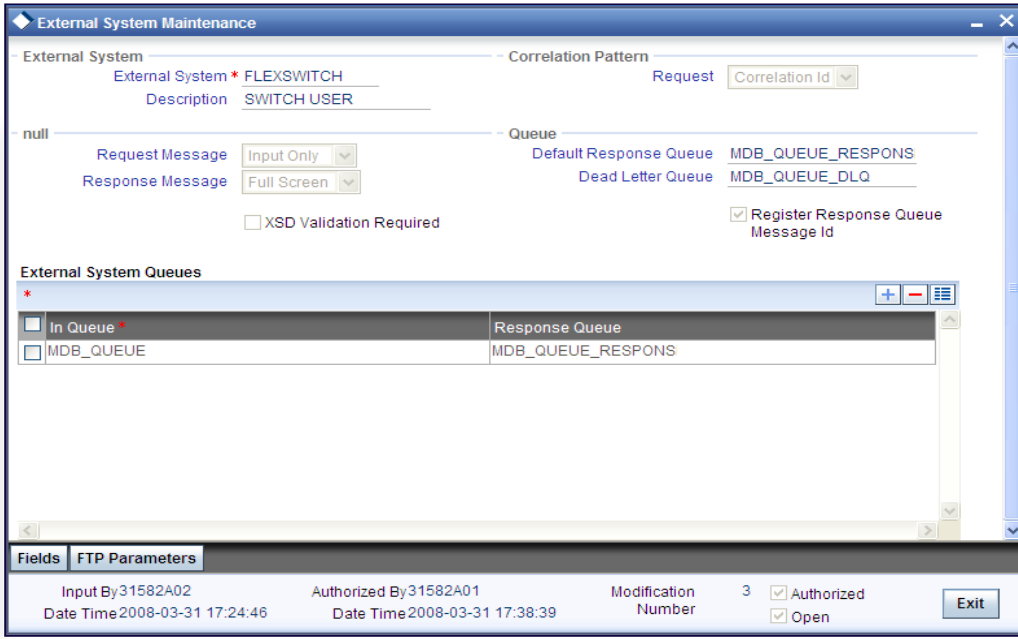
- User needs to Maintain External Source as “FLEXSWITCH” which is External system for ATM and POS transaction.



Interface Specific Maintenance – contd …

- **External System Maintenance**

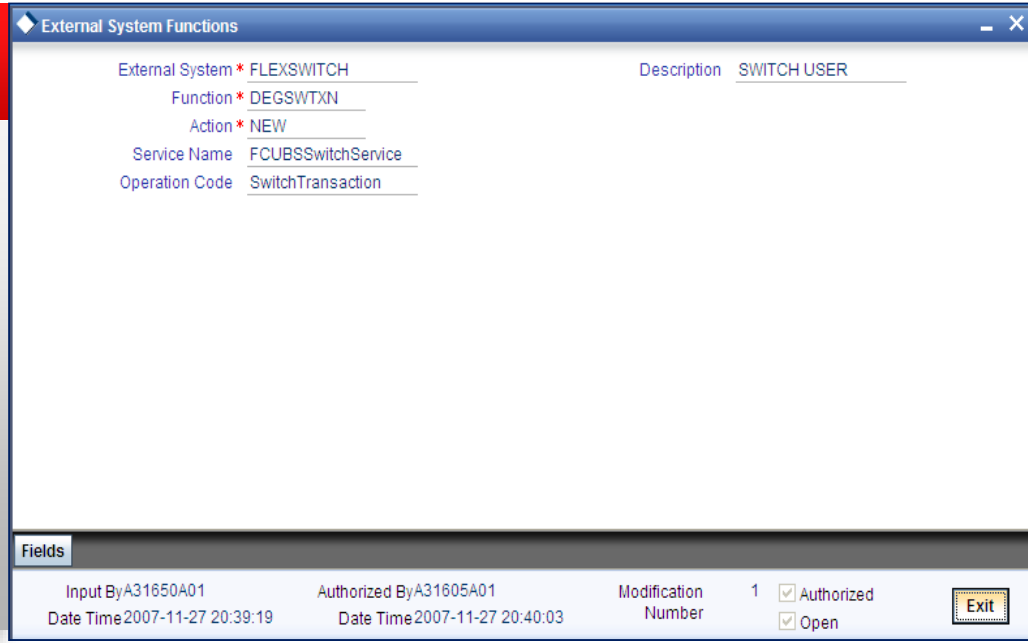
- User needs to Maintain External System as “FLEXSWITCH” which is External system for ATM and POS transaction.
- User must provide Queues (Default Response queue , Dead letter Queue , In Queue , Response Queue) in accordance to the Schema Setup



Interface Specific Maintenance – contd …

- **External System Function Maintenance**

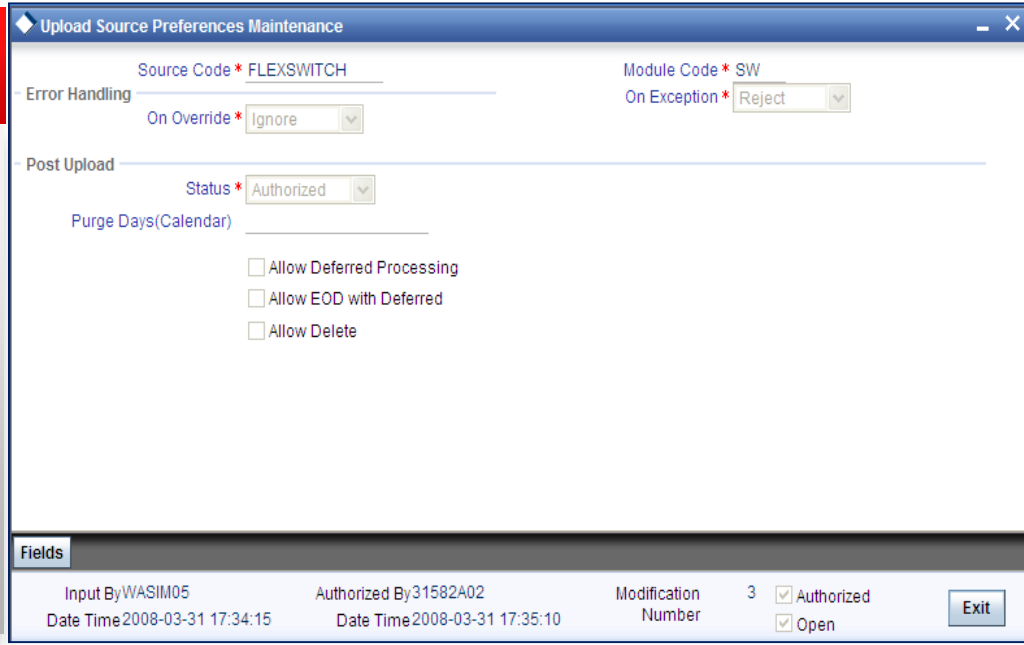
- User needs to Maintain External System Function as “FLEXSWITCH.
- User must External System to ‘*Service Name*’ named ‘FCUBSSwitchService’ and *‘Function’* named ‘GWDEXFUN’.



Interface Specific Maintenance – contd …

- **Upload Source Preferences maintenances**

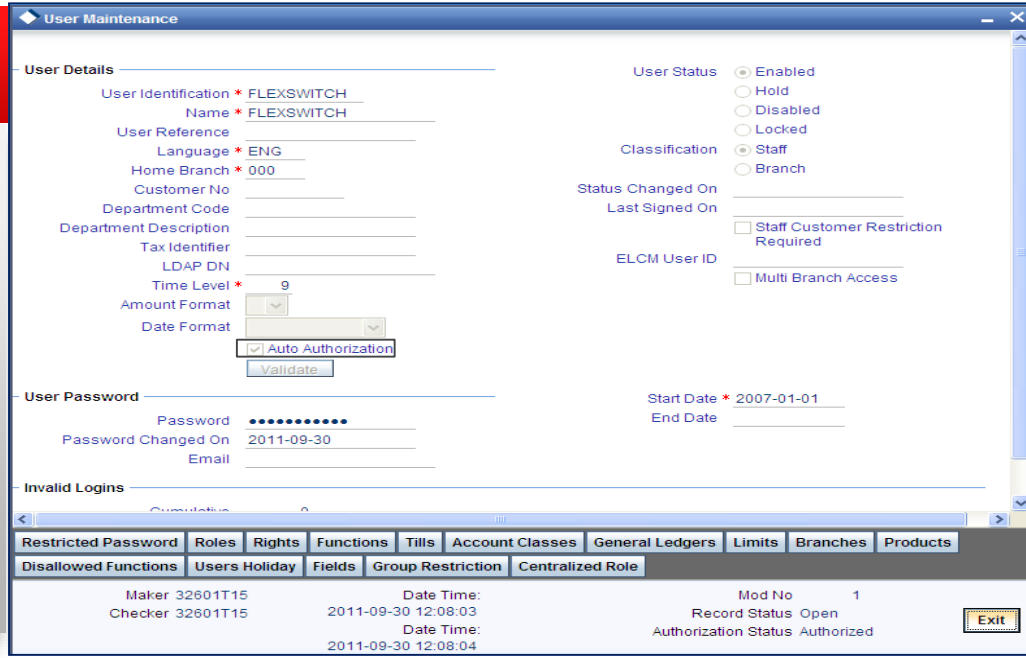
- User needs to Maintain Upload Source Preferences as “FLEXSWITCH.
- With the help of the upload source preferences maintenances screen map the External system with the module ‘Switch’.



Interface Specific Maintenance – contd …

- **User Maintenance**

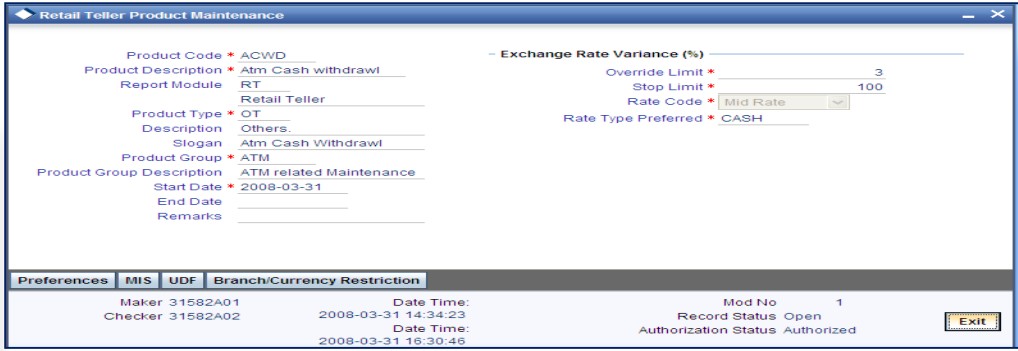
- User needs to Maintain User as “FLEXSWITCH.
- The User need to have ‘Auto Authorize’ facility.

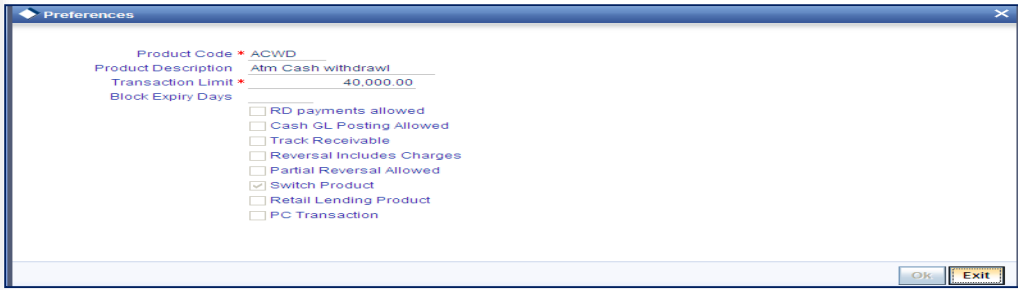


Interface Specific Maintenance – contd …

- **Retail Teller Product Maintenance**

- User needs to Maintain ‘Retail Teller Product’. This must be maintained for maintained for each and every type of transactions such as Cash withdrawal, Cash deposit, POS transaction, Balance enquiry, Mini statement etc,
- In the “Preferences” tab of the “Retail Teller Product Maintenance” it is necessary to check the box ‘Switch product’, so that the product can be fetched in the “Switch Product” mapping screen

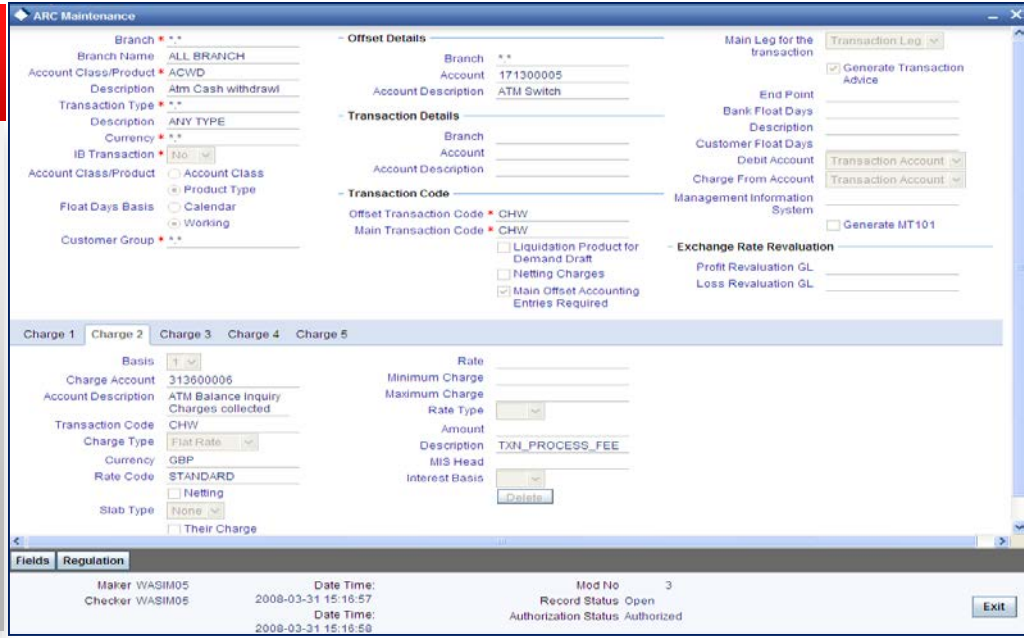




Interface Specific Maintenance – contd …

- **ARC Maintenance**

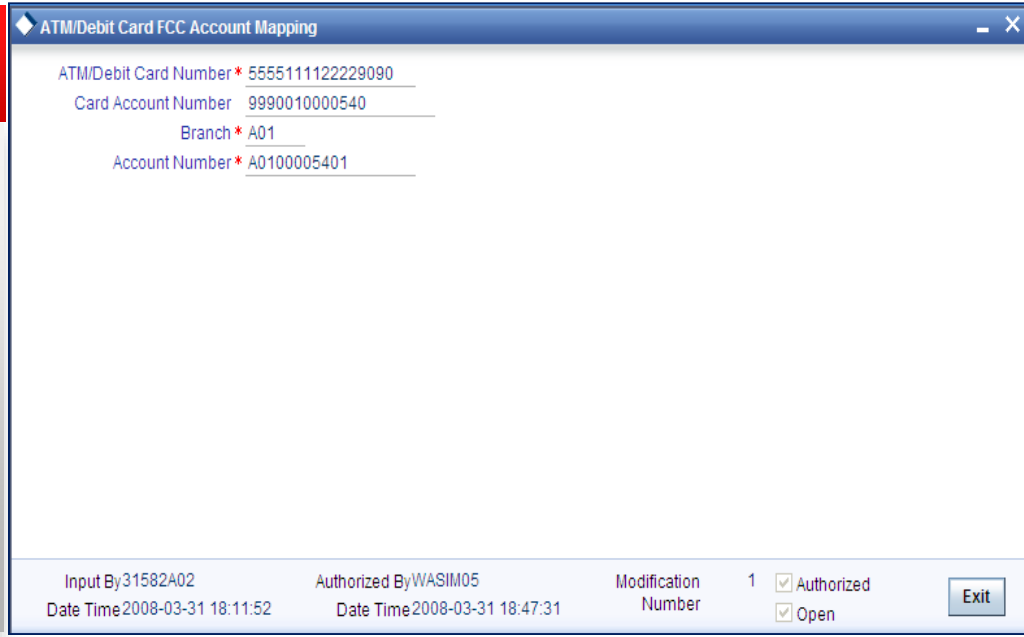
- User needs to Maintain ‘ARC’. This must be maintained for maintained for each and every type of transactions such as ‘Cash withdrawal’, ‘Cash deposit’, ‘POS transaction’, ‘Balance enquiry’, ‘Mini statement’ etc . This maintenance is used to collect charges for a particular set of ATM operations like “Balance Enquiry” charges etc.
- *Description* as “TXN_FEE” and “TXN_PROCESS_FEE” must be maintained under “Charge1” and “Charge2” tab respectively.



Interface Specific Maintenance – contd …

- **ATM/Debit Card FCC Account Mapping**

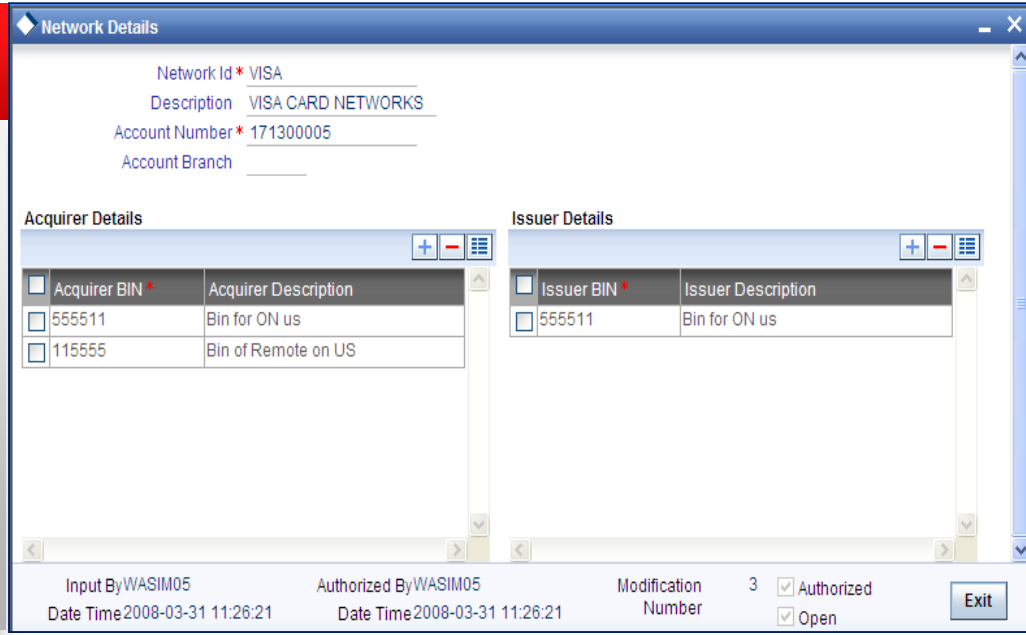
- User needs to Maintain ‘ATM/Debit Card FCC Account Mapping’ in order to map “ATM/Debit Card number” ,” Card Account Number” and “Customer Account Number”.



Interface Specific Maintenance – contd …

- **Network Details**

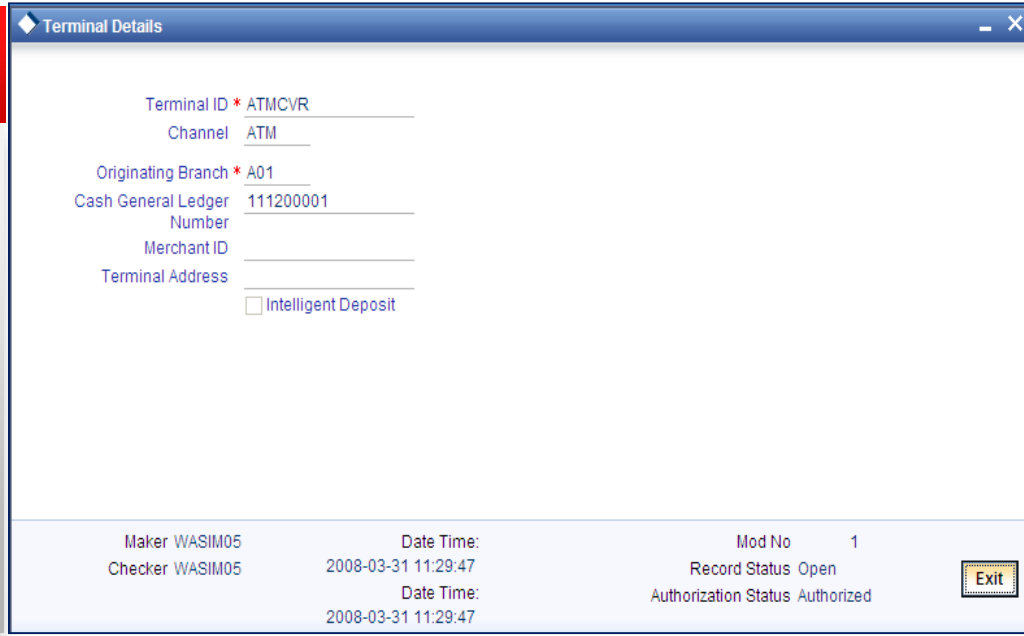
- User needs to Maintain ‘Network Details’ in order to map “Issuer” and “Acquirer” with their BIN. This is required as ATM/POS transaction interacts with Networks with the help of this BIN



Interface Specific Maintenance – contd …

Terminal Details

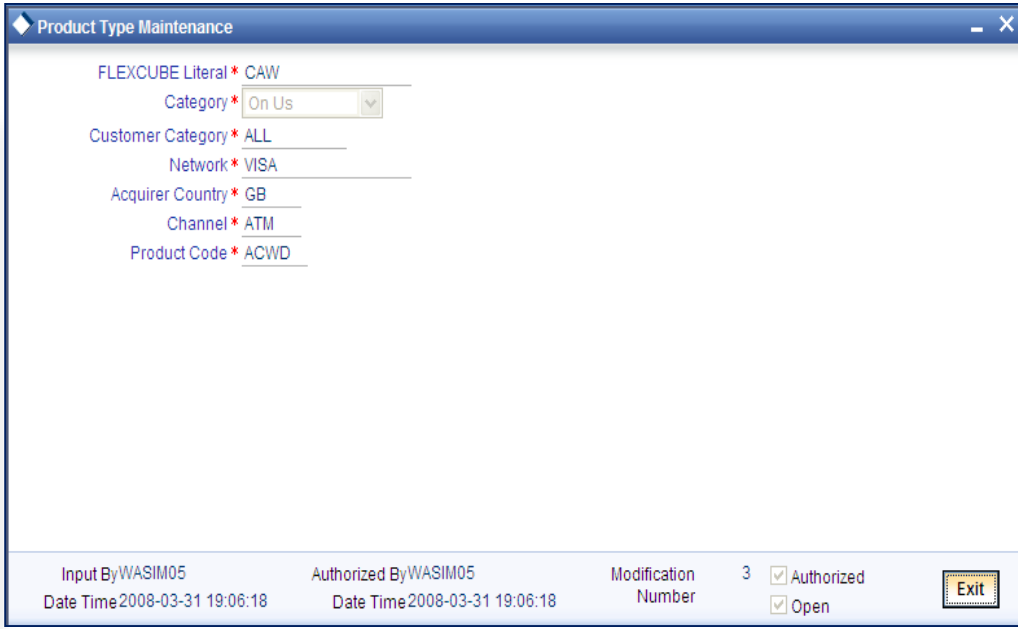
- User needs to Maintain ‘Terminal Details’. The term ‘Terminal’ is used to refers to an external entity from which a Switch Transactions either originates or Terminates. Typically , a Terminal is a ATM Dispenser machine or a POS equipment in a Super Market .
- The checkbox “Intelligent deposit” is checked if the Terminal can accept Cash Deposit.



Interface Specific Maintenance – contd …

Product Type Maintenance

- Product type maintenance screen is used to map the FLEXCUBE literals with the RT products maintained and the channels .
- The following are the FLEXCUBE Literals :-
  - CAW - Cash withdrawal
  - BEQ - Balance enquiry
  - CDP - Cash Deposit
  - FTR - Fund transfer
  - MST - Mini statement



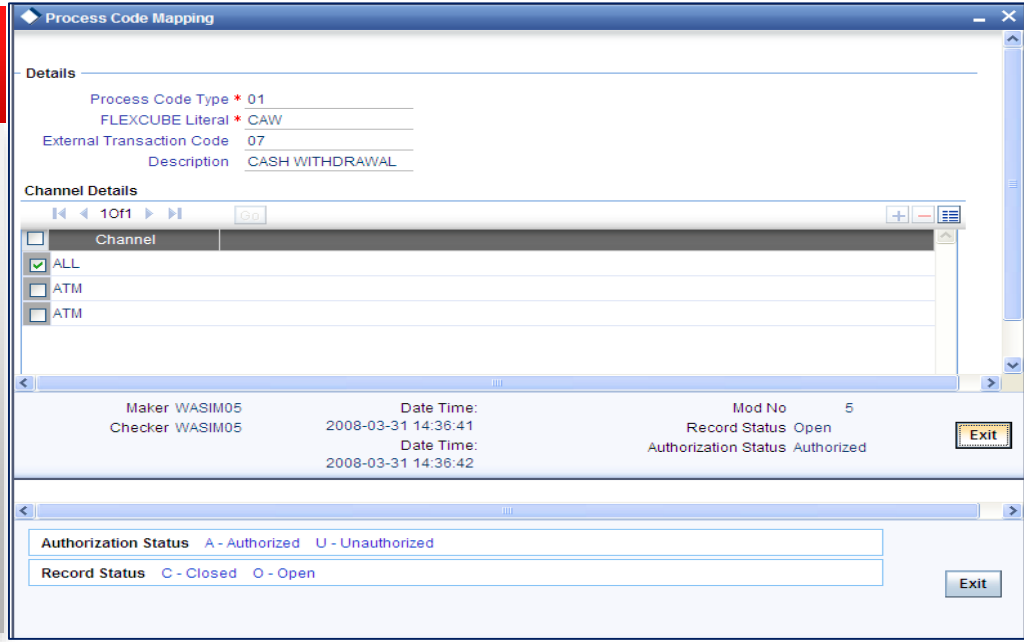
Interface Specific Maintenance – contd …

Process Code Mapping

- The Process code must have to be mapped with the respective channels with the help of the Process code mapping screen.
- The following are the FLEXCUBE Literals :-
  - 31 – Balance Enquiry
  - 21 - Cash Deposit
  - 01 - Cash Withdrawal
  - 38 - Mini Statement generation
  - 00 - Normal Purchase(POS)
  - 91 - Cheque Book Request
  - 40 - Funds Transfer
  - 77 - Merchant File Settlement

Interface Specific Maintenance – contd …

- Process Code Mapping – contd…



SWITCH Software

Switch software functions in 2 layers,

As shown in the picture, In Layer1,

- Switch software maintains the terminals viz., ATM / POS interchange information.
- Maintains the card number to account number linkages.
- Verifies the PIN and the card status
- Receives card transactions from ATM / POS terminals

As part of Layer2,

- The switch software Forwards the transactions to Host Banking Systems like FLEXCUBE
- Converts the received proprietary protocol messages from the terminal into ISO8583 protocol.
- Performs “stand-in” authorization incase of Link to application systems is down.
- Refreshes Account balances from Banking Systems .

Transaction Supported in SWITCH

- **Transactions supported for ATM/IVR/POS**

ATM	IVR	POS
Balance Enquiry	Balance Enquiry	Cash Back
Cheque Book Request	Cheque Book Request	Merchant File Statement
Adhoc Statement Request	Adhoc Statement Request	Merchant settlement
Mini Statement Request	Mini Statement Request	Normal Purchase
Funds Transfer	Funds Transfer	Purchase Adjustment
Cash Withdrawal		
Cash Deposit		

Hardware and Software

ORACLE

Engineered to Work Together


ORACLE®