

Change ID		Issue ID	
Requestor:			
Name & Surname	Chief Masia	Date:	10 June 2022
Project Name:	FI Fusion Error Handler		
Submission Date:	28 June 2022		
Priority:	<div>High</div> <div>Medium</div> <div>Low</div>		

## 1. CONTEXT

FI Fusion manages, maintains, and orchestrate all recharges from the banks or financial institutions. It comprises of mainly three services namely eligibility for customer validation, account adjustment for airtime recharges and subscription for bundle purchases.

It is observed from time to time that some of the errors either business or technical are not being handled properly and mapped to the appropriate "Return Code". This creates havoc for the support team and our financial institutions. Some of these issues lead to Vodacom losing revenue daily.

## 2. PROPOSED CHANGE/REQUIREMENT

Having the above said, there is a requirement to enhance the API's error handling. These changes apply to all FI APIs.

The following return codes are possible AS-IS.

Description	Return code	Eligibility request	Adjustment request	Bundle Purchase
Approved validation Or Recharge completed successfully	200	X	X	X
Delay in processing the recharge	10		X	X
Invalid Recharge (e.g. Recharge attempt without activation, Business rule violation)	12		X	
Invalid Recharge Denomination	13		X	
Invalid Financial Institution Id	15	X	X	X
<u>Vodacom related problem</u> This response code indicates that the transaction was not successfully processed due to a problem on the back-end system. For single occurrences, the financial institution may re-submit the transaction with a <b>new</b> transaction id. For multiple occurrences in succession, the financial institution must report the problem to Vodacom by following the fault reporting procedure as specified in the SLA.	22	X	X	X
Duplicate transaction (Mess ID 001 same Trans ID))	26		X	X
No. of retries exceeded. Max (3) retries			X	X
Invalid MSISDN	42	X	X	X
<u>Vodacom related problem</u> This response code indicates that the back-end system is either unavailable or did not respond in time. For single occurrences, the financial institution may re-submit the transaction with the <b>same</b> transaction id. For multiple occurrences in succession, the financial institution must report the problem to Vodacom by following the fault reporting procedure as specified in the SLA.	500	X	X	X

Table 2.1

The following is a list of refined lists of possible return codes and their respective conditions.

Description	Return code	Eligibility request	Adjustment request	Bundle Purchase
Approved validation Or Recharge completed successfully	200	X	X	X
Delay in processing the recharge. This applies to slow response from CCS(Read Timeout not connection timeout). Retriable errors are also catered by this. Refer to Scenario 4 & 5.	10		X	X
Invalid Recharge (e.g. Recharge attempt without activation, Business rule violation). This error code is now reserved for all business-related errors from CCS, CUR and within FI Fusion. Refer to Scenario 3	12		X	X
Invalid Recharge Denomination	13		X	
Invalid Financial Institution Id	15	X	X	X
<u>Vodacom related problem</u> This response code indicates that the transaction was not successfully processed due to a problem on the back-end system. For single occurrences, the financial institution may re-submit the transaction with a <b>new</b> transaction id. For multiple occurrences in succession, the financial institution must report the problem to Vodacom by following the fault reporting procedure as specified in the SLA. This is mainly for technical errors i.e the back-end system is not available due to network problems. Refer to Scenario 2 for more info.	22	X	X	X
Duplicate transaction. This return code is now only reserved for retried traction that was previously processed successfully.	26		X	X
No. of retries exceeded. Max (3) retries			X	X
Invalid MSISDN	42	X	X	X
<u>Vodacom related problem</u> This response code indicates that the back-end system is either unavailable or did not respond in time. For single occurrences, the financial institution may re-submit the transaction with the <b>same</b> transaction id. For multiple occurrences in succession, the financial institution must report the problem to Vodacom by following the fault reporting procedure as specified in the SLA. This must be used for "Connection Timeout" from CCS, and Pricebook.	500	X	X	X

Table 2.2

### **Scenario 1: (Code=0):**

IF the FI retries a previously successful transaction that has been recorded on the audit table as 'code 0' response 'code=26' - 'duplicate transaction' will be returned to the FI indicating the previous transaction Succeeded.

### **Scenario 2: (Code=22) :**

Code=22 should be used for technical errors or error responses where the transaction could have been potentially processed on the FI .ie the final status is unconfirmed. To appropriately cater for these errors, they must be identified and listed for the purpose of ensuring they are incorporated in the development, else they will be incorporated as they are identified in production.

#### **(Code=22 - Previously Successful)**

IF a retried transaction with the same **conversationID**, **FI CODE** and **MSISDN** previously failed with '**code=22**' but was actually successfully provisioned on CCS , On retry Fusion will check the Audit table IF '**code=22**' on the **DB**, Fusion will check the **CCS tempDB** if the transaction exists on the CCS tempDB and was successful, Fusion will return the error '**code=26**' indicating that transaction is a duplicate and was successful. **The Fi Audit Table will also be updated with code=0 that means success.**

#### **(Code=22 - Does not exist on CCS tempDB)**

IF a retried transaction with the same **conversationID**, **FI CODE** and **MSISDN** previously failed with '**code 22**', On retry Fusion will check the Audit table IF '**code=22**' on the **DB** , Fusion will check the **CCS tempDB** if the transaction Does Not Exist on the tempDB . Fusion will retry the transaction as per normal flow. On valid failure to CCS fusion will return/update error '**code=12**'. **On Success Fusion will return 'code=0'**. On technical failure return error '**code=22**' or other applicable error encountered during normal purchase flow.

### **Scenario 3: (Code=12: Invalid Recharge - Business rule Violations)**

The error '**code=12**' is applicable to all business-related errors coming from either CCS, CUR or withing FI Fusion itself. This might be Malformed, incomplete, or invalid payloads from the Bank. Non-retriable and retriable Errors from CCS for both Diameter and SoapService must be identified and correctly classified to be incorporated in the error handling development, else they will be incorporated as they are identified in production.

#### **Scenario 4: (Code=10 - Pending transactions - Updated process)**

If on initial purchase request a transaction can't be completed successfully due to for example a read timeout on CCS. The FI will be sent a 'code=10' response indicating a delayed transaction. Fusion updates the Audit table with 'code=10' and 'status=1' while the transaction is being retried from the retry queue. Fusion will continue to retry the transaction as per configured max retry counter.

On Success: Fusion will now also update the Error code as well as the status. on successful provisioning during the internal fusion retry process. Fusion will update code on the audit table with 'code=0' and 'status=0'.

On Failure: On reaching the maximum retry threshold or if a technical error is potentially retryable, Fusion will update 'code=10' on the audit table with 'code=22' as well as the status 'code=1' with 'code=2' to indicate failure. If the failure was due to a business rule violation or should not be retryable 'code=10' will be replaced with error 'code=12' and 'status=1' replaced with 'status=2' or other valid error code failure as per the business violation rule.

#### **Scenario 5: (Code=10 - Pending transactions - retry process)**

If a transaction is retried while it is still in progress .ie if the status on the audit table is 'code=10' and 'status=1', Fusion upon finding the transaction during the retry by the FI will, simply return 'code=10' -"Delayed Transaction" response and terminate processing for this retried transaction.

Since Scenario 3 will ensure that transactions that were initially 'code=10' are now updated with the final status code encountered during the retry process, Scenario 1,2 or 3 will be applied for retried transactions.

## Payload Validation







The bundle purchase request must be validated before a call to CCS. The validation must be based on the bundle information received from the Pricebook. Let's consider Soid J648 below. The bundle's Size and Validity are dynamic. These mean CCS expects the external system to provide this information. So, these must be validated from the incoming request received from the FI/Bank before calling CCS. If the validation fails, the transaction must be aborted and return **code=12 (business rule violation)** must be used with the appropriate description else call CCS for bundle provisioning and proceed with the normal process flow.

```
<offerings>
  <offering>
    <id>3089</id>
    <packageName>Social2</packageName>
    <offeringCode>J648</offeringCode>
    <offeringKey>894392</offeringKey>
    <description>1GB Social Ticket</description>
    <type>data</type>
    <validity>
      <period>1</period>
      <validityType>DAYS</validityType>
    </validity>
    <data/>
    <freeUnitType>
      <id>5137</id>
      <name>data</name>
      <description>data</description>
      <restricted>true</restricted>
      <defaultOfferingCode>VTO</defaultOfferingCode>
    </freeUnitType>
    <cancelable>false</cancelable>
    <billingCycle>once-off</billingCycle>
    <productVidCode>VID10002642</productVidCode>
    <pcrfServiceName>WWSOCIAL</pcrfServiceName>
    <priceOverwrite>dynamic</priceOverwrite>
    <sizeOverwrite>dynamic</sizeOverwrite>
    <validityOverwrite>dynamic</validityOverwrite>
    <integratedParent>false</integratedParent>
    <serviceBalanceDefault>false</serviceBalanceDefault>
    <dynamicName>true</dynamicName>
  </offering>
</offerings>
```



## Country Code Validation

We have recently picked up that the FI Fusion APIs don't validate the subscriber's country code e.g 27 for South Africa or 266 for Lesotho. So, the SA number can be used against Lesotho API to recharge Airtime successfully because of this loophole and vice versa. And this causes reporting nightmare. So, the country code validation must be applied for the following APIs. Return code=12 must be used with description "Invalid Country Code".

### SA Country Code (27)

	Description		URI
1	<b>[Non-Swagger]</b> [Eligibility Service]		<a href="/api/vbs/customer/eligibility/v1">/api/vbs/customer/eligibility/v1</a>
2	<b>[Non-Swagger]</b> [Airtime Recharge]		<a href="/api/vbs/account-adjust/v1">/api/vbs/account-adjust/v1</a>
3	<b>[Non-Swagger]</b> [Bundle Purchase]		<a href="/api/vbs/bundle/purchase/v1">/api/vbs/bundle/purchase/v1</a>
4	<b>[Swagger]</b> [Eligibility Service]		<a href="/ServiceCustomerEligibilityAPI/v2/customerEligibility/search">/ServiceCustomerEligibilityAPI/v2/customerEligibility/search</a>
5	<b>[Swagger]</b> [Airtime Recharge]		<a href="/serviceAccountAdjustmentAPI/v2/serviceAccountAdjustment">/serviceAccountAdjustmentAPI/v2/serviceAccountAdjustment</a>
6	<b>[Swagger]</b> [Bundle Purchase]		<a href="/subscriptionAPI/v2/subscription">/subscriptionAPI/v2/subscription</a>

### Lesotho Country Code (266)

	Description		URI
1	<b>[Non-Swagger]</b> [Eligibility Service]		<a href="/vcl/api/vbs/rest/customer/eligibility/v1">/vcl/api/vbs/rest/customer/eligibility/v1</a>
2	<b>[Non-Swagger]</b> [Airtime Recharge]		<a href="/vcl/api/vbs/rest/account-adjust/v1">/vcl/api/vbs/rest/account-adjust/v1</a>