PayGo Zimbabwe REST API Transaction Protocol Specification

Version v1.5.0, 17.05.2022

Contents

Table 1. Changelog

Version	Date	Author	Comments
Draft	10/01/2021	bgrobler	Initial
1.1.2	23/06/2021	bgrobler	Add reference and institution id description.
1.1.3	15/07/2021	bgrobler	Add push/pull transaction description.
1.1.3-1	19/07/2021	bgrobler	Change BSP to PSP, Remove architecture diagram (superseded transaction description diagrams)
1.2.0	23/07/2021	bgrobler	Remove `directoryInformation` for MSP, superseded by `directoryService` object, MSP are required to created Credentials and Merchants via the Admin API as a pre-requisite. Change additionalData field keys to *lowerCamelCase* from *UPPER_SNAKE_CASE*
1.2.1	19/08/2021	bgrobler	modify section3.3 - include authorizedCredentialId and merchantId information
1.2.1-1	06/09/2021	bgrobler	update references to change reference between req/rsp pair. Update camelCasing for `entryType` and `pointOfInititation`
1.3.0	11/03/2022	bgrobler	add response code, and field definitions.
1.4.0	27/04/2022	bgrobler	add response codes section (helper) for auth response, Add 2.2 - Protocol (describes the PayGo REST API), Update expirySeconds description to be more informative.
1.5.0	17/05/2022	bgrobler	rename document to REST API Transaction Protocol Specification, Add EMVco QR Code specification
1.6.0	18/06/2022	bgrobler	Fix fields table (participantReference typo's)

1. Introduction

PayGo Zimbabwe provides payment lookup and routing services.

1.1. Audience

The target audience for this document are Business Analysts and Software Engineers.

1.2. Pre-Requisites

A familiarity with the Vsuite Bridge Protocol as provided by Vsuite - Bridge Specification v1.0.0, and a basic understanding of financial payments / electronics funds transfer terminology and concepts is expected.

2. Integration

The PayGo API is an enrichment of the Vsuite Bridge Protocol.

Each PayGo Transaction is a strict contract between PayGo and the Member, any non-compliant messages will be dropped. See the PayGo Contract for further details concerning compliance and SLA.

2.1. Concepts & Terms

2.1.1. PayGo Directory Services (PayGo DS)

PayGo DS is a central routing/validation service that allows prefix allocation and message routing between numerous organizations.

2.1.2. Credential

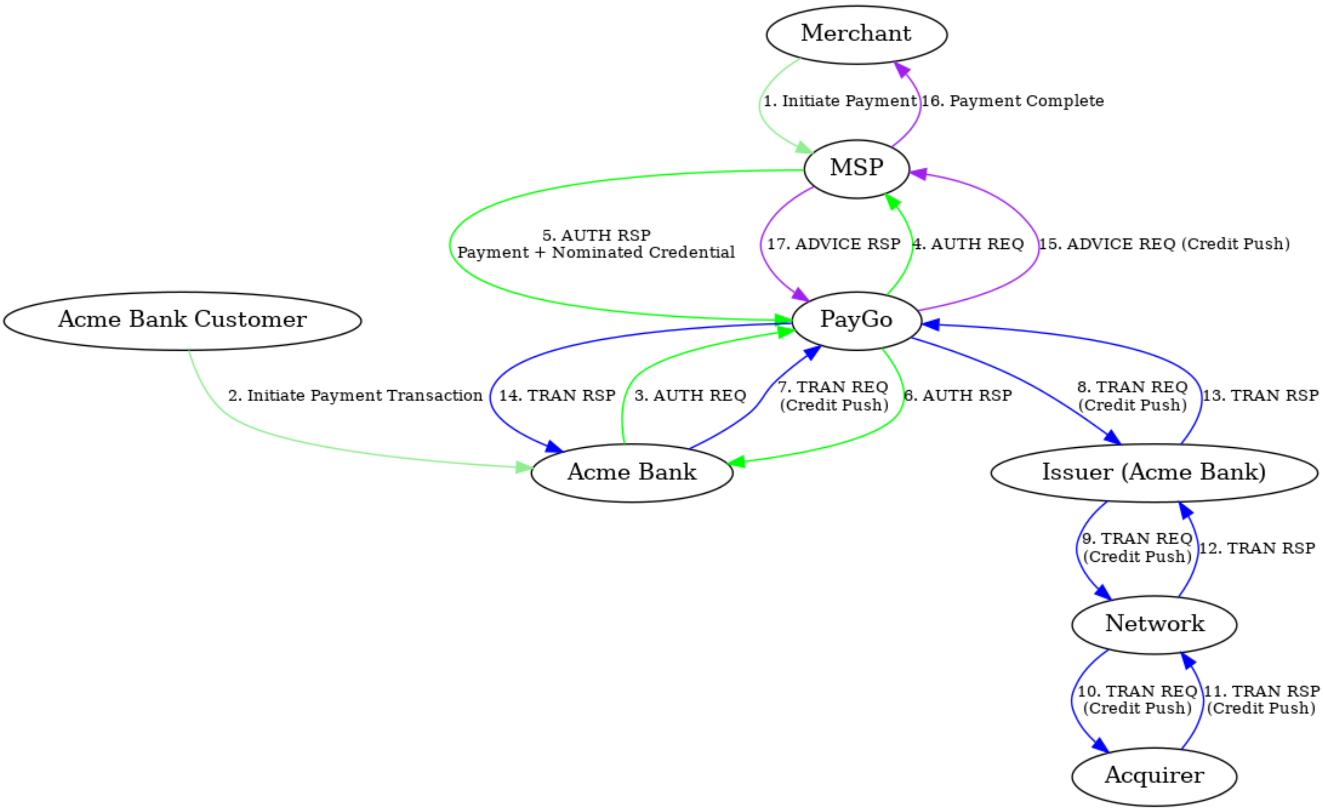
A credential is the way to identify a payment method, for example it may represent a bank account at a specific institution, or it may represent a token (a card) at a network, an acceptor at an acquirer, etc.

2.1.3. Push vs Pull Transaction

There are currently two methods of processing a transaction between financial institutions (or between payer and payee, customer and merchant, etc).

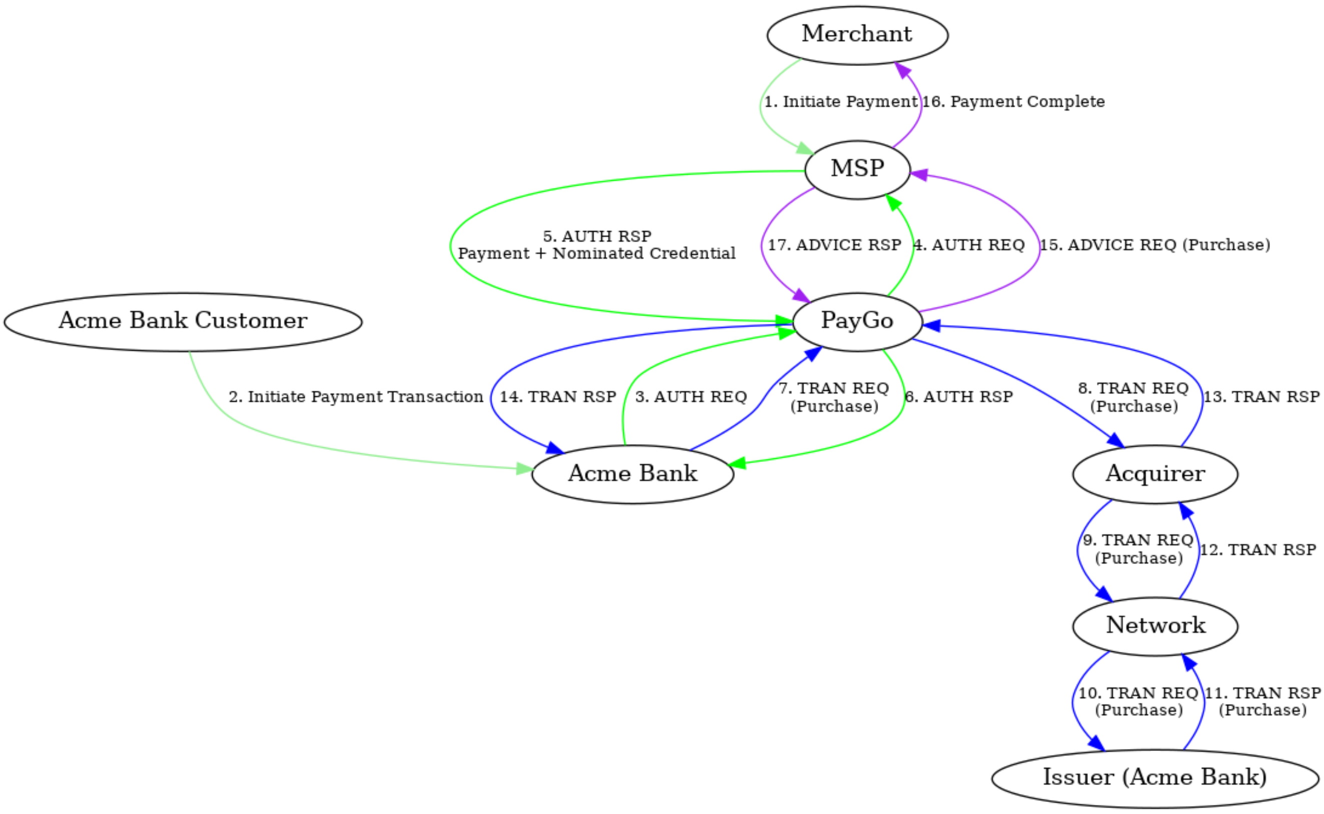
Push

A push transaction is where a transaction is originated at the customer/payer having debited the customer, and sent to the merchant/payee at the receiving institution (crediting the payee).



Pull

A pull transaction is where a transaction is originated at the merchant/payee, sent to an Acquirer who then onward forwards the transaction to the Issuer (customer/payer) where the debit occurs, on response the merchant is credited.



2.1.4. Point of Capture Initiator

PCI represents the point at which a code was captured and turned into a lookup, i.e. a mobile phone has entered into a PayGo Members mobile banking and entered the code that was displayed.

2.1.5. Transaction Originator

A TO creates a transaction, it is the first point at which at financial transaction is originated, typically this is the customer’s bank.

On receipt of a valid AUTH response, a TO is expected to construct a transaction that will be sent to PayGo DS.

Critically, a TO must act on the following information

A payment is not the same as transaction, a transaction is used to effect a payment.

2.1.6. Nominated Credential

This field indicates how the merchant / person can be paid, therefore, depending on the credential type, the financial transaction can be constructed in various ways.

Table 2. Credential Types

Type	Description	Action
ACCEPTOR	This indicates that this credential (merchant/person account) is overlayed as a cardAcceptorId & terminalId pair	Construct a transaction that has **cardAcceptorId** set to **nominatedCredential.additionalData.cardAcceptorId**, **terminalId** set to **nominatedCredential.additionalData.terminalId** **acquiringInstitutionId** set to **nominatedCredential.institutionId** usually **card** based though there may be exceptions (i.e. set **debitAccount**), set this based on availability of the Transaction Originator.

2.1.7. Requested Payment

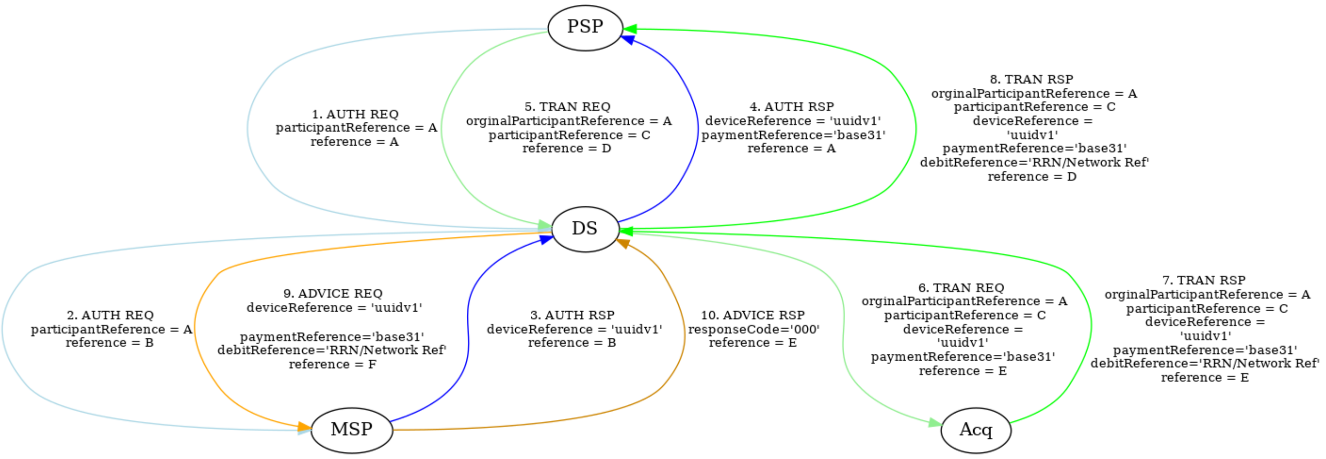
A requested payment, is a payment that has been created at the MSP, and now available to be paid. it indicates critical information, such as, amount, narration, currency, etc.

In the event that a AUTH response contains a requestedPayment, the TO must override the acceptance flow i.e. if requestedPayment.amount is set, then the user must not be requested to capture it, the same follows for narration. The initiator field *may* be shown to the user to indicate who/what initiated this payment, for example "Till No.3 - A. Another". The MSP is responsible for "payment initiation", and therefore must specify the expiry of the payment, i.e. what is the period of time that the payment is valid.

In the local market (ZWE), if the currency of the users selected payment method, does not match the requested currency, then the payment must be aborted, or a different payment method selected.

2.1.8. References

A `paymentReference` is provided by PayGo for a completed transaction, this is shared between the PSP, DS, and MSP, therefore, each payment can be tracked by this `paymentReference`.



2.1.9. Institution ID's

As a transaction transits the ecosystem, it must identify where it is coming from, who it is going to, who will it be forwarded too, etc.

Table 3. AUTH

Field	**Description**
`acquiringInstitutionId`	The institution that captured the transaction. Point of Capture Initiator
`destinationInstitutionId`	not set
`forwardingInstitutionId`	The prefix of the MSP.

Table 4. TRAN (Pull)

Field	Description
`acquiringInstitutionId`	The institution id (bin) of the institution that can settle the merchant.
`destinationInstitutionId`	not set
`forwardingInstitutionId`	The prefix of the MSP.

2.2. Protocol

2.2.1. HTTP Request Headers

Table 5. Headers

Header	Type	Format	Example	Description
X-Api-Key	String	VAR36 UUID	5c177bee-deeb-4273-9966-51359e47fc54	See link:API Key
Accept-Version	String	VAR255 vM.m.p (M - Major, m - minor, p - patch)	v1.0.0	API Version Information
Content-Type	String	VAR	application/json	Encoding information

2.2.2. HTTP Response Headers

Table 6. Headers

Header	Type	Format	Example	Description
X-Api-Key	String	VAR36 UUID	5c177bee-deeb-4273-9966-51359e47fc54	See link:API Key
Accept-Version	String	VAR255 vM.m.p (M - Major, m - minor, p - patch)	v1.0.0	API Version Information
Content-Type	String	VAR	application/json	Encoding information

2.2.3. Fields

Table 7. Fields

Field	Type	Format	Mandatory	Example	Description
acquiringInstitutionId	String	N.11	Y	123456	The institution who originated (acquired) the transaction and/or maintains the merchant.
additionalData	Complex		O	`{ "OBJECT_KEY": { "value": "foo" }, "ANOTHER_KEY": "BAR" }`	Additional variables

<table>
<tr><th>Field</th><th>Type</th><th>Format</th><th>Mandatory</th><th>Example</th><th>Description</th></tr>
<tr><td>amount</td><td>Number</td><td>D19.2</td><td>*O</td><td>12345.67</td><td>Transaction Amount</td></tr>
<tr><td>balances</td><td>Complex</td><td></td><td>O</td><td><pre>[
  {
    "balance": 997861.8,
    "balanceType":
"LEDGER",
    "currency": "USD"
  },
  {
    "balance": 997861.8,
    "balanceType":
"AVAILABLE",
    "currency": "USD"
  }
]</pre></td><td>Balances of debitAccount</td></tr>
<tr><td>card</td><td>Complex</td><td></td><td>O</td><td><pre>{
  "expiry": "2025-12=01",
  "pan":
"6058720040005994",
  "sequenceNumber": null,

"serviceRestrictionCode":
null,
  "track2": null,
  "pinData": null
}</pre></td><td>Card</td></tr>
<tr><td>cardAcceptorId</td><td>String</td><td>AN15</td><td>Y</td><td>123456789012345</td><td>Id of the card acceptor (usually merchant id)</td></tr>
<tr><td>cardAcceptorNameLocation</td><td>Complex</td><td></td><td>N</td><td><pre>{
"name": "ACME SHOP",
"address": "", "city":
"Harare", "region": "Af",
"countryCode": "ZW",
"phoneNumber":
"4459596222", "url":
"http:
//bit.ly/3443ccr3",
"emailAddress":
"merchant@acme.com" }
----</pre></td><td>Merchant Information</td></tr>
</table>

Field	Type	Format	Mandatory	Example	Description
channel	String	VAR255	Y	SMARTPHONE	Field to identify the platform on which this transaction originated
created	String	VAR255 ISO8601 2 Timestamp	Y	2021-01-19T14:06:34.223+02:00	Timestamp representing the creation of the transaction.
creditAccount	Complex		*O	{ "currency": "USD", "id": "0242310812", "product": null, "type": "00" }	Account to be credited / to account.
creditReference	String	VAR255	*O	000000003232	A reference from the system the performed the credit.
currencyCode	String	ISO4217-alpha3	Y	USD	Transaction Currency Code (of the '*amount*' field)
debitAccount	Complex		*O	{ "currency": "USD", "id": "0242310812", "product": null, "type": "00" } ----	Account to be debited, or queried if type is ENQUIRY, etc.
debitReference	String	VAR255	O	74e68e29-ae0d-4bf0-bf3c-5628aeb4e662	A reference from the system the peformed a debit.
destinationInstitutionId	String	N.11	O	654321	The destination institution used to process this transaction, (commomly used for routing and reporting purposes)
destinationMsisdn	String	N.20 ITU-T e.164	O	554545455454	The msisdn that was the beneficiary of thie transaction, common in transfer, payments, etc.

Field	Type	Format	Mandatory	Example	Description
deviceReference	String	VAR255	O	db7c708ccb43	A reference from the transaction acceptor (usually an RRN)
extendedType	String	VAR255	Y	P2P	Additional tag to identify this transaction (common to provide metainfo)
forwardingInstitutionId	String	N.11	O	999999	The institution that has forwarded this transaction, usually identifying a network or processor, however commonly used for ancialliary routing purposes.

transactionFees	Complex		O	`[`
				`{`
				`"type": "TRANSACTION_FEE",`
				`"amount": 1.50,`
				`"currency": "USD"`
				`},`
				`{`
				`"type": "IMTT_TAX",`
				`"amount": 1.00,`
				`"currency": "USD"`
				`}`
				`]`
					Fee’s to be charged for this transaction.

settlementFees	Complex		0	`[`
				`{`
				`"type": "TRANSACTION_FEE",`
				`"amount": 1.50,`
				`"currency": "USD"`
				`},`
				`{`
				`"type": "IMTT_TAX",`
				`"amount": 1.00,`
				`"currency": "USD"`
				`}`
				`]`
					Fee’s to charged for this transaction (usually specified in the response).

Field	Type	Format	Mandatory	Example	Description
issuingInstitutionId	String	N.11	O	111111	The issuer of the card / accounts related to this transaction
messageRepeats	Number	N.2	O	0	Indicates how many times this message has been re-transmitted.
messageType	String	VAR255	Y	REQUEST	Indicates the type of 'request'
msisdn	String	N.20 ITU-T e.164	O	4343545654	The mobile number of the initiator of this transaction (commonly used for notification purposes)
narration	String	VAR255	O	Pay you back for dinner	A description of this transactions purpose capured by the original initiator of the transaction.
network	String	VAR255	O	VODAFONE	The network on which this transaction was captured
traceId	String	VAR255	M	tRBGIzztumxbZOeYLDzXMl	A system id generated by the source system that correlates all subsequent activities for the purposes of tracing and troubleshooting.
originalCreated	String	VAR255 ISO8601 Timestamp	*O	2020-06-10T13:50:02.922+02:00	Time at which the original transaction was created (commonly used in ADVICE transactions)
originalParticipantReference	String	VAR255	*O	2959e6c1-0e90-476e-b614-4c2ced967366	
originalReference	String	VAR255	*O	5e790f84-4ffe-4b17-9541-709c99afd110	

Field	Type	Format	Mandatory	Example	Description
participantReference	String	VAR255	*O	500d4038-66b3-443e-911a-a8bfa95de23e	The reference generated by the participant (unique by participant)
payee	String	VAR255	O	A. ANOTHER	
payeeProduct	String	VAR255	O	DEFAULT	
paymentMethod	String	VAR255	O	ACCOUNT	The method used to debit the originator of this transaction.
reference	String	VAR36 UUIDv4	Y	2385d527-4fa3-486a-b743-5111229b63a3	Reference generated by the receiving system, intended to correlate the request and response.
responseCode	String	N3	*O	000	The status of this transaction.
responseDescription	String	VAR255	*O	APPROVED	
terminalId	String	AN8	Y	12345678	
paymentReference	String	VAR255	*O	TRBG-IZZT-UMXB-ZOEY	Link all transaction realted to a payment and shared with third parties to identify this payment.
type	String	VAR255	Y	CREDIT_PUSH	
upstreamResponseCode	String	VAR255	*O	00	
upstreamResponseDescription	String	VAR255	*O	APPROVED	

2.2.4. Message Types

Table 8. Message Types

Type	Description
ADVICE	An advice (must process) of a financial transaction.

REQUEST	A financial transaction request.
REVERSAL	A reversal of a financial transaction request.

2.2.5. Transaction Types

Table 9. Transaction Types

Type	Description
PURCHASE	A purchase transaction

2.2.6. Extended Types

Table 10. Extended Types

Type	Description
P2M	A Person to Merchant Transaction

2.2.7. AdditionalData

Represents a dictionary of Key Values, where the `Key` is a String, and the `Value` is an Object. This element is used to hold various metadata.

BridgeAdditionalDataDto

```
{
  "KEY": {
    "value": "foo"
  },
  "ANOTHER_KEY": "BAR"
}
```

2.2.8. Balances

BridgeBalancesDto

```
[
  {
    "balance": 997861.8,
    "balanceType": "LEDGER",
    "currency": "USD"
  },
  {
    "balance": 997861.8,
    "balanceType": "AVAILABLE",
    "currency": "USD"
  }
]
```

2.2.9. Card

BridgeCardDto

```
{
  "expiry": "2025-12-01",
  "pan": "6058720040005994",
  "sequenceNumber": null,
  "serviceRestrictionCode": null,
  "track2": null,
  "pinData": null
}
```

2.2.10. Account

BridgeAccountDto

```
{
  "currency": "USD",
  "id": "0242310812",
  "product": null,
  "type": "00"
}
```

2.2.11. Fee

BridgeFeeDto

```
{
    "type": "TRANSACTION_FEE",
    "amount": 1.50,
    "currency": "USD"
}
```

2.2.12. CardAcceptorNameLocation

BridgeCardAcceptorNameLocationDto

```
{
    "name": "ACME SHOP",
    "address": "",
    "city": "Harare",
    "region": "Af",
    "countryCode": "ZW",
    "phoneNumber": "4459596222",
    "url": "http: //bit.ly/3443ccr3",
    "emailAddress": "merchant@acme.com"
}
```

2.2.13. MinistatementData

BridgeStatementDataDto


```
[
  {
    "amount": 123.45,
    "currency": "ZWL",
    "destinationAccountId": "4000000011149649",
    "feeAmount": 0,
    "location": "Joe Blogs",
    "narration": "paying you back for dinner the other night",
    "reference": "TRBG-IZZT-UMXB-ZOEY",
    "sourceAccountId": "4000000011149649",
    "sourceAccountType": "00",
    "transactionDate": "2020-06-14T23:50:37.322+02:00",
    "transactionType": "27",
    "transactionTypeDesc": "Payment Credit (VISA Direct)"
  },
  {
    "amount": 123.45,
    "currency": "ZWL",
    "destinationAccountId": "0001234560",
    "feeAmount": 0,
    "location": "Acme Another",
    "narration": "paying you back for breakfast the other morning",
    "reference": "6HL2-V2G6-32CA-20M6",
    "sourceAccountId": "0001234560",
    "sourceAccountType": "00",
    "transactionDate": "2020-06-14T23:50:37.322+02:00",
    "transactionType": "27",
    "transactionTypeDesc": "Payment Credit (ZIPIT)"
  }
]
```


3. Roles

3.1. Financial Institution

An FI is the primary funding institution for all financial impact transactions that occur on the PayGo Network. MSP's must have a relationship with an FI to create a Credential - and therefore receive funds. PSP's must have a relationship (albeit the same institution in most cases) with an FI to originate authorized transactions into the PayGo network and thus permit onward settlement.

3.2. Payment Service Provider (PSP)

PSP's provide service to the customer, i.e. a Bank creating a platform to allow their customers access to the PayGo ecosystem. They are primarily responsible for "originating" a financial transaction, a Transaction Originator

A PSP requires a "sponsor/partnering" Financial Institution to operate.

3.2.1. Transaction Sets

Table 11. Transaction Sets

Txn Ref	Description	Message	Type	Extended	API Reference
1	PSP P2M PayGoID Query	AUTH	PURCHASE	MERCHANT_ALIAS	P2M - PayGoID / Merchant Code
2	PSP P2M PayGoID Tran	REQUEST	PURCHASE	P2M	P2M - PayGoID / Merchant Code

3.2.2. Transactions

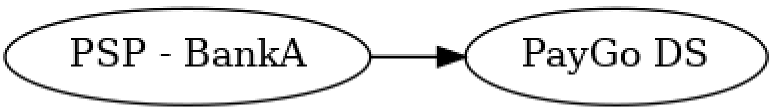
P2M - PayGoID / Merchant Code

Summary

Person to Merchant (P2M) transaction, to effect a payment between a payer (person) and a merchant (payee), using the payee’s PayGoID to retrieve the nominated credential.

The following examples represent the flow of transactions from the initiator to PayGo Directory Services (DS).

Examples



AUTH REQUEST (Lookup)

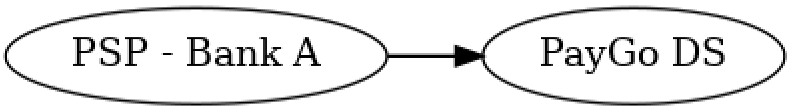

```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "entryType": "MANUAL",
    "pointOfInitiation": "QR_STATIC",
    "directoryQuery": {
      "alias": "40044",
      "type": "MERCHANT_ALIAS"
    },
    "complianceData": {
      "origin": {
        "contactNumber": "N/A",
        "emailAddress": "N/A",
        "firstName": "N/A",
        "lastName": "N/A",
```

```
        "nationalId": "N/A",
        "type": "PERSON"
      }
    }
  },
  "amount": 0,
  "card": {
    "expiry": "2025-12-30",
    "pan": "6058720040005994"
  },
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:43.594+02:00",
  "currencyCode": "ZWL",
  "extendedType": "MERCHANT_ALIAS",
  "forwardingInstitutionId": "400",
  "messageDirection": "REQUEST",
  "messageType": "AUTH",
  "msisdn": "263772726298",
  "network": "econet",
  "participantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
  "payee": "40044",
  "paymentMethod": "CARD",
  "reference": "ddc51524-c1c4-4305-967c-c2d9e7ece925",
  "terminalId": "MFS09001",
  "traceId": "u1ikdoKHnMtbZtGhyaVkSr",
  "type": "PURCHASE"
}
```

AUTH RESPONSE (Lookup)

```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "directoryInformation": {
      "name": "Acme Shop",
      "nominatedCredential": {
        "credential": "12341234",
        "currencyCode": "ZWL",
        "institutionId": "605872",
        "type": "ACCEPTOR"
      },
      "requestedPayment": {
        "amount": 5,
        "currencyCode": "ZWL",
        "narration": "bananas",
        "expirySeconds": 600,
        "initiator": "A. Another (Acme Shop)"
      },
      "sourceDirectoryName": "paygo_msp",
```

```
        "type": "MERCHANT"
      },
      "complianceData": {
        "origin": {
          "type": "PERSON",
          "firstName": "N/A",
          "lastName": "N/A",
          "nationalId": "N/A",
          "contactNumber": "N/A",
          "emailAddress": "N/A"
        }
      }
    },
    "amount": 0,
    "cardAcceptorId": "605872000009001",
    "channel": "USSD",
    "created": "2021-06-16T10:24:43.594+02:00",
    "currencyCode": "ZWL",
    "deviceReference": "3c096f9f-ce7c-11eb-8ffd-b1eed8df0d79",
    "extendedType": "MERCHANT_ALIAS",
    "forwardingInstitutionId": "400",
    "messageDirection": "RESPONSE",
    "messageType": "AUTH",
    "msisdn": "263772726298",
    "network": "econet",
    "participantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
    "payee": "40044",
    "paymentMethod": "CARD",
    "reference": "ddc51524-c1c4-4305-967c-c2d9e7ece925",
    "responseCode": "000",
    "responseDescription": "APPROVED",
    "terminalId": "MFS09001",
    "type": "PURCHASE"
}
```

TRAN REQUEST (Purchase)


```
{
    "acquiringInstitutionId": "605872",
    "additionalData": {
      "complianceData": {
        "origin": {
          "contactNumber": "N/A",
          "emailAddress": "N/A",
          "firstName": "N/A",
          "lastName": "N/A",
          "nationalId": "N/A",
```

```
          "type": "PERSON"
        }
      }
    },
    "amount": 5,
    "card": {
      "expiry": "2025-12-30",
      "pan": "6058720040005994"
    },
    "cardAcceptorId": "605872000009001",
    "channel": "USSD",
    "created": "2021-06-16T10:24:46.165+02:00",
    "creditAccount": {
      "id": "12341234"
    },
    "currencyCode": "ZWL",
    "extendedType": "P2M",
    "forwardingInstitutionId": "400",
    "messageDirection": "REQUEST",
    "messageType": "REQUEST",
    "msisdn": "263772726298",
    "narration": "bananas",
    "network": "econet",
    "originalParticipantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
    "originalReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
    "participantReference": "13081b4e-8463-4cac-afdd-037988efbcd6",
    "payee": "40044",
    "paymentMethod": "CARD",
    "reference": "67b72bda-d9ab-4086-8bae-25f599b28b8f",
    "terminalId": "MFS09001",
    "traceId": "dHJ22OJFpqldWriuItNbgo",
    "type": "PURCHASE"
  }
```

TRAN RESPONSE (Purchase)

```
  {
    "acquiringInstitutionId": "605872",
    "additionalData": {
      "complianceData": {
        "origin": {
          "contactNumber": "N/A",
          "emailAddress": "N/A",
          "firstName": "N/A",
          "lastName": "N/A",
          "nationalId": "N/A",
          "type": "PERSON"
        }
      }
    },
```

```
  "amount": 5,
  "card": {
    "expiry": "2025-12-30",
    "pan": "6058720040005994"
  },
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:46.475+02:00",
  "creditAccount": {
    "id": "12341234"
  },
  "currencyCode": "ZWL",
  "debitReference": "000000000000",
  "deviceReference": "3c096f9f-ce7c-11eb-8ffd-b1eed8df0d79",
  "extendedType": "P2M",
  "forwardingInstitutionId": "400",
  "messageDirection": "RESPONSE",
  "messageType": "REQUEST",
  "msisdn": "263772726298",
  "narration": "bananas",
  "network": "econet",
  "originalParticipantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
  "originalReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
  "participantReference": "13081b4e-8463-4cac-afdd-037988efbcd6",
  "payee": "40044",
  "paymentMethod": "CARD",
  "paymentReference": "EEWR4AS4MX62LSC1N40F54NYDM",
  "reference": "1756e334-eef8-4eee-a58a-e6b18e28fbd0",
  "responseCode": "000",
  "responseDescription": "Approved",
  "terminalId": "MFS09001",
  "traceId": "dHJ22OJFpqldWriuItNbgo",
  "type": "PURCHASE"
}
```

3.3. Merchant Service Provider (MSP)

MSP's provide service to a merchant (or numerous merchants), and are allocated a specific prefix by PayGo. The service is that of payment lookup and advice, such that the MSP's responsibility is to answer a request from PayGo where PayGo has captured a Merchant Code / Dynamic Code (both referred to as PayGoID's), This answer (if successful) must contain relevant information for the specific code, i.e. tying a code to a merchant, or to a specific merchants "pending payment" (in the case of dynamic). The relevant information is specified as an `authorizedCredentialId` which will be returned to the PSP as a Nominated Credential, a `merchantId` which will indicate which merchant this payment is for (see the PayGo Admin API for further information), and any other ancillary information complementary to the payment process (such as a Requested Payment).

An MSP is a completely autonomous concept, and provided that they honour the API call's, the method by which this is achieved is entirely at the discretion of the MSP.

> PayGo requires that the merchant and their credentials are registered with the Directory Service, if the credential and / or merchant returned are not registered, the payment will be declined, and an message sent to the MSP advising of the decline, the payment cannot proceed. See the PayGo Admin API for further information regarding this registration process.

3.3.1. Transaction Sets

Table 12. Transaction Sets

Txn Ref	Description	Message	Type	Extended	API Reference
1	MSP P2M PayGoID Query	AUTH	PURCHASE	MERCHANT_ALIAS	MSP P2M - PayGoID / Merchant Code
2	MSP Payment Notification	ADVICE	PURCHASE	P2M	MSP - Payment Notification

3.3.2. Transactions

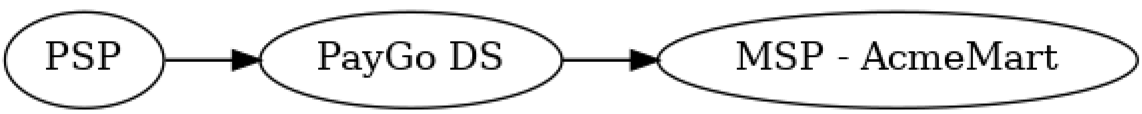
MSP P2M - PayGoID / Merchant Code

Summary

Person to Merchant (P2M) transaction, to effect a payment between a payer (person) and a merchant (payee), using the payee’s PayGoID to retrieve the nominated credential.

The following examples represent the flow of transactions from PayGo Directory Services (DS) to the MSP.

Examples



AUTH REQUEST (Lookup)

```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "directoryQuery": {
      "alias": "40044",
      "type": "MERCHANT_ALIAS"
    },
    "complianceData": {
      "origin": {
        "contactNumber": "N/A",
        "emailAddress": "N/A",
        "firstName": "N/A",
```

```
        "lastName": "N/A",
        "nationalId": "N/A",
        "type": "PERSON"
      }
    },
    "entryType": "MANUAL",
    "pointOfInitiation": "QR_STATIC"
  },
  "amount": 0,
  "card": {
    "expiry": "2025-12-30",
    "pan": "6058720040005994"
  },
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:43.594+02:00",
  "currencyCode": "ZWL",
  "extendedType": "MERCHANT_ALIAS",
  "forwardingInstitutionId": "400",
  "messageDirection": "REQUEST",
  "messageType": "AUTH",
  "msisdn": "263772726298",
  "network": "econet",
  "participantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
  "payee": "40044",
  "paymentMethod": "CARD",
  "reference": "ddc51524-c1c4-4305-967c-c2d9e7ece925",
  "terminalId": "MFS09001",
  "traceId": "u1ikdoKHnMtbZtGhyaVkSr",
  "type": "PURCHASE"
}
```

AUTH RESPONSE (Lookup)

```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "complianceData": {
      "origin": {
        "type": "PERSON",
        "firstName": "N/A",
        "lastName": "N/A",
        "nationalId": "N/A",
        "contactNumber": "N/A",
        "emailAddress": "N/A"
      }
    },
    "directoryService": {
      "merchantId": "efd59fb8-e850-47d1-ab1d-257e0fe0fcc0",
      "authorizedCredentialId": "0469aafe-9961-4c53-8bf5-b4be45ab8b07",
```

```
      "requestedPayment": {
        "amount": 5.00,
        "currencyCode": "ZWL",
        "narration": "bananas",
        "expirySeconds": 600,
        "initiator": "A. Another (Acme Shop)"
      }
    }
  },
  "amount": 0,
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:43.594+02:00",
  "currencyCode": "ZWL",
  "extendedType": "MERCHANT_ALIAS",
  "forwardingInstitutionId": "400",
  "messageType": "AUTH",
  "msisdn": "263772726298",
  "network": "econet",
  "participantReference": "db47acf4-1b4c-4bd5-b7a1-12eb9046c150",
  "payee": "40044",
  "paymentMethod": "CARD",
  "reference": "ddc51524-c1c4-4305-967c-c2d9e7ece925",
  "terminalId": "MFS09001",
  "type": "PURCHASE",
  "responseCode": "000",
  "responseDescription": "APPROVED",
  "deviceReference": "3c096f9f-ce7c-11eb-8ffd-b1eed8df0d79"
}
```


The `directoryService` object must contain a previously created Merchant / Authorized Credential Pair as this is what indicates to PayGo DS what `directoryInformation` (with nominated credential) object to send back to the PSP. see the PayGo Admin API for more information.

Table 13. Suggested Response Codes

Response Code	Description	Comment
000	Approved	(Expect credential and requestedPayment - i.e. directoryInformation)
001	Generic Error	failure to process payment due to non-technical error i.e. not exceptional.
003	Merchant Not Found	in the event that the code (PayGoId) is not found.
006	Error	indicates an error occurred (i.e. a known exception - (handled) has occurred and the payment cannot proceed)
096	System Malfunction	an error has occurred that is unhandled.

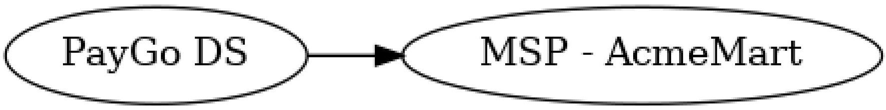
MSP - Payment Notification

Summary

A Merchant Service Provider (MSP) offers a payment service on behalf of merchants, it is not the immediate recipient of the financial transaction, a notification is sent to the MSP upon completion of the transaction (approved/declined) to advise the status of the financial transaction.

> This is an ADVICE class message, meaning that it will be repeated until acknowledged.

Examples



NOTIFICATION REQUEST (Advice)


```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "complianceData": {
      "origin": {
        "contactNumber": "N/A",
        "emailAddress": "N/A",
        "firstName": "N/A",
        "lastName": "N/A",
        "nationalId": "N/A",
        "type": "PERSON"
      }
    }
  },
  "amount": 5,
  "card": {
    "expiry": "2025-12-30",
    "pan": "6058720040005994"
  },
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:46.483+02:00",
  "creditAccount": {
    "id": "12341234"
  },
  "currencyCode": "ZWL",
  "debitReference": "000000000000",
  "deviceReference": "3c096f9f-ce7c-11eb-8ffd-b1eed8df0d79",
  "extendedType": "P2M",
  "forwardingInstitutionId": "400",
  "messageDirection": "REQUEST",
  "messageType": "ADVICE",
```

```
  "msisdn": "263772726298",
  "narration": "bananas",
  "network": "econet",
  "originalCreated": "2021-06-16T10:24:46.475+02:00",
  "originalParticipantReference": "13081b4e-8463-4cac-afdd-037988efbcd6",
  "originalReference": "1756e334-eef8-4eee-a58a-e6b18e28fbd0",
  "participantReference": "13081b4e-8463-4cac-afdd-037988efbcd6",
  "payee": "40044",
  "paymentMethod": "CARD",
  "paymentReference": "EEWR4AS4MX62LSC1N40F54NYDM",
  "reference": "1e098591-2227-4029-86f1-e320e73f991e",
  "responseCode": "000",
  "responseDescription": "Approved",
  "terminalId": "MFS09001",
  "traceId": "fquCGlvTecGOpzEmnkEIjs",
  "type": "PURCHASE"
}
```

NOTIFICATION RESPONSE (Advice)

```
{
  "acquiringInstitutionId": "605872",
  "additionalData": {
    "complianceData": {
      "origin": {
        "type": "PERSON",
        "firstName": "N/A",
        "lastName": "N/A",
        "nationalId": "N/A",
        "contactNumber": "N/A",
        "emailAddress": "N/A"
      }
    }
  },
  "amount": 5,
  "cardAcceptorId": "605872000009001",
  "channel": "USSD",
  "created": "2021-06-16T10:24:46.483+02:00",
  "currencyCode": "ZWL",
  "extendedType": "P2M",
  "forwardingInstitutionId": "400",
  "messageType": "ADVICE",
  "msisdn": "263772726298",
  "narration": "bananas",
  "network": "econet",
  "participantReference": "13081b4e-8463-4cac-afdd-037988efbcd6",
  "payee": "40044",
  "paymentMethod": "CARD",
  "reference": "1e098591-2227-4029-86f1-e320e73f991e",
  "terminalId": "MFS09001",
```

```
  "type": "PURCHASE",
  "responseCode": "000",
  "responseDescription": "APPROVED",
  "paymentReference": "EEWR4AS4MX62LSC1N40F54NYDM",
  "deviceReference": "3c096f9f-ce7c-11eb-8ffd-b1eed8df0d79"
}
```

3.3.3. Response Codes

Response Code	Description	Final
000	Approved, The payment may be completed successfully.	**yes**
001	Contact Issuer	**no**
002	Future	**no**
003	Invalid Merchant	**no**
004	Future	**no**
005	Do not honour	**no**
006	Error	**no**
007-008	Future	**no**
009	Request in progress	**no**
010	Approved Partial	**no**
011-012	Future	**no**
013	Invalid Amount	**no**
014	Invalid Card	**no**
015	Invalid Issuer	**no**
016-018	Future	**no**
019	Reenter Transaction	**no**
020	Invalid Response	**no**
021	No action taken	**no**
022-024	Future	**no**
025	Not Found	**no**
026	Duplicate	**no**
027	Incomplete	**no**
028-029	Future	**no**
030	Format Error	**no**
040	Function Not Support	**no**
041	Card on Hold	**no**
042	Invalid Account	**no**

Response Code	Description	Final
043-044	Future	**no**
045	Account Closed	**no**
046-047	Future	**no**
048	No Customer Record	**no**
049-050	Future	**no**
051	Insufficient Funds	**no**
052-053	Future	**no**
054	Expired Card	**no**
055	Invalid Pin	**no**
056	Future	**no**
057	Transaction not permitted	**no**
058-059	Future	**no**
060	Contact Acquirer	**no**
061	Exceeds Limit	**no**
062	Restricted Card	**no**
063	Security Violation	**no**
064-066	Future	**no**
067	Pick up card	**no**
068	Payment Expired, The payment did not complete within the expiry window.	**yes**
069-074	Future	**no**
075	Pin tries exceeded	**no**
076-090	Future	**no**
091	Timeout	**no**
092	Routing Error	**no**
093-094	Future	**no**
095	Reconciliation Error	**no**
096	System Malfunction	**no**
097-ZZZ	Future	**no**

4. Data Structures

Unless otherwise specified all fields are limited to VAR255 (ANS)

4.1. Directory Query

This object is used to provide information to the directory to execute a query.

Example


```
{
   "type": "PERSON_ALIAS",
   "alias": "80017"
}
```


Table 14. directoryQuery

Field	Description
type	Indicates the “Type” of query that is to be executed, this information may not necessarily be available in the directory, however it is informational and may be acted upon if available. Available Options: **PERSON_ALIAS, MERCHANT_ALIAS, PERSON_MSISDN, PERSON_EMAIL_ADDRESS**
alias	The information to be searched in the directory, specifically the 'alias' field, this may be a “Merchant Code”, “PayGoID”, "PayGoCode" as an example.

4.2. Directory Service

This object is the response to a successful information query from an MSP.

Example


```
{
  "merchantId": "a57b1a23-b379-4794-b708-293d51c9c735",
  "authorizedCredentialId": "039dc851-498c-4f74-b33e-60e5711e2459",
  "requestedPayment": {
    "amount": 5.00,
    "currencyCode": "ZWL",
    "narration": "bananas",
    "expirySeconds": 600,
    "initiator": "A. Another (Acme Shop)"
  }
}
```


4.3. Directory Information

This object is the response to a successful information query from PayGo.

Example

```
{
  "type": "PERSON",
  "alias": "80017",
  "name": "Acme Another",
  "contactNumber": "26377555444212",
  "emailAddress": "aanother@acmemail.com",
  "addressLine1": "123 Acme Rd",
  "addressLine2": "Acme Gardens",
  "city": "Acme",
  "country": "Acme",
  "requestedPayment": {
    "amount": 5.00,
    "currencyCode": "ZWL",
    "narration": "bananas",
    "expirySeconds": 600,
    "initiator": "A. Another (Acme Shop)"
  },
  "nominatedCredential": {
   "credentialType": "ACCEPTOR",
   "institutionId": "411111",
   "currencyCode": "ZWL",
   "additionalData": {
      "cardAcceptorId":"123456789012345",
      "cardAcceptorTerminalId":"12345678"
      }
    },
   "sourceDirectoryName": "ACME_BANK"
}
```

Table 15. directoryInformation

Field	Description
type	The type of entry Available Options: **PERSON, MERCHANT**
name	The display name of the entity
alias	The associated alias (primarily used for lookup)
contactNumber	The phone number of the entity (ITU-T e.164)
*emailAddress	The email address of the entity
addressLine1	The address of the entity
addressLine2	The address of the entity
city	The city in which the entity is located

Field	Description
country	The country in which the entity is located
requestedPayment	The payment that has been requested by the payee. [Optional - Required for dynamic payments.]
nominatedCredential	The credential associated with this directory entry
sourceDirectoryName	Indicates the directory where this information eventually originated.

4.4. Requested Payment

A payment request, if this object is set the transaction must comply to the values specified.

Example


```
{
   "amount": 123.45,
   "currencyCode": "ZWL",
   "narration": "Please pay me back for dinner the other night",
   "created": "2021-06-09T09:48:53.445+02:00",
   "expirySeconds": 600,
   "initiator": "A. Another (Acme Shop)"
}
```


Table 16. requestedPayment

Field	Description
amount	The amount in decimal (2 decimal place precision)
currencyCode	The currency of the requested amount, ISO4217 currency code (alpha3) e.g. USD
narration	A comment or short description of this payment request, e.g. "Please pay me back for dinner."
created	The time at which the payment was initiated at the MSP
expirySeconds	The length of time (seconds) from "creation" that this payment will be valid. i.e. this is the time permitted between the AUTH Response and the receipt of a TRAN Request, beyond this time that payment will be expired and an ADVICE sent to the MSP notifying of such action. The deviceReference is no longer valid and must be created anew to proceed with this payment. The maximum time permitted by PayGo (at the time of writing is 24 hours).
initiator	The individual or organization responsible for this request, e.g. "Acme Another" - a teller.

4.5. Nominated Credential

Example

```
{
   "credentialType": "BANK_ACCOUNT",
   "institutionId": "411111",
   "credential": "0001234560",
   "currencyCode": "ZWL",
   "additionalData": {
      "cardAcceptorId":"123456789012345",
      "cardAcceptorTerminalId":"12345678"
   }
}
```

Table 17. nominatedCredential

Field	Description
credentialType	The type of credential, this indicates to the origin the type of credential, and thus the available payment options available. Available Options: **BANK_ACCOUNT**, **ACCEPTOR**
institutionId	The generic id associated with this credential, SwiftCode or BIN, etc
credential	The identifying credential at the institution
currencyCode	The currency of the account associated with the credential (This is usefull to indicate to the payer that currency conversion may take place). ISO4217 currency code (alpha3) e.g. USD

4.6. Compliance Data

Example

```
{
  "origin": {
     ...
  },
  "destination": {
     ...
  }
}
```

Table 18. complianceData

Field	Description
origin	The KYC defining the originating entity of this transaction
destination	The KYC defining the destination entity of this transaction

Table 19. KYC

Field	Description
type	Defines the type of data contained in this object. Available Options: **PERSON, MERCHANT, CORPORATE**
name	A full name or a business name.
firstName	A Persons first name/s e.g. Acme A.
lastName	A Persons last name e.g. Another
nationalId	A Persons national identity number or identifying credential of similar function.
contactNumber	The primary phone number for this entity
addressLine1	First line of the entities address (Domicilium citandi)
addressLine2	Second line of the entities address (Domicilium citandi)
city	…
country	…
registrationNumber	An id that is recognizable with a governing body (for example a company registration nr with the registrar of companies)
taxIdNumber	The id (TIN) allocated to the entity by the revenue authority.
emailAddress	The email address that the entity wishes to make available for primary communications
url	A url related to the entity

5. Appendix

5.1. QR Code Specification

EMV® QR Code Specification for Payment Systems (EMV QRCPS) https://www.emvco.com/terms-of-use/?u=/wp-content/uploads/documents/EMVCo-Merchant-Presented-QR-Specification-v1.1.pdf

A publicly accessible EMVco QR (PayGo Specification) generator is available in the

Admin API, please see the document for further information. https://api.paygo.co.zw/admin/public/qr?shortCode=40010&narration=bananas&merchantName=My%20Shop&address=23%20Cookie%20Lane&amount=123

Reference - Data Object under the root of a QR Code (as per Table 3.6)

Table 20. MerchantAccountInformationReservedAdditional (Tag36)

Tag	Specification	Description
01	N.10	Version Tag i.e. 1
02	N.19 LUHN	This is the Short PayGoID suffixed with a Luhn Check Digit (based on the compressed value, i.e. negating consecutive zeroes) e.g. 40010 (not the long code i.e. 4000000000000010 - the luhn is correct foe the long code, not the short code , one must decompress the shortcode, to calculate a valid luhn)
03	VARCHAR.255	A short description of the payment, i.e. "Paying you back for lunch", or "INVOICE1234"

For the below example, the https://github.com/mvallim/emv-qrcode library was used.

Example Implementation (Java)

```
  private static MerchantAccountInformationTemplate
getMerchanAccountInformationPayGo(int version,String paygoId,

String shortDesc) {
        TagLengthString paygoVersion = new TagLengthString();
        paygoVersion.setTag("01");
        paygoVersion.setValue(version + "");

        TagLengthString paygoIdTag = new TagLengthString();
        paygoIdTag.setTag("02");
        paygoIdTag.setValue(paygoId);

        TagLengthString shortDescTag = new TagLengthString();
        shortDescTag.setTag("03");
        shortDescTag.setValue(shortDesc);

        MerchantAccountInformationReservedAdditional merchantAccountInformationValue =
new MerchantAccountInformationReservedAdditional();
        merchantAccountInformationValue.setGloballyUniqueIdentifier("com.paygo");
        merchantAccountInformationValue.addPaymentNetworkSpecific(paygoVersion);
        merchantAccountInformationValue.addPaymentNetworkSpecific(paygoIdTag);
        merchantAccountInformationValue.addPaymentNetworkSpecific(shortDescTag);

        return new MerchantAccountInformationTemplate("36",
```

```
merchantAccountInformationValue);
  }
```

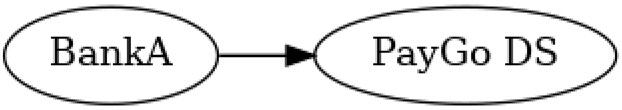
```
public static String generateDynamicQrCodeString(int version, String paygoId, String
shortDesc,
                                                     String countryCode, String mcc,
String city, String merchantName,
                                                     String transactionAmount, String
transactionCurrency){
        //paygo transaction details
        MerchantAccountInformationTemplate merchanAccountInformationReservedAdditional
=
                getMerchanAccountInformationPayGo(version,paygoId,shortDesc); // 36
PayGo Specification

        TagLengthString rFUforEMVCo = new TagLengthString("65", "00");

        MerchantPresentedMode merchantPresentMode = new MerchantPresentedMode();

        merchantPresentMode.setPayloadFormatIndicator("01"); //mandatory
        merchantPresentMode.setCountryCode(countryCode); //mandatory
        merchantPresentMode.setMerchantCategoryCode(mcc); //mandatory
        merchantPresentMode.setMerchantCity(city); //mandatory
        merchantPresentMode.setPointOfInitiationMethod("12"); //optional 11 static 12
dynamic
        merchantPresentMode.setMerchantName(merchantName); //mandatory

        merchantPresentMode.setTransactionAmount(transactionAmount);
        merchantPresentMode.setTransactionCurrency(transactionCurrency);


merchantPresentMode.addMerchantAccountInformation(merchanAccountInformationReservedAdd
itional);
        merchantPresentMode.addRFUforEMVCo(rFUforEMVCo);

        return  merchantPresentMode.toString();
```

The generated QR image must be compliant with the PayGo Certification Standard.

5.2. Examples

5.2.1. Purchase P2M Auth (Initiator to PayGo DS)

The following example is from the perspective of PayGo DS receiving a request to process a P2M Auth from Bank A to Bank B.



[PAYGO] Message To Remote [http://172.17.0.4:8477/vsuite/vintegration/bridge]


```
{
  "acquiringInstitutionId" : "111111",
  "additionalData" : {
    "entryType": "MANUAL",
    "pointOfInitiation": "QR_STATIC",
    "directoryQuery" : {
      "alias" : "20014",
      "type" : "MERCHANT_ALIAS"
    },
    "complianceData" : {
      "origin" : {
        "contactNumber" : "N/A",
        "emailAddress" : "N/A",
        "firstName" : "N/A",
        "lastName" : "N/A",
        "nationalId" : "N/A",
        "type" : "PERSON"
      }
    }
  },
  "cardAcceptorId" : "111111012345678",
  "channel" : "USSD",
  "created" : "2021-02-02T08:43:08.266+02:00",
  "currencyCode" : "USD",
  "debitAccount" : {
    "id" : "1234567890"
  },
  "destinationInstitutionId" : "200",
  "extendedType" : "MERCHANT_ALIAS",
  "messageType" : "AUTH",
  "participantReference" : "b1119174-1b70-47d0-98d5-6adcf2c29d07",
  "payee" : "20014",
  "reference" : "9dd81f76-f99c-4911-b92c-21a97d8cf03e",
  "terminalId" : "11111111",
  "traceId" : "ElZeH1mxEXRydIgKeYbxlM",
  "type" : "PURCHASE"
}
```