Currency conversion in Mojaloop

Workstream Progress Report

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Objectives

Overall objectives

- Work through Foreign Exchange Providers (FXPs)
  - This is a role, not an entity type
  - Must be a settling participant in a Mojaloop scheme
- Support two types of currency conversion: bulk and PvP
  - In bulk conversion:
    - The DFSP who requests it receives the funds in the converted currency.
    - It maintains a ledger in that currency, and settles in converted funds.
  - In PvP conversion:
    - Funds are converted only for a single payment
    - The conversion is not executed unless the transfer succeeds
    - Each DFSP only transacts and settles in its home currency.

Overall objectives

- Allow either the creditor or the debtor participant to perform the conversion
  - … or both, which allows use of a reference currency if appropriate
  - If the debtor participant performs the conversion, the transfer is denominated in the target currency.
  - If the creditor participant performs the conversion, the transfer is denominated in the source currency.
- Ensure that reservations are made against the correct accounts.

The new API

New endpoints (1)

- /services/FXP
  - Also used by the PISP API
  - Allows a participant to obtain a list of the participants in their scheme who offer a particular service

- /fxQuotes
  - Used by a DFSP to request agreement of terms for a currency conversion
  - Does not specify whether the conversion is bulk or PvP
  - FXP responds with a condition.

New endpoints (2)

- /fxTransfers
  - Used by a DFSP to request execution of a currency conversion
  - If the conversion is PvP, then:
    - The transaction ID of the payment itself is passed with the request.
    - The FXP will respond with the status RESERVED.
    - The switch will reserve funds against the correct accounts:
      - The debtor DFSP in the source currency
      - The FXP in the target currency
    - By responding in this way, the FXP resigns to the switch its ability to decide on the success or failure of the conversion
  - If not:
    - The FXP will respond with the status COMMITTED
    - Ledgers will be updated in the normal way

Changes to existing endpoints

- The PUT /parties response
- The POST /quotes message
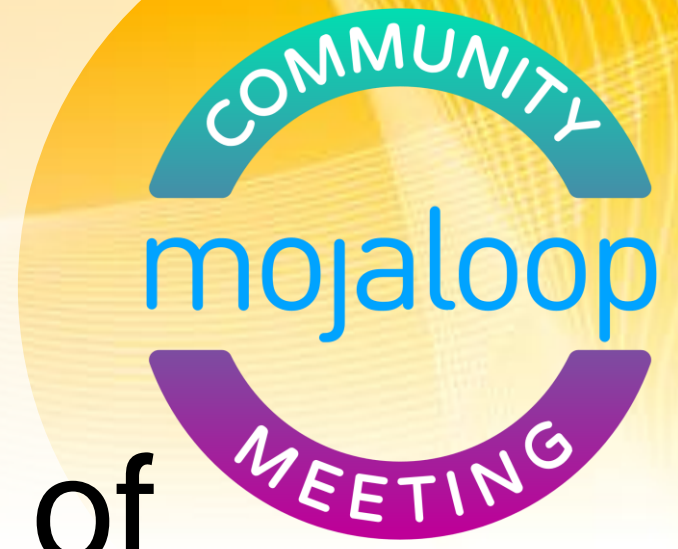- The Transaction object

The PUT /parties response

- A new data structure to enable the creditor DFSP to specify the currency (-ies) in which the beneficiary can receive funds.
- This will involve the addition of a new optional structure to the **party** object.

Changes to the POST /quotes request

- Add an optional field to allow the debtor DFSP to specify which of the parties should undertake currency conversion.
    - This will be an enumeration.

- Add one or more fields to allow the debtor DFSP to specify the dependencies associated with the transfer.
    - A dependent represents an associated action (in this case, a currency conversion) whose success or failure depends on the success or failure of the transfer itself.
    - It has two components:
        - The FSP ID of the intermediary whose obligations are being registered (in this case, the FXP)
        - The ILP condition for the intermediary operation.

Changes to the Transaction object

- The Converter field proposed in the POST /quotes message will be included in the Transaction object.

- The Dependents structure proposed in the POST /quotes message will be included in the Transaction object.

Changes to hub processing

Assumptions:

- Each phase of the transfer other than the transfer itself will have a dependent entry associated with the transfer execution request.

- The content of a dependent entry will be as follows:
    - The identifier of the credit party associated with the reservation – for instance, the FXP in a currency conversion reservation.
    - The condition which identifies the reservation.

- Conditions will be unique in the list of dependencies.

Core pattern

- We will perform liquidity checks and create reservations when individual requests to execute payment are initially received.

- These reservations will be created on the correct underlying accounts for the overall transfer.
  - A reservation in the source currency against the debtor party to the transfer.
  - A reservation in the target currency against the FXP.

- The stated parties to the transfer will be different from the correct underlying parties.

- The hub will deterministically transform stated parties into the correct parties.

- Obligations will be created based on the reservations.

Reservations

- A reservation is made when execution of a payment (or a currency conversion) is requested.
- It must be in a currency in which the debtor party holds an account.
  - … otherwise the liquidity check would be impossible
- So:
  - If the debtor party already holds an account in the currency of the request, reserve funds against the debtor party's account.
    - (This is the case where there is no currency conversion, or where the debit party is performing the conversion)
  - If this is a request to execute a currency conversion, perform the reservation against the credit participant named in the dependent transfer.
    - (The case where currency conversion is being undertaken PvP by the creditor party)
  - If this is a request to execute a transfer, then perform the reservation against the account of the participant named in the first dependent transfer
    - (The case where the debit party is performing a PvP currency conversion)

Converting reservations to obligations

- There will now be one (if there is no currency conversion) or two (if there is a currency conversion) reservations against the transfer.

- The dependency list can be recovered from the transaction object associated with the transfer ID.

- If there are no dependencies, then create an obligation between the account where the reservation was created and the analogous account (same currency, same ledger account type) for the participant identified in the transfer.

- Otherwise, traverse the list of dependencies.
  - If the reservation referred to by the dependency's condition is against the debtor party for the transfer, then it represents a currency conversion initiated by the debtor participant: create an obligation between the account where the reservation was created and the analogous account (same currency, same ledger account type) for the participant identified in the dependency list. The amount and currency of the obligation are the same as the reservation.
  - If the reservation referred to by the dependency's condition is against an FXP, then it represents a currency conversion initiated by the creditor participant: create an obligation between the account where the reservation was created and the analogous account (same currency, same ledger account type) for the credit party for the transfer. The amount and currency of the obligation are the same as the reservation.

Any questions?