mojaloop

Cross-network proposal update

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Agenda

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1. Mojaloop to Mojaloop transfers
2. Connections between Mojaloop and non-Mojaloop networks

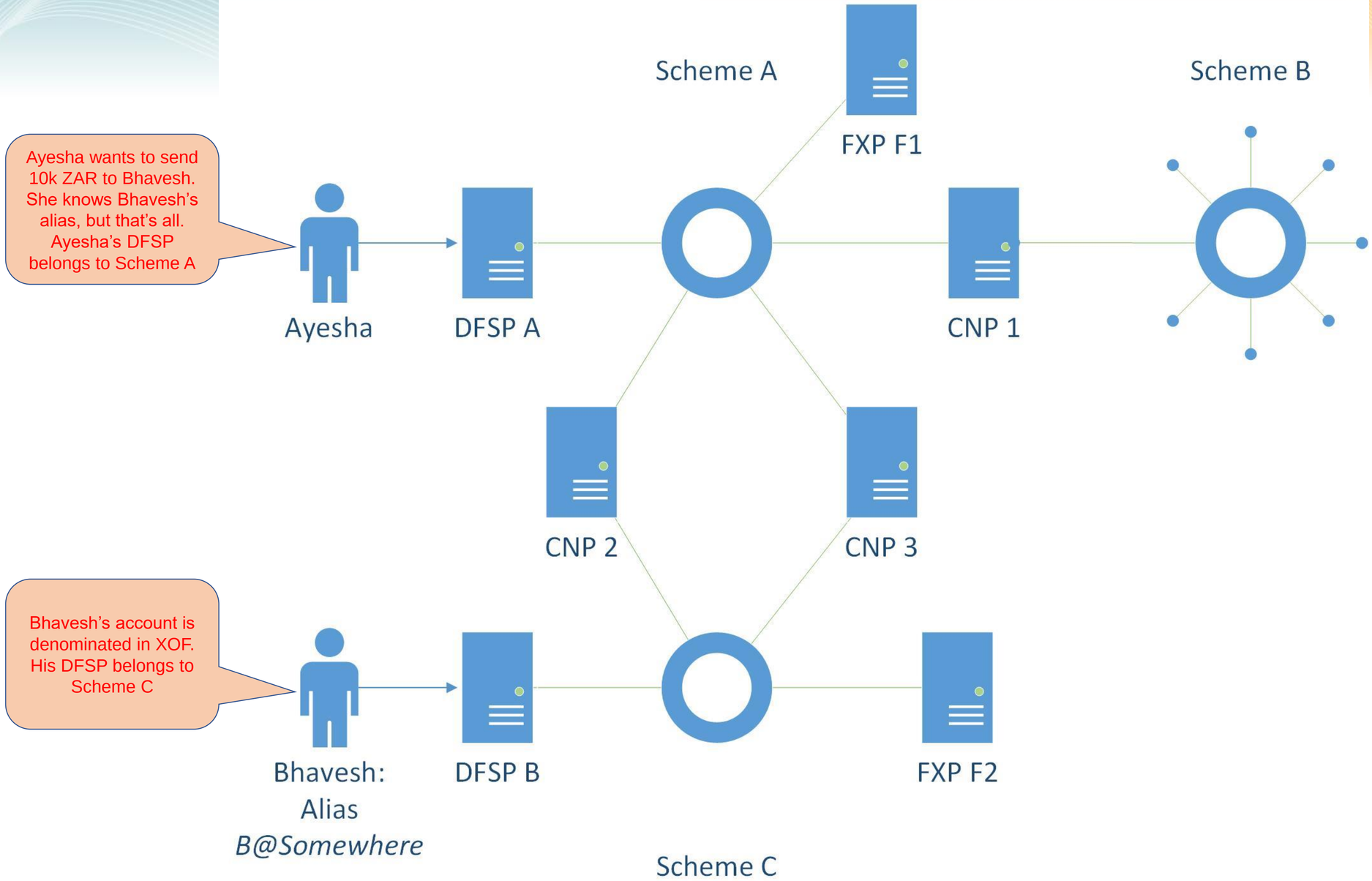
What use cases are we supporting?

- Mojaloop-to-Mojaloop connections
  - Where the payer DFSP is in one Mojaloop network and the payee DFSP is in another Mojaloop network
- Mojaloop-to-non-Mojaloop connections
  - Where the payer is in a Mojaloop network and the payee is in a non-Mojaloop network.
- Non-Mojaloop-to-Mojaloop connections
  - Where the payer is in a non-Mojaloop network and the payee is in a Mojaloop network.
- All use cases:
  - Include transfers where there are intermediate Mojaloop networks
  - Exclude transfers where there are intermediate non-Mojaloop networks

Mojaloop-to-Mojaloop transfers

Current state and proposals

An example cross-instance context



The result…

- There are three possible routes to Bhavesh's DFSP:
  - **CNP 2 -> FXP F2 -> DFSP B**
  - **FXP F1 -> CNP 2 -> DFSP B**
  - **CNP 3 -> FXP F2 -> DFSP B**

Moja-to-Moja issues

- Locating an off-network DFSP
- Plotting the route to an off-network DFSP
- Data issues
- Regulation

Locating an off-network DFSP

- Through the hoops or over the top?
- Through the hoops:
  - Since the routes must be traversed in any case, the discovery phase can be used to identify available routes
  - Multiple routes must be evaluated before it is known whether the identifier can be reached or not
- Over the top:
  - Immediate access to payee DFSPs in any network
  - How to manage identifier resolution

Plotting the route to an off-network DFSP

- Routes should be collated by the switch, not the receiving DFSP
- Routes can be plotted either in the discovery phase or the quotation phase
  - If we plot at the discovery phase, the payer DFSP can discard or select routes prior to the additional work of quotation.
  - If we plot at the quotation phase, all routes will be quoted in any case.
  - If we use over-the-top payee identification, routes will have to be plotted in the quotation phase

Data issues

- Registering for services
  - An extension to the overall Mojaloop definition
  - Where should this be defined?
- Describing a route
  - The routes collection
  - The route object
  - The participants collection
- Setting fees
- Describing regulatory requirements

A simple version of the routing information

```
"routes" [
    {
        "participantList": [
            "participant" {
                "fspId": "FXP F1",
                "transferCurrency": "XOF"
            },
            "participant" {
                "fspId": "CNP 2",
                "transferCurrency": "XOF"
            }
        ]
    },
    {
        "participantList": [
            "participant" {
                "fspId": "CNP 2"
            },
            "participant" {
                "fspId": "FXP F2",
                "transferCurrency": "XOF"
            }
        ]
    },
    {
        "participantList": [
            "participant" {
                "fspId": "CNP 3",
                "transferCurrency": "ZAR"
            },
            "participant" {
                "fspId": "FXP F2",
                "transferCurrency": "XOF"
            }
        ]
     }
]
```

Regulation

- What can scheme rules regulate in a multi-Moja context?
  - What sort of warranties can CNPs provide about the networks to which they connect?
- Interoperation:
  - Do we need a way for schemes to identify which other schemes they will or will not interoperate with?
  - Or should this decision be left to CNPs and solved by regulating them?
  - Should there be a cross-network regulation guide to which individual schemes can subscribe?

Mojaloop to non-Mojaloop transfers

Current state and proposals

Assumptions (1)

- When a transfer is eventually routed via a non-Mojaloop network, the payer DFSP’s scheme can know nothing about how or whether the transfer was successfully completed.
- Participants in a transfer which includes a Mojaloop network must be confident that the eventual payee DFSP has:
  - Received the funds defined by the transaction.
  - Acknowledged correct receipt of the funds and their transfer to the eventual payee account.
  - Confirmed immediate clearance of the funds to the payee account
- The eventual payee DFSP must be confident that it will be reimbursed for the funds that it has disbursed to the eventual payee account.

Assumptions (2)

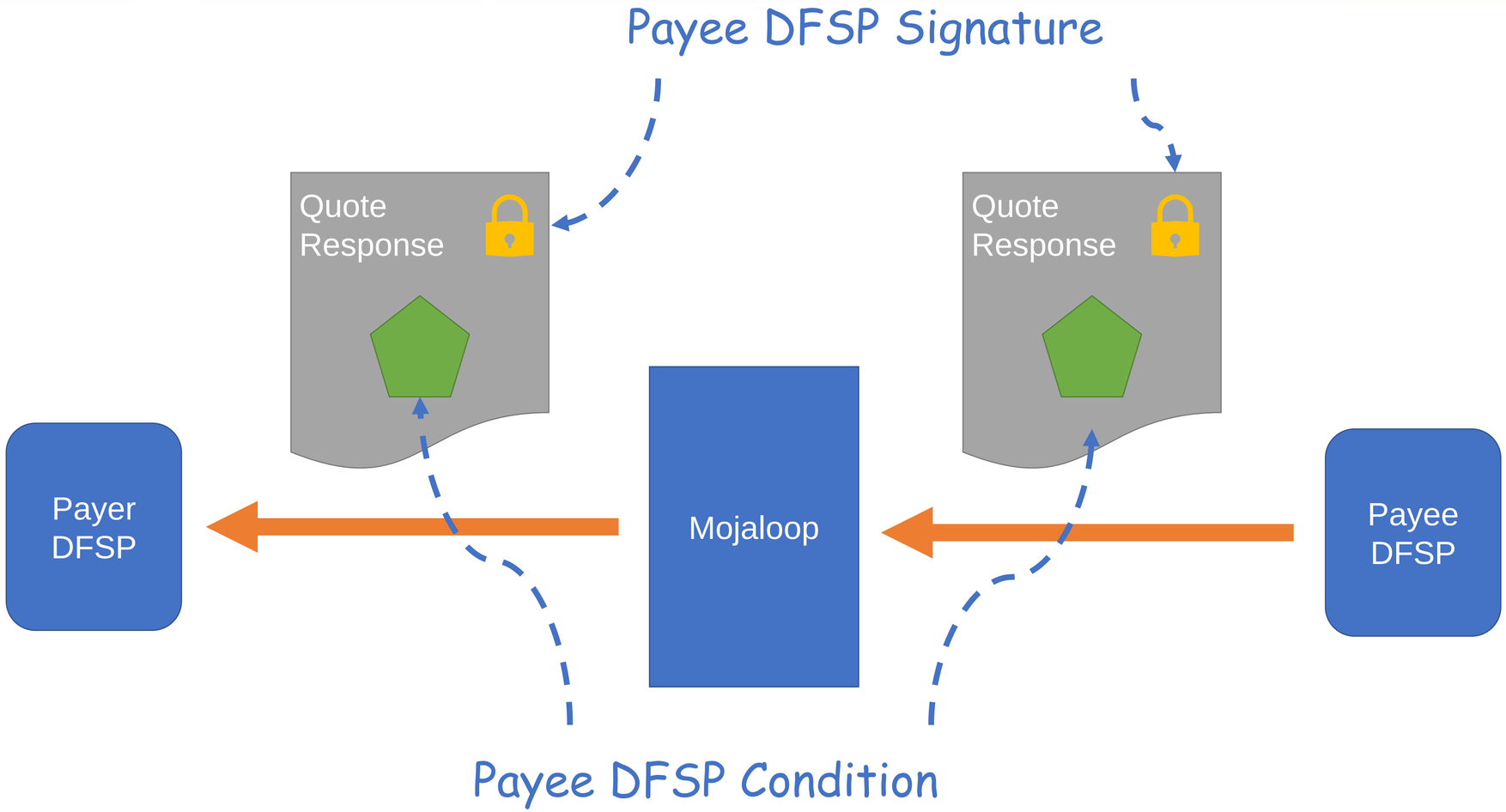
- Relationships between networks will be managed by a Cross-Network Provider (CNP).
- Relationships between Mojaloop and non-Mojaloop networks can be sufficiently described by:
  1. Describing the responsibilities of a CNP in particular use cases.
  2. Describing the regulatory requirements which apply to a CNP in particular use cases.

The existing Mojaloop authorisation model

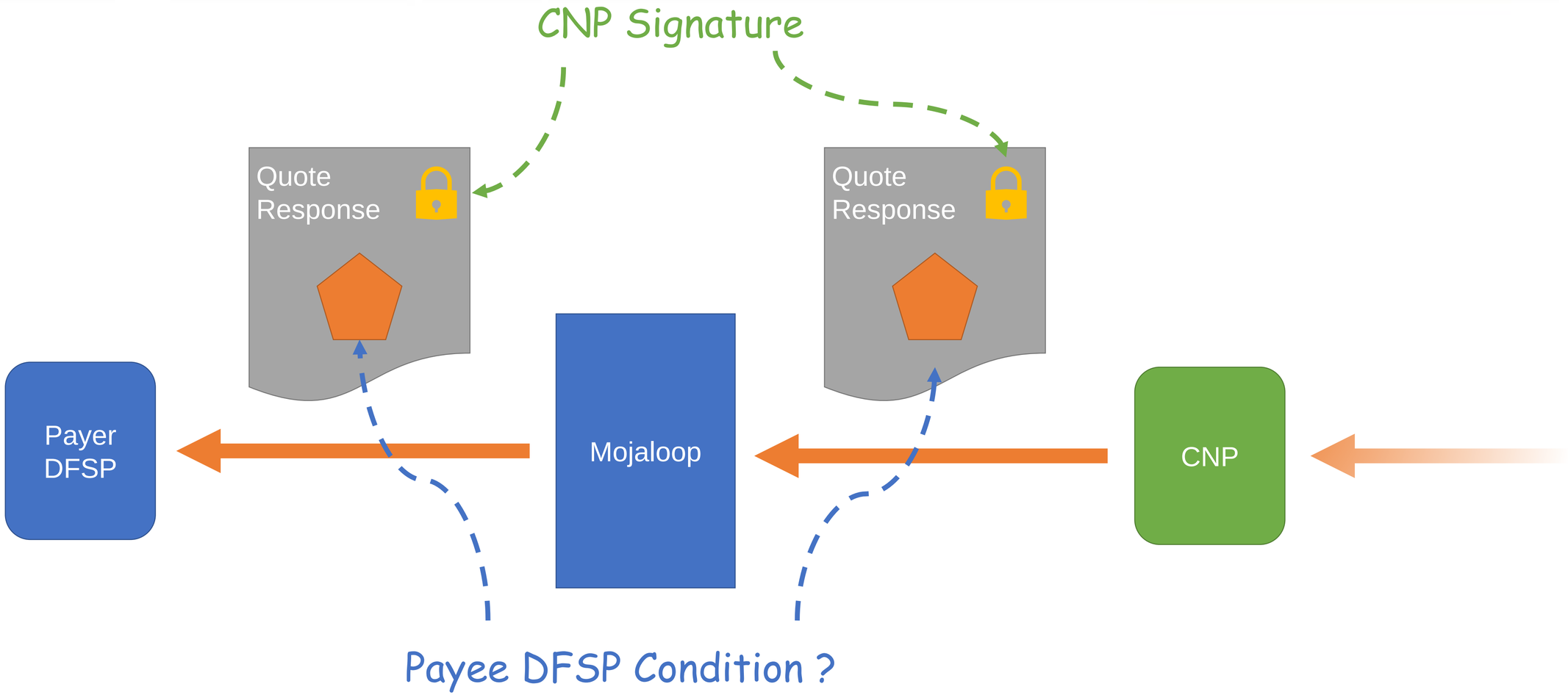
Based around two separate items of knowledge:

1. A pair of signatures where one (*the hash of the fulfilment*) is the result of applying a public one-way hash to the other (*the fulfilment*.)
   - The hash of the fulfilment is received by each participant as a preliminary to completion of the transfer;
   - the fulfilment is received by each participant after the transfer has been accepted by the payee DFSP, and allows each participant to verify independently that the response from the payee DFSP is indeed a response to the authorisation under which they originally reserved their funds.
2. A non-repudiation signature which allows all participants to be confident that the first signature really did come from the payee DFSP
   - In multi-hop transactions, our current design relies on a chain of trust from the payee DFSP to the payer DFSP.
   - This means that a participant receives a non-repudiation signature from the proximate participant in the chain, which contains an implicit guarantee that the chain of signatures can in fact be traced back to the payee DFSP.

Single-hop transfer (Quote Response)



Multi-hop transfer (Quote Response)



Focus of this section

- This section focuses on transfers where the payer DFSP is in a Mojaloop network and the payee DFSP is in a non-Mojaloop network.
- It does not consider:
  - Transfers where the payer DFSP is in a Mojaloop network and the payee DFSP is also in a Mojaloop network.
  - Transfers where the payer DFSP is in a non-Mojaloop network and the payee DFSP is in a Mojaloop network.
- So the CNP is receiving transfer (and quote) requests from the Mojaloop network and is routing them to the eventual beneficiary using the CNP's internal procedures, which are opaque to Mojaloop.

So the problem is:

- Where a CNP is acting as a gateway to a non-Mojaloop network, it needs to make a guarantee that it has actually performed the transfer that it undertook to perform.
- This may not be able to take the form of the ILP protocol that Mojaloop uses, if the non-Mojaloop network does not support it.
- What guarantee might a Mojaloop network accept instead?

Proposal (1)

- A CNP which provides a gateway to a non-Mojaloop network may only transfer to *approved accounts* in that network
- An approved account specifically excludes, for instance:
  1. OTC transfers
  2. Transfers to unregistered MSISDNs which can be completed on registration
- These requirements will form part of the scheme rules under whose terms the CNP is permitted to join the Mojaloop network

Proposal (2)

- When a CNP which provides a gateway to a non-Mojaloop network receives a request for a *quotation*, it must include in its acceptance of that request sufficient information to enable the Mojaloop scheme reliably to identify the account which will eventually be credited with the funds.
- This information forms a warrant on the part of the CNP that it will transfer the funds in accordance with the requirements of the Mojaloop scheme which it belongs to.
- Although it does not form an immediate guarantee of successful transfer to the eventual recipient, it is intended to provide evidence of a commitment made by the CNP that can be used as evidence in case a dispute needs to be resolved.
- The warrant is made to the scheme to which the CNP belongs, and to any other participants in the transfer. It says: *you may rely on the fact that I have transferred the funds as I promised to do*.
- The commitment made by the CNP in this way can be made a condition of participation in the scheme by the scheme rules.

Proposal (3)

Reliable identification of an account includes:

1. An approved scheme-independent identifier for the DFSP that owns that account.
2. An approved identifier type for the DFSP that owns the account
   - Scheme-independent identifier types might include:
     - BIC
     - LEI
3. An identifier for the transaction account which will be the eventual recipient of the funds. This identifier should be of an approved type.
4. An identifier type for the transaction account
   - Approved identifier types might include:
     - IBAN
     - MSISDN
     - Account number
5. A statement of the timetable within which the CNP warrants to clear the funds if they are transferred.

Proposal (4)

- The CNP will include this information in the Transaction object for the response to the request for quotation, and it will form part of the information from which the cryptographic fulfilment and condition are generated.
- This will ensure that the veracity of the information can be tested in case of a dispute.

Proposal (5)

The transfer process itself will not be different, except that:

- When the CNP returns the ILP fulfilment to the other participants in the transfer, this will be accepted by them as a warranty that the funds have been transferred to the recipient’s transaction account named in the quotation response in the time frame specified.
- This warranty will be enforced by the rules of the Mojaloop scheme to which the CNP belongs

Philosophical question:

- At present, our designs see a CNP as providing a specialised service, irrespective of whether or not it also provides standard DFSP services.
- Obviously, one of those services will be the ability to settle; but:
  - Settlement accounts themselves are outside the definitional scope of the Mojaloop API.
  - They are represented internally by ledger accounts inside the switch, but we have always been clear that a ledger does not directly record the state of a settlement account.
  - At present, it's possible to conceive that a CNP could settle via an account which did not belong to a DFSP.
  - This would not, of course, absolve the CNP from the necessity to provide liquidity cover for its transfers; but, again, that is formally independent of its status as a DFSP.
- So the question is: *do we want to insist that a CNP should also be a DFSP, or a customer of one?*

Philosophical question:

In favour:

- We will have a record of inbound and outbound transfers which is independent of the ledgers in the switch.
- The CNP’s funds will be regulated in the same way as those belonging to other deposit-holding institutions in that jurisdiction.

Philosophical question:

Against:

- As long as the CNP can meet its settlement obligations to the scheme and its warranty obligations to other participants, the scheme should not need it to undertake any other forms of guarantee.
- The requirements of a CNP are different from those of a DFSP, and it would restrict competition if CNPs were required to be, or be like, DFSPs.
- If the CNP were a customer of a DFSP rather than a DFSP itself,then recording at the DFSP account movements which were the consequence of transfers going through the CNP would add considerably to the complexity and, eventually, cost of the system. There is no obvious current mechanism for doing this.

Any questions?