

Functionality [To be further discussed]

The IOU application is basically a ledger that is fed with 'receipts' of value transfer transactions that took place in the PIVT application. The IOU application has the following functionality:

- Create token transactions between two parties (i.e. pension funds)
- Net all transactions per party periodically
- Present the outcome of the netting in a human readable way
- Reset after netting

Sequence Diagram

The figure below depicts the message flow between the PIVT and the IOU applications. The messages between the participant, PIVT and the Pension Funds are informational only and not relevant to this specification.

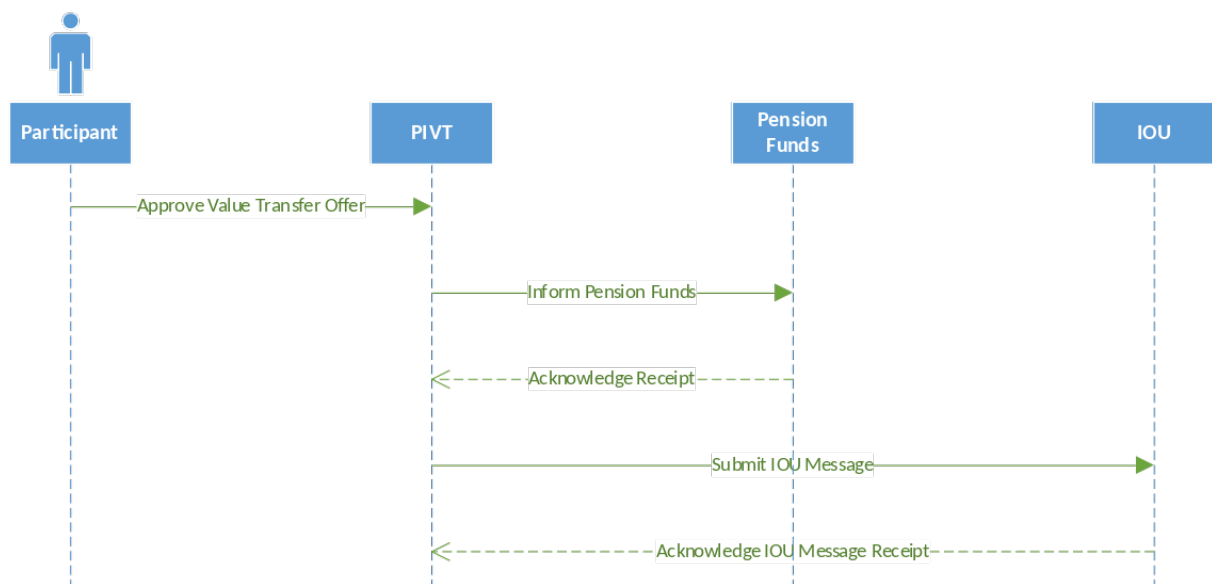


Figure 1: Sequence Diagram

API

The API used for interfacing between the PIVT and IOU applications is hosted by the IOU application and called by the PIVT application. The API is a RESTful API which consists of a single resource called **iou**. Data is formatted in JSON. The API contains the following information:

Request:

- Header:
 - Message date and time
 - API version
 - Correlation ID
 - Random string to enable tracing a transaction across systems
- Body:
 - Value transfer acceptance date and time
 - Date and time on which both funds have successfully received the value transfer offer as accepted by the participant
 - Value transfer ID
 - Unique identification of a value transfer
 - Transferring fund code
 - Unique code of the transferring pension fund
 - Receiving fund code
 - Unique code of the receiving pension fund
 - Value transfer amount
 - The total amount to be transferred between two funds

Response:

- Header:
 - Message date and time
 - API version
 - Correlation ID
 - Random string to enable tracing a transaction across systems as present in the request message
- Body
 - Response code
 - 202
 - 400
 - 401
 - 404
 - ...

The technical specification can be found in Appendix A.

Security

The API is security by way of using HTTPS in combination with client id and secret.

Appendix A

The technical specification of the API can be found below in OpenAPI YAML. All details can be found in the attached ZIP file.



C96F64E3.zip

```
openapi: 3.0.2
info:
  title: IOU
  version: 1.0.0
  contact:
    name: To be determined
    url: tbd
    email: to-be-determined@pivt.nl
  description: These api's are offered by IOU.
components:
  securitySchemes:
    ApiKeyAuth:
      type: apiKey
      in: header
      name: X-API-KEY
  schemas:
    valueTransfer:
      description: The details of an accepted value transfer.
      type: object
      properties:
        acceptanceDate:
          description: Date that the participant accepted the value
          transfer (yyyy-MM-dd)
          type: string
          format: date
          example: 2019-11-22
        valueTransferId:
          description: A unique id for the value transfer.
          type: string
          pattern: "[A-Fa-f0-9]{64}"
          example:
            BD53BCA3FF65221D077CDCAD0A0FEEA64D0BFE73AFC9FDB8EC139F928534514B
        transferringFundCode:
          description: The PUV code of the transferring fund.
          type: string
          pattern: U[0-9]{4}
          example: U0202
        receivingFundCode:
          description: The PUV code of the receiving fund.
          type: string
          pattern: U[0-9]{4}
          example: U0202
        amount:
          description: The amount of money which is going to be
          transferred.
          type: number
```

```

    format: double
    minimum: 0
    maximum: 1000000000
    multipleOf: 0.01
    example: 1234567.15
  required:
    - acceptanceDate
    - valueTransferId
    - transferringFundCode
    - receivingFundCode
    - amount
  pong:
    description: Returns pong.
    type: object
    properties:
      message:
        description: message containing pong, to acknowledge
        everything works.
        type: string
        enum:
          - pong
        example: pong
  error:
    title: Error
    type: object
    properties:
      message:
        description: The error message.
        type: string
        example: An error has occurred.
      code:
        description: The http status code.
        type: integer
        minimum: 100
        maximum: 600
        multipleOf: 1
        example: 500
    required:
      - message
      - code
  responses:
    badRequest:
      description: Bad Request
      headers:
        X-GENERATED-DATETIME:
          description: The current date and time of the response.
          This can be used to find
          caching issues.
          required: true
          schema:
            type: string
            format: date-time
            example: 2019-12-22T14:22:11Z
        X-IMPLEMENTED-API-VERSION:
          description: The versionnumber of the implemented API
          version.

```

```
    required: true
    schema:
      type: string
      example: 1.0.2
  X-CORRELATION-ID:
    description: The correlation id that is unique for this
transaction. It can be
      used to track transactions through systems.
    required: true
    schema:
      type: string
      example: 0c480378-b5fe-4b18-afad-be206746759c
  content:
    application/json:
      schema:
        $ref: "#/components/schemas/error"
      example:
        message: "Bad Request: The server cannot or will not
process the request
        due to something that is perceived to be a client
error"
        code: 400
  unauthorized:
    description: No authorization
    headers:
      X-GENERATED-DATETIME:
        description: The current date and time of the response.
This can be used to find
        caching issues.
        required: true
        schema:
          type: string
          format: date-time
          example: 2019-12-22T14:22:11Z
      X-IMPLEMENTED-API-VERSION:
        description: The versionnumber of the implemented API
version.
        required: true
        schema:
          type: string
          example: 1.0.2
      X-CORRELATION-ID:
        description: The correlation id that is unique for this
transaction. It can be
        used to track transactions through systems.
        required: true
        schema:
          type: string
          example: 0c480378-b5fe-4b18-afad-be206746759c
    content:
      application/json:
        schema:
          $ref: "#/components/schemas/error"
        example:
          message: "Unauthorized: API key is missing or invalid"
          code: 401
```

forbidden:
description: Access token does not have the required scope
headers:
X-GENERATED-DATETIME:
description: The current date and time of the response.
This can be used to find
caching issues.
required: true
schema:
type: string
format: date-time
example: 2019-12-22T14:22:11Z
X-IMPLEMENTED-API-VERSION:
description: The versionnumber of the implemented API
version.
required: true
schema:
type: string
example: 1.0.2
X-CORRELATION-ID:
description: The correlation id that is unique for this
transaction. It can be
used to track transactions through systems.
required: true
schema:
type: string
example: 0c480378-b5fe-4b18-afad-be206746759c
content:
application/json:
schema:
\$ref: "#/components/schemas/error"
example:
message: Forbidden. API key is incorrrect.
code: 403
notFound:
description: The resource can't be found.
headers:
X-GENERATED-DATETIME:
description: The current date and time of the response.
This can be used to find
caching issues.
required: true
schema:
type: string
format: date-time
example: 2019-12-22T14:22:11Z
X-IMPLEMENTED-API-VERSION:
description: The versionnumber of the implemented API
version.
required: true
schema:
type: string
example: 1.0.2
X-CORRELATION-ID:
description: The correlation id that is unique for this
transaction. It can be


```

        used to track transactions through systems.
        required: true
        schema:
            type: string
            example: 0c480378-b5fe-4b18-afad-be206746759c
    content:
        application/json:
            schema:
                $ref: "#/components/schemas/error"
            example:
                message: "Not Found: The resource can't be found."
                code: 404
    internalServerError:
        description: Internal Server Error
        headers:
            X-GENERATED-DATETIME:
                description: The current date and time of the response.
                This can be used to find
                caching issues.
                required: true
                schema:
                    type: string
                    format: date-time
                    example: 2019-12-22T14:22:11Z
            X-IMPLEMENTED-API-VERSION:
                description: The versionnumber of the implemented API
                version.
                required: true
                schema:
                    type: string
                    example: 1.0.2
            X-CORRELATION-ID:
                description: The correlation id that is unique for this
                transaction. It can be
                used to track transactions through systems.
                required: true
                schema:
                    type: string
                    example: 0c480378-b5fe-4b18-afad-be206746759c
        content:
            application/json:
                schema:
                    $ref: "#/components/schemas/error"
                example:
                    message: "Internal Server Error: The server encountered
                    an unexpected
                    condition that prevented it from fulfilling the
                    request."
                    code: 500
    badGateway:
        description: Bad Gateway
        headers:
            X-GENERATED-DATETIME:
                description: The current date and time of the response.
                This can be used to find
                caching issues.

```

```

    required: true
    schema:
      type: string
      format: date-time
      example: 2019-12-22T14:22:11Z
  X-IMPLEMENTED-API-VERSION:
    description: The versionnumber of the implemented API
version.
    required: true
    schema:
      type: string
      example: 1.0.2
  X-CORRELATION-ID:
    description: The correlation id that is unique for this
transaction. It can be
      used to track transactions through systems.
    required: true
    schema:
      type: string
      example: 0c480378-b5fe-4b18-afad-be206746759c
  content:
    application/json:
      schema:
        $ref: "#/components/schemas/error"
      example:
        message: "Bad Gateway: The server, while acting as a
gateway or proxy,
          received an invalid response from an inbound server it
accessed
          while attempting to fulfill the request."
        code: 502
  serviceUnavailable:
    description: Service Unavailable
    headers:
      X-GENERATED-DATETIME:
        description: The current date and time of the response.
This can be used to find
          caching issues.
        required: true
        schema:
          type: string
          format: date-time
          example: 2019-12-22T14:22:11Z
      X-IMPLEMENTED-API-VERSION:
        description: The versionnumber of the implemented API
version.
        required: true
        schema:
          type: string
          example: 1.0.2
      X-CORRELATION-ID:
        description: The correlation id that is unique for this
transaction. It can be
          used to track transactions through systems.
        required: true
        schema:

```

```

        type: string
        example: 0c480378-b5fe-4b18-afad-be206746759c
    content:
        application/json:
            schema:
                $ref: "#/components/schemas/error"
            example:
                message: "Service Unavailable: The server is currently
unable to handle the
                request due to a temporary overload or scheduled
maintenance,
                which will likely be alleviated after some delay."
                code: 503
    tags:
        - name: IOU
          description: API's from the IOU service
    paths:
        /v1/valuetransfers:
            post:
                operationId: newValueTransfer
                description: A participant accepted a value transfer.
                security:
                    - ApiKeyAuth: []
                tags:
                    - IOU
                parameters:
                    - name: X-IMPLEMENTED-API-VERSION
                      in: header
                      required: true
                      description: The versionnumber of the implemented API
version.
                schema:
                    type: string
                    example: 1.0.2
            requestBody:
                description: The details of the value transfer.
                content:
                    application/json:
                        schema:
                            $ref: "#/components/schemas/valueTransfer"
            responses:
                "202":
                    description: Het request is geaccepteerd voor verdere
verwerking, maar is nog
                    niet compleet.
                    headers:
                        X-GENERATED-DATETIME:
                            description: The current date and time of the
response. This can be used to
                            find caching issues.
                            required: true
                            schema:
                                type: string
                                format: date-time
                                example: 2019-12-22T14:22:11Z
                        X-IMPLEMENTED-API-VERSION:

```

```

        description: The versionnumber of the implemented API
version.
        required: true
        schema:
            type: string
            example: 1.0.2
        X-CORRELATION-ID:
        description: The correlation id that is unique for
this transaction. It can
            be used to track transactions through systems.
        required: true
        schema:
            type: string
            example: 0c480378-b5fe-4b18-afad-be206746759c
    "400":
        $ref: "#/components/responses/badRequest"
    "401":
        $ref: "#/components/responses/unauthorized"
    "403":
        $ref: "#/components/responses/forbidden"
    "404":
        $ref: "#/components/responses/notFound"
    "500":
        $ref: "#/components/responses/internalServerError"
    "502":
        $ref: "#/components/responses/badGateway"
    "503":
        $ref: "#/components/responses/serviceUnavailable"
/v1/ping:
    get:
        operationId: ping
        description: Ping can be used to monitor the api.
        security:
            - ApiKeyAuth: []
        tags:
            - IOU
        parameters:
            - name: X-IMPLEMENTED-API-VERSION
              in: header
              required: true
              description: The versionnumber of the implemented API
version.
            schema:
                type: string
                example: 1.0.2
            - name: X-CORRELATION-ID
              in: header
              required: true
              description: The correlation id that is unique for this
transaction. It can be
              used to track transactions through systems.
            schema:
                type: string
                example: 0c480378-b5fe-4b18-afad-be206746759c
        responses:
            "200":

```

description: The metainformation which can be used to determine the state if the api.

headers:

X-GENERATED-DATETIME:

description: The current date and time of the response. This can be used to find caching issues.

required: true

schema:

type: string

format: date-time

example: 2019-12-22T14:22:11Z

X-IMPLEMENTED-API-VERSION:

description: The versionnumber of the implemented API version.

required: true

schema:

type: string

example: 1.0.2

X-CORRELATION-ID:

description: The correlation id that is unique for this transaction. It can be used to track transactions through systems.

required: true

schema:

type: string

example: 0c480378-b5fe-4b18-afad-be206746759c

content:

application/json:

schema:

\$ref: "#/components/schemas/pong"

"400":

\$ref: "#/components/responses/badRequest"

"404":

\$ref: "#/components/responses/notFound"

"500":

\$ref: "#/components/responses/internalServerError"

"502":

\$ref: "#/components/responses/badGateway"

"503":

\$ref: "#/components/responses/serviceUnavailable"