Attn.:	Allevo
From:	Denisa Dinca
Subject:	FinTPc - API - architecture

Software Architecture
Project: TOSS
Release: FinTPc - API
Version: 1.0

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Cod MySMIS: 115724, Nr. Contract Finanțare: 101/16.08.2017

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Contents

1 Introduction 4

1.1 Intended audience 5

2 Architecture 6

2.1 Logical component architecture 7

2.2 Component interaction model 18

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Version	Date	Short description	Author
1.0	2019, September, 7th	Chapter 1	Mihai Guiman
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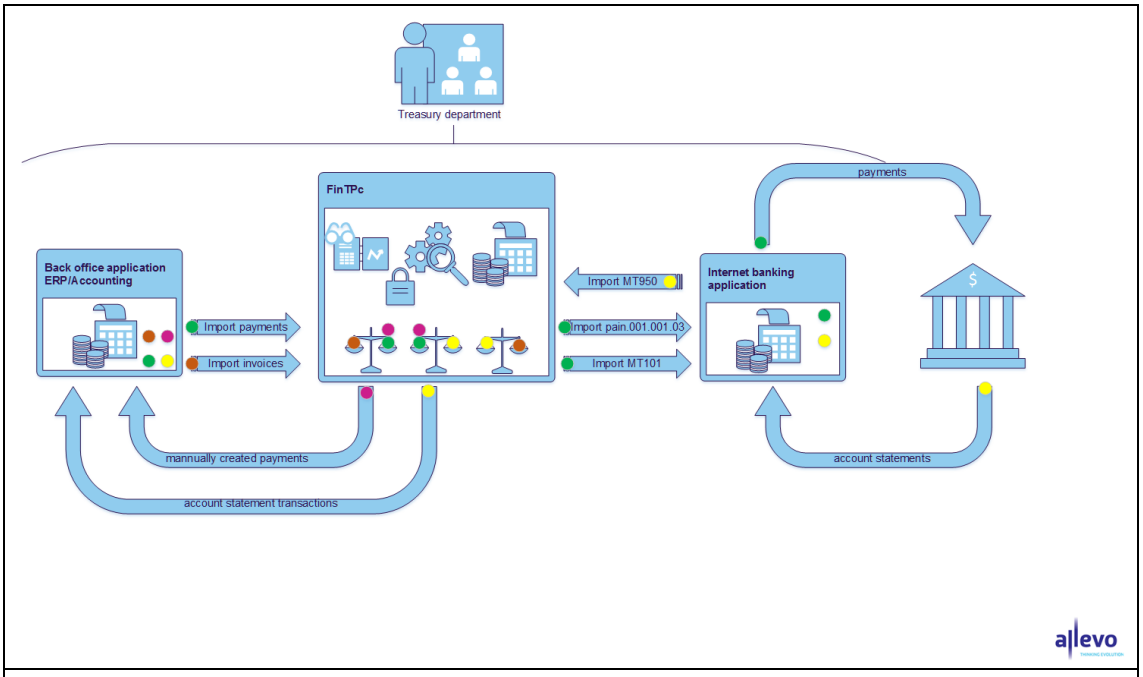
1 Introduction

This product is a feature of **FinTPc** which ensures the connection between the corporation and their corresponding banks via API-REST in compliance with the Berlin Group Next Gen standard, endorsed by the Romanian banking community as well as by most of the EU countries. This feature has the following functionalities:

- The connection between the interfaces through Open Banking mechanisms using the authentication by means of the OAuth2 security procedure. Additionally, by using this application, it is possible to set up the API interfaces exposed by the banking infrastructure in order to process financial transactions;
- Accessing the internal accounts in order to obtain additional information such as checking the balance and details related to the transactions
- Payments to suppliers from one of the bank accounts administrated in a centralized manner in FinTPc as well as the transfers between internal accounts. Accordingly, various information may be retrieved such as: transaction status and its related fees
- Generating statistical outputs and reports real-time based on data retrieved through API calls, providing an overall picture of its financial position. In turn, this provides the possibility to efficiently administrate the current liquidity (cash management reports) for medium and long terms.



FinTPc::business overview

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1.1 Intended audience

Architects

Developers

Testers

Implementers

Sales and Marketing

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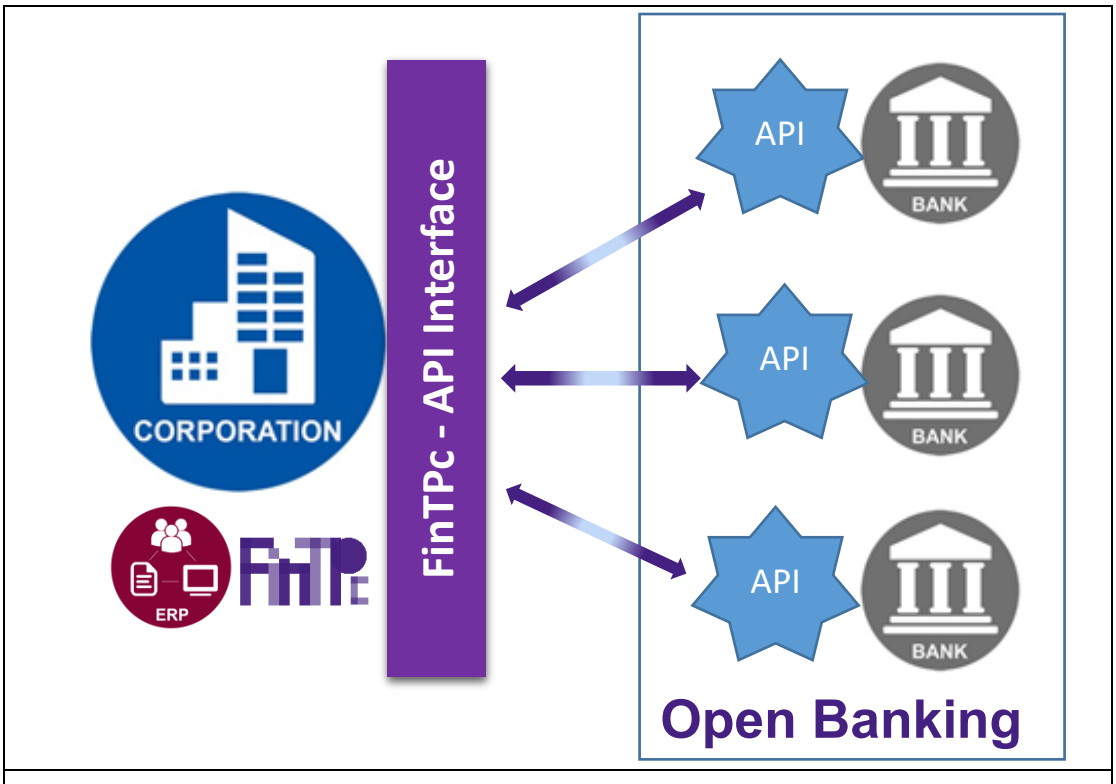
2 Architecture

The IEEE[1] recommendation defines an architecture as the fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution. Architectures represent the abstraction used to understand any system and also form the basis for a shared understanding to all its stakeholders.

Application architecture seeks to build a bridge between business requirements and technical requirements by understanding use cases, and then finding ways to implement those use cases in the software.

An architectural overview is aimed at providing a shared understanding of the architecture across a broad range of people including the developers, marketing, management and possibly potential end-users. An architectural overview is ideally produced early in the development lifecycle and serves as the starting point for the development. An architectural overview should be at a high level of abstraction. All the major functionalities and components of the architecture should be described but the descriptions may lack detail and precision as they often use natural language rather than formal notations.

This current document is describing this high level, overview architecture from different perspectives.



FinTPc - API::architecture

[1] Institute of Electrical and Electronics Engineers

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2.1 Logical component architecture

Consent Request on Dedicated Accounts

Call

`POST /v1/consents`

Creates an account information consent resource at the ASPSP regarding access to accounts specified in this request.

Query Parameters

No specific query parameter.

Request Header

Attribute	Type	Condition	Description
X-Request-ID	UUID	Mandatory	ID of the request, unique to the call, as determined by the initiating party.
PSU-ID	String	Conditional	Client ID of the PSU in the ASPSP's client interface. Might be mandated in the ASPSP's documentation. It might be contained even if an OAuth2 based authentication was performed in a pre-step. In this case the ASPSP might check whether PSU-ID and token match, according to ASPSP documentation.
PSU-ID-Type	String	Conditional	Type of the PSU-ID, needed in scenarios where PSUs have several PSU-IDs as access possibility.
PSU-Corporate-ID	String	Conditional	Might be mandated in the ASPSP's documentation. Only used in a corporate context.
PSU-Corporate-ID-Type	String	Conditional	Might be mandated in the ASPSP's documentation. Only used in a corporate context.
Authorization	String	Conditional	If OAuth2 has been chosen as pre-step to authenticate the PSU.

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TPP-Redirect-Preferred	Boolean	Optional	If it equals "true", the TPP prefers a redirect over an embedded SCA approach. If it equals “false”, the TPP prefers not it be directed for SCA. The ASPSP will then choose between the Embedded or the Decoupled SCA approach, depending on the choice of the SCA procedure by the TPP/PSU. If the parameter is not used, the ASPSP will choose the SCA approach to be applied depending on the SCA method chosen by the TPP/PSU.

Response Body

Attribute	Type	Condition	Description
consentStatus	Consent Status	Mandatory	Authentication status of the consent
consentID	String	Mandatory	Identification of the consent resource as it is used in the API structure
scaMethods	Array of Authenticati on Objects	Conditional	This data element might be contained, if SCA is required and if the PSU has a choice between different authentication methods. Depending on the risk management of the ASPSP this choice might be offered before or after the PSU has been identified with the first relevant factor, or if an access token is transported. If this data element is contained, then there is also an hyperlink of type “selectAuthenticationMethods” contained in the response body. These methods shall be presented towards the PSU for selection by the TPP.
chosenScaMe thod	Authetication Object	Conditional	This data element is only contained in the response if the ASPSP has chosen the Embedded SCA Approach, if the PSU is already identified with the first relevant factor or alternatively an

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			access token, if SCA is required and if the authentication method is implicitly selected.
challengeData	Challenge	Conditional	It is contained in addition to the data element chosenScaMethod if challenge data is needed for SCA. In rare cases this attribute is also used in the context of the startAuthorisationWithPsuAuthentication or startAuthorisationWithEncryptedPsuAuthentication link.
_links	Links	Mandatory	A list of hyperlinks to be recognized by the TPP.

Token Request

FinTP sends a POST request to the token endpoint in order to exchange the authorisation code provided in the authorisation response for an access token and, optionally, a refresh token.

The following parameters are used:

Request Parameters

Attribute	Type	Description
Grant_type	Mandatory	“authorization_code” is recommended as response type.
Client_id	Mandatory	
Code	Mandatory	Authorization code from the authorization response.
Redirect_uri	Mandatory	The exact uri of the TPP where the OAuth2 server redirected the user agent to for this particular transaction.
Code_verifier	Mandatory	PKCE verifier according to cryptographic.

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Token Response

The ASPSP responds with the following parameters:

Attribute	Type	Description
Access_token	Mandatory	Access Token bound to the scope as requested in the authorization request and confirmed by the PSU.
Token_type	Mandatory	Set to “Bearer”
Expires_in	Optional	The lifetime of the access token in seconds.
Refresh_token	Optional	Refresh Token, which can be utilized to obtain a fresh access tokens in case the previous access token expired or was revoked. Especially useful in the context of AIS.
Scope	Mandatory	The scope of the access token.

Read Account List

Call

```
GET /v1/accounts{query-parameters}
```

Reads a list of bank accounts, with balances where required. It is assumed that a consent of the PSU to this access is already given and stored on the ASPSP system.

The addressed list of accounts depends then on the PSU ID and the stored consent addressed by consentId, respectively the OAuth2 access token.

Query Parameters

Attribute	Type	Condition	Description
withBalance	Boolean	Optional	If contained, this function reads the list of accessible payment accounts including the booking balance, if granted by the PSU in the related consent and available by the ASPSP. This parameter might be ignored by the ASPSP.

Request Header

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Attribute	Type	Condition	Description
X-request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.
Consent-ID	String	Mandatory	Shall be contained since “Establish Consent Transaction” was performed via this API before.
PSU-IP-Address	String	Conditional	The forwarded IP Address header field consists of the corresponding HTTP request IP Address field between PSU and TPP. It shall be contained if and only if this request was actively initiated by the PSU.
Authorization	String	Conditional	Is contained only, if an OAuth2 based authentication was performed in a pre-step or OAuth2 based SCA was performed in the related consent authorization.

Request Body

No request body

Response Code

HTTP Response Code equals 200.

Response Header

Attribute	Type	Condition	Description
X-request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.

Response Body

Attribute	Type	Condition	Description
Accounts	Array of Account Details	Mandatory	

Read Transaction List

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Call

```
GET /v1/accounts/{account-id}/transactions {query-parameters}
```

Reads account data from a given account addressed by “account-id”.

Path Parameters

Attribute	Type	Description
Account-id	String	The identification is denoting the addressed account. The account-id is retrieved by using a “Read Account List” call. The account-id is the “id” attribute of the account structure. Its value is constant at least throughout the lifecycle of a given consent.

Query Parameters

Attribute	Type	Condition	Description
dateFrom	ISODate	Conditional	Starting date (inclusive the date dateFrom) of the transaction list, mandated if no delta access is required. Might be ignored if a delta function is used.
dateTo	ISODate	Optional	End date (inclusive the data dateTO) of the transaction list, default is “now” if not given. Might be ignored if a delta function is used.
entryReference From	String	Optional if supported by API provider	This data attribute is indicating that the AISP is in favour to get all transactions after the transaction with identification entryReferenceFrom alternatively to the above defined period. This is a n implementation of a delta access. If this data element is contained, the entries “dateFrom” and “dateTo” might be ignored by the ASPSP if a delta report is supported.
bookingStatus	String	Mandatory	Permitted codes are “booked”, “pending” and “both” “booked” shall be supported by the ASPSP.

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			To support the “pending” and “both” feature is optional for the ASPSP, Error code if not supported in the online banking frontend.
delta_ist	Boolean	Optional if supported by API provider	This data attribute is indicating that the AISP is in favor to get all transactions after the last report access for this PSU on the addressed account. This is another implementation of a delta access-report. This delta indicator might be rejected by the ASPSP if this function is not supported. If this data element is contained, the entries “dateFrom” and “dateTo” might be ignored by the ASPSP if a delta report is supported.
withBalance	Boolean	Optional	If contained, this function reads the list of transactions including the booking balance, if granted by the PSU in the related consent and available by the ASPSP. This parameter might be ignored by the ASPSP.

Request Header

Attribute	Type	Condition	Description
X-request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.
PSU-IP-Address	String	Conditional	The forwarded IP Adress header field consists of the corresponding HTTP request IP Address field between PSU and TPP. It shall be contained if and only if this request was actively initiated by the PSU.
Consent-ID	String	Mandatory	
Authorization	String	Conditional	Is contained only, if an OAuth2 based authentication was performed in a pre-step or OAuth2 based SCA was performed in the related consent authorization.

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Accept	String	Optional	The TPP can indicate the formats of account reports supported together with a prioritization following the HTTP header definition.

Request Body

No request body

Response Code

HTTP Response Code equals 200.

Response Header

Attribute	Type	Condition	Description
Content-Type	String	Mandatory	Possible values are: • Application/json • Application/sml • Application/text
X-request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.

Response Body

In case the ASPSP returns a camt.05x XML structure, the response body consists of either a camt.052 or camt.053 format. The camt.052 may include pending payments which are not yet finally booked. The ASPSP will decide on the format due to the chosen parameters, specifically on the chosen dates relative to the time of the request. In addition the ASPSP might offer camt.054x structure e.g. in a corporate setting.

In case the ASPSP returns **a MT94x** content, the response body consists of an MT940 or MT942 format in a text structure. The MT942 may include pending payments which are not yet finally booked. The ASPSP will decide on the format due to the chosen parameters, specifically on the chosen dates relative to the time of the request.

A JSON response is defined as follows:

Attribute	Type	Condition	Description
Account	Account Reference	Optional	Identifier of the addressed account.

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			Remark for Future: It si recommended to use this data element. The condition might change to “mandatory” in a next version of the specification.
Transactions	Account Report	Optional	JSON based account report. This account report contains transactions resulting from the query parameters.
Balances	Array of Balance	Optional	A list of balances regarding this account, which might be restricted of the current balance.
_links	Links	Optional	A list of hyperlinks to be recognized by the TPP.

Payment Initiation with pain.001 XML message as Payment Instruction

Call

```
POST /v1/payments/{payment-product}
```

Creates a payment initiation request at the ASPSP.

Remark: The underlying pain.001 structure which is transported in the content body of this request may only contain one payment.

Path Parameters

Attribute	Type	Description
Payment-product	String	Pain.001-instant-sepa-credit-transfers

Query Parameters

Request Header

Attribute	Type	Condition	Description
Content-Type	String	Mandatory	Application/json

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X-Request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.
PSU-ID	String	Conditional	Client ID of the PSU in the ASPSP's client interface. Might be mandated in the ASPSP's documentation. It might be contained even if an OAuth2 based authentication was performed in a pre-step. In this case the ASPSP might check whether PSU-ID and token match, according to ASPSP documentation.
PSU-ID-Type	String	Conditional	Type of the PSU-ID, needed in scenarios where PSUs have several PSU-IDs as access possibility. In this case, the mean and use are then defined in the ASPSP's documentation.
PSU-Corporate-ID	String	Conditional	Identification of a Corporate in the Online Channels. Might be mandated in the ASPSP's documentation. Only used in a corporate context.
PSU-Corporate-ID-Type	String	Conditional	This is describing the type of the identification needed by the ASPSP to identify the PSU-Corporate-ID content. Mean and use is defined in the ASPSP's documentation. Only used in a corporate context.
Authorization	String	Conditional	Bearer Token. Is contained only, if an OAuth2 based authentication was performed in a pre-step or an OAuth2 based SCA was performed in a preceding AIS service in the same session.
Consent-ID	String	Optional	This data element may be contained, if the payment initiation transaction is part of a session, i.e. combined AIS/PIS service. This then contains the "consentID" of the related AIS consent, which was performed prior to this payment initiation.

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PSU-IP-Address	String	Conditional	The forwarded IP Address header field consists of the corresponding HTTP request IP Address field between PSU and TPP. If not available, the TPP shall use the IP Address used by the TPP when submitting this request.
TPP-Redirect-Preferred	Boolean	Optional	If it equals “true”, the TPP prefers a redirect over an embedded SCA approach. If it equals “false”, the TPP prefers not to be redirected for SCA. The ASPSP will then choose between the Embedded or the Decoupled SCA approach, depending on the choice of the SCA procedure by the TPP/PSU. If the parameter is not used, the ASPSP will choose the SCA approach to be applied depending on the SCA method chosen by the TPP/PSU.
TPP-Redirect-URI	String	Conditional	URI of the TPP, where the transaction flow shall be redirected to after a Redirect.
TPP-Nok-Redirect-URI	String	Optional	If this URI is contained, the TPP is asking to redirect the transaction flow to this address instead of the TPP-Redirect-URI in case of a negative result of the redirect SCA method. This might be ignored by the ASPSP.
TPP-Explicit-Authorization-Preferred	Boolean	Optional	If it equals “true”, the TPP prefers to start the authorization process separately, e.g. because of the usage of a signing basket. This preference might be ignored by the ASPSP, if a signing basket is not supported as functionality. Default: false implicit authorization is assumed (signing basket not supported).

Request Body

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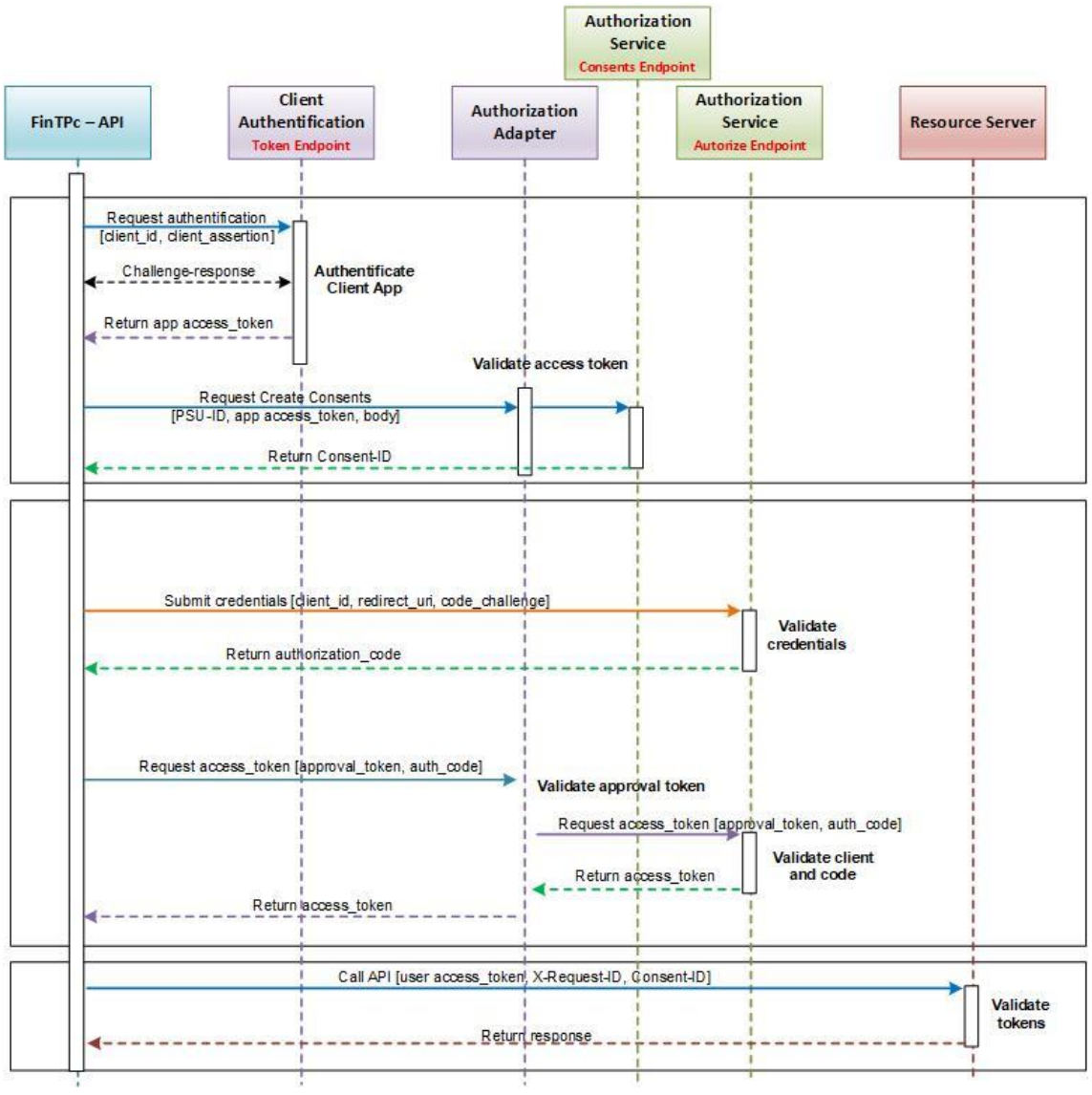
Certificat ISO 9001:2015
Certificat ISO/IEC 27001:2013

A pain.001 structure corresponding to the chosen payment product, see above on XML schema support.

2.2 Component interaction model

The diagram below shows the basic interaction actions between the identified application components for a specific scenario. The sample scenario consists of an end to end flow for payment transactions - collected from an application (used by the treasury department of a given corporation) and exported for other banking applications. We considered as input a payments file that is going to be split into individual payments inside the application and enriched with missing data. Then the user has to decide whether to authorize them towards banking application or reject some of them for whatever reasons. After authorization the payments are grouped together and transformed to a standard bank compliant format (in this sample MT101 or pain.001).



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