

SRS - Software Requirements Specification

Project: FinTPc - API Interface

Version: 7

Date: 13.03.2020

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1 Introduction

1.1 Purpose

<Identify the product whose software requirements are specified in this document, including the revision or release number. Describe the scope of the product that is covered by this SRS, particularly if this SRS describes only part of the system or a single subsystem.>

FinTP is a complete open source application that processes financial transactions, automates business flows and offers operational risk containment and compliance to regulatory and industry standards for banks.

FinTP and all ancillary documentation are distributed freely and openly through the FINkers United community and provides collaboration ground for rapid development and integration of new technologies, such as crypto currencies, biometric security, data analysis algorithms. This creates an open infrastructure for achieving real-time payments and a better management of liquidity and assets.

FinTP source code complies with GPLv3 license and it capitalizes on a 12 years practice proven qPayIntegrator designed and implemented by Allevio back in 2002. FinTP's predecessor has been live at 10 financial institutions and has successfully managed their daily operations, automating their flows, centralizing their transactions and ensuring end-to-end interoperability.

FinTP is a reliable financial middleware to manage the transactions flows with features for:

Business area: liquidity reporting and forecasting, enhanced interoperability with the bank's corporation customers, as well as flexible service for individuals based on the extended use of SWIFT standardized messages set for remittances (SWIFT Remit).

Operations area: support for the most popular financial information transfer instruments (credit transfer, direct debit, debit instruments and securities), as well as multicurrency enablement, and operational risk containment functionalities (such as accounting reconciliation, duplicate detection, AML filtering).

IT area: insurance of the data quality: end-to-end persistent transactions, system resilience (transactions mirroring to back-up platform), native ISO20022 support, easy operational and data flows configurations through embedded XML schemas etc.

FinTPc is an extension of FinTP functionalities. **FinTPc** addresses SMEs / corporations specific flows, ensuring consolidation of treasury and financial business to optimize the resources allocation and efficiency, and providing a single view of the financial operations, cash reporting and forecasting, accounting reconciliation (i.e. AR/AP with the banks' statements of account), transaction filtering, all customized for company usage.

FinTPc-API Interface 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.

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This document contains the detailed software requirements specifications of **FinTPc-API Interface**.

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1.2 Document Conventions

<Describe any standards or typographical conventions that were followed when writing this SRS, such as fonts or highlighting that have special significance. For example, state whether priorities for higher-level requirements are assumed to be inherited by detailed requirements, or whether every requirement statement is to have its own priority.>

In chapter 3 System Features, scenarios and functionalities respect the following naming conventions:

- SAPInn – base scenario (for API interface) number nn, mandatory
- FAPInn – base functionality (for API interface) number nn, mandatory

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1.3 Intended Audience and Reading Suggestions

<Describe the different types of reader that the document is intended for, such as developers, project managers, marketing staff, users, testers, and documentation writers. Describe what the rest of this SRS contains and how it is organized. Suggest a sequence for reading the document, beginning with the overview sections and proceeding through the sections that are most pertinent to each reader type.>

This document is addressed to experts with different professional profiles, involved in development, documentation, testing and implementation:

- Business Analysts
- Solution / Software Architects
- Designers & Developers
- Testers
- Implementers
- Support Personnel
- Project Managers
- Documentarists

Reviews and contributions are expected from all professionals listed, as this document is an artefact used in designing, developing, testing and documenting the project.

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1.4 Project Scope

<Provide a short description of the software being specified and its purpose, including relevant benefits, objectives, and goals. Relate the software to corporate goals or business strategies. If a separate vision and scope document is available, refer to it rather than duplicating its contents here. An SRS that specifies the next release of an evolving product should contain its own scope statement as a subset of the long-term strategic product vision.>

Allevo launches its application for processing financial transactions (**FinTP**) into open source at the beginning of 2014. The open source version is a rework of the commercial version of the application (**qPI**), with added support for open source 3rd party software prerequisites for internal database, message oriented middleware and application server, enhanced documentation for code and design, integration with open source developer tools and other changes required for an application published into open source.

FinTP provides building blocks for processing financial transaction, helping banks, SMEs, corporations, public administrations, and micro-financing institutions to:

- Consolidate business work flows
- Create flexible interfaces for various market infrastructures
- Process various kinds of funds transfers (such as credit transfer, direct debit, debit instruments, treasury flows) while providing safe operations and duplicate detection
- Gain several operation functionalities (such as liquidity reporting, accounting reconciliation, AML transactions filtering, remittances management, and competitive reports)

Some of the most important technical requirements for such an application are its reliable messages delivery (with persistent End-To-End transactions, assurance that messages are delivered and not duplicated) and its processing capacity (number of messages processed over a period of time, eliminating the waiting time).

In 2017 Allevo starts the **TOSS** (Treasure Open Source Software) project, in order to develop **FinTPc**, an innovative software solution for the processing of financial transactions for SMEs and corporations, distributed in open source. **FinTPc** can be seen as an extension of **FinTP**, following the same high-level architecture, but will feature a new user interface and reworked functionalities and workflows, addressing specific flows. **FinTPc** has been developed in such way, to be able to also accommodate connectivity through APIs.

FinTPc-API Interface 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

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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.

1.5 References

<List any other documents or Web addresses to which this SRS refers. These may include user interface style guides, contracts, standards, system requirements specifications, use case documents, or a vision and scope document. Provide enough information so that the reader could access a copy of each reference, including title, author, version number, date, and source or location.>

TOSS project documentation:

- Approved business plan of the project
- SWIFT Standards MT:
https://www2.swift.com/knowledgecentre/rest/v1/publications/mfvr_20191220/1_0/MFVR2020.pdf?logDownload=true
- https://www2.swift.com/uonline/books/public/en_uk/us1m_20170720/index.htm
- SWIFT Standards MX:
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- Berlin Group Next Gen standard:
 - <https://www.berlin-group.org/nextgenpsd2-downloads>

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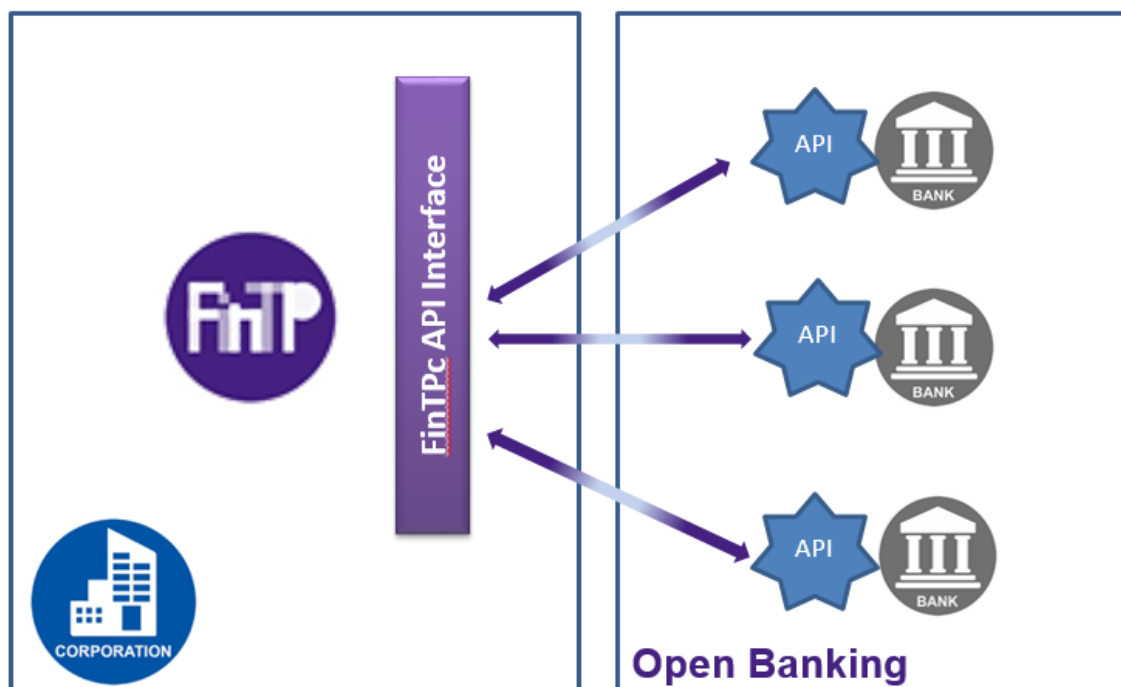


2 Overall Description

2.1 Product Perspective

<Describe the context and origin of the product being specified in this SRS. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SRS defines a component of a larger system, relate the requirements of the larger system to the functionality of this software and identify interfaces between the two. A simple diagram that shows the major components of the overall system, subsystem interconnections, and external interfaces can be helpful.>

FinTPc is extending its connection to banks through APIs by Open Banking (API REST) mechanisms.



The key benefits provided by **FinTPc-API Interface** are:

- Consolidation of all corporation/group financial transactions
- Streamlining operations by:
 - integrating payments from other applications
 - flows automation
 - automatic generation of consolidated reports
 - risk containment of duplicate or invalid payments
- Reducing fraud-related risks in connection with bank interface access
- Generating reports and company relevant statistic

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2.2 Product Features

<Summarize the major features the product contains or the significant functions that it performs or lets the user perform. Details will be provided in Section 3, so only a high level summary is needed here. Organize the functions to make them understandable to any reader of the SRS. A picture of the major groups of related requirements and how they relate, such as a top level data flow diagram or a class diagram, is often effective.>

The main building blocks provided by **FinTPc-API Interface** are:

- **Administration:** provides capabilities for defining **Users and Rights, Application Management** and configuration (including routing logic, parameters, validations) and **Business Management** configuration of various lists (partner banks, entities and accounts, partners and accounts, black lists and so on).
- **Application Interfaces:** represent the external interfaces to other applications, for importing financial transactions or sending financial transactions in various structured formats for the corresponding business flows (**payments and transaction reports**)
- **Transactions Processing:** provide users with the possibility of **creating** different types of transactions, either manually or based on pre-defined templates, **editing** transactions imported in FinTPc or enriching them based on the lists defined in FinTPc and **publishing** on the bank's interface automatically
- **Reporting:** generating real-time statistical outcomes and reports for specific business or operational needs
- **Audit Trails:** ensure the basis for tracking workflows and exceptions or recording user actions within the application, necessary for performing investigations for exceptions or consistency checks

The **FinTPc** diagram bellow presents the main features described above. The mandatory features for any specific configuration / deployment are written in **bold**, while features configured optionally are written in light grey.

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2.3 User Classes and Characteristics

<Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the favoured user classes from those who are less important to satisfy.>

FinTPc-API Interface is used by the following user profiles:

- *Security Administrators* – ensure user management and access rights
- *Application Administrators* – ensure administration of FinTPc, providing support for managing specific business requests on the application configuration
- *Support and Monitoring Personnel* – provide continuous monitoring of FinTPc and initiate investigations when errors occur
- *Operators* – perform business operations provided by FinTPc, like actions on financial transactions (create, modify, reject, authorize), reconciliation, generate various reports and so on
- *Supervisors* –oversee the overall result of business processing, like generating reports on financial transactions

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2.4 Operating Environment

<Describe the environment in which the software will operate, including the hardware platform, operating system and versions, and any other software components or applications with which it must peacefully coexist.>

FinTPc requires easy adoption in order to be seamlessly integrated into the payments system of a corporation. From this perspective, the technological choices need to take into consideration the following common principles which can be applied to most corporations targeted by this application:

- Corporations have limited technological variety, mostly using basic/common operating systems (Windows, Linux)
- Corporations rarely have deals for enterprise software platforms from big established technology vendors (such as IBM, Oracle, Microsoft); most applications are deployed with built-in/embedded 3rd party products
- Corporations are *cost-aware*, so proposed technological solutions and hardware resources required by FinTPc should not introduce high costs for the implementation project
- Corporations' technical teams are not very specialized in narrow technology fields, they rather cover a broader range of activities (they rarely have designated personnel that provides administration just for databases, or operating systems, or application servers, or networking, etc.). Therefore, the application should be easily to install, configure, administer & maintain
- Integration between applications is usually what vendors provide in the off-the-shelf products. Most common interfaces are with files with structured formats (csv/xslt, xml, fin), but they also use other types of interfaces like different communication protocols (ftp/ftps), web services (https), database tables

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2.5 Design and Implementation Constraints

<Describe any items or issues that will limit the options available to the developers. These might include: corporate or regulatory policies; hardware limitations (timing requirements, memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communications protocols; security considerations; design conventions or programming standards (for example, if the customer's organization will be responsible for maintaining the delivered software).>

FinTPc is an open source application, distributed under GPL v3 license. All prerequisites for deploying, exploiting and maintaining FinTPc should be also be open source. The user of FinTPc should have the possibility to choose between different technologies in order to align to the corporation's internal requirements, policies and personnel knowhow.

- FinTPc has to be supported both on Windows and Linux platforms
- FinTPc must not require high computing resources (CPU, RAM, disk) for small transaction volumes
- Client workstations should not be limited to only one web browser – most common browsers have to be supported: Chrome, Firefox, Internet Explorer
- Open source third-party products required should either have an enterprise version supported by an established technology vendor or an equivalent into an commercial product (for instance, the operating system can be CentOS but also RHEL / Windows Server)
- Deployment architectures should be flexible to accommodate specific customer requirements – e.g. the possibility to have a single-server installation or a distributed architecture with centralized database on one server and application on another server, deployed on premise or hosted in a datacenter
- Integration to the corporation's LDAP server should be possible but not mandatory. Alternatives to integrating to the corporation LDAP server could also involve other types of authentication or delivering a standalone LDAP solution dedicated for FinTPc
- The official language should be English, but FinTPc application interface should support multiple common languages. This can also be achieved by ensuring that third party browser add-ons can perform translation for the interface in multiple languages
- FinTPc has to accommodate high security standards for accessing the user interface, data between interfaces, encryption, protection by implementing CIA controls (Confidentiality, Integrity and Availability)
- Flows defined in FinTPc should be able to run in parallel, so the ones with high priority do not impact the ones with a lower priority from a performance perspective, or changes implemented on one flow do not affect others

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2.6 User Documentation

<List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.>

The application will be delivered with two manuals:

- User manual
- Installation and administration manual

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2.7 Assumptions and Dependencies

<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors, such as software components that you intend to reuse from another project, unless they are already documented elsewhere (for example, in the vision and scope document or the project plan).>

FinTPc is a financial middleware that provides integration between various applications / systems that process financial transactions in a corporation. Each of these applications have implemented their own interface to other application, from a technological perspective (files, web services, databases, queues, and so on) or data format perspective (structured positional files, csv/excel, xml, and so on). This document covers the most common interfaces with banking applications (internet banking systems, TMS applications, Cash Management applications), ERPs, Human Resources Applications, Accounting applications from both perspectives. The application has to be designed to allow easy integration with other types of interfaces.

Each corporation has its own governance in place, with different roles and processes defined throughout its business line. This translates also in different workflows within the financial workflows. **FinTPc** has to be designed to allow easy configuration of workflows, so that processes can be adapted to specific corporate requirements (e.g. segregation of data and roles, four-eye principle for some critical actions, granularity of user rights and access).

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3 System Features

<This template illustrates organizing the functional requirements for the product by system features, the major services provided by the product. You may prefer to organize this section by use case, mode of operation, user class, object class, functional hierarchy, or combinations of these, whatever makes the most logical sense for your product.>

<Don't really say "System Feature 1." State the feature name in just a few words.>

<Provide a short description of the feature and indicate whether it is of High, Medium, or Low priority. You could also include specific priority component ratings, such as benefit, penalty, cost, and risk (each rated on a relative scale from a low of 1 to a high of 9).>

<List the sequences of user actions and system responses that stimulate the behaviour defined for this feature. These will correspond to the dialog elements associated with use cases.>

<Itemize the detailed functional requirements associated with this feature. These are the software capabilities that must be present in order for the user to carry out the services provided by the feature, or to execute the use case. Include how the product should respond to anticipated error conditions or invalid inputs. Requirements should be concise, complete, unambiguous, verifiable, and necessary. Use "TBD" as a placeholder to indicate when necessary information is not yet available.>

<Each requirement should be uniquely identified with a sequence number or a meaningful tag of some kind.>

3.1 Concepts

Nr crt.	Concept	Definition
1.	Application Interface	Represents the integration between FinTPc and other applications. It is defined by communication protocol and structured data format. Application interface can be internal and external. Internal application interface represents the integration between FinTPc and corporate's core applications (ERP, accounting, human resources). External application interface represents the integration between FinTPc and applications that ensure connection to business partners.
2.	Financial Message	Represents a structured data set exchanged on an application interface. A message contains one or more financial transactions.
3.	Business Area	Is defined as a logical classification for different categories of financial transactions, such as : <ul style="list-style-type: none"> - Payments - Invoices - Statements Classification is based on financial transactions that share a set of related information that meet a business purpose.

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		FinTPc design allows definition of new business areas.
4.	Financial Transaction	<p>Represents the information exchanged between counterparties part of a larger financial flow. In this case, it represents an element that defines an individual financial operation.</p> <p>Financial transactions are logically grouped in business areas based on their predefined business purpose.</p> <p>Financial transactions can also be referred to as transactions.</p>
5.	Status	Represents a property of a financial transaction that indicates its processing phase.
6.	Action	<p>Is a processing operation on financial transactions either:</p> <ul style="list-style-type: none"> • automatically, based on predefined processing configuration, referred as Routing Rule (RR), or • manually, based on user decisions, referred as User Action (UA).
7.	Event	Represents auditing trails related to processing of financial transactions and actions performed in the user interface.
8.	Queue	Represents a collection of financial transactions grouped together with the purpose of applying the same set of actions.
9.	Entity	<p>Represents an organization with a number of bank accounts associated. A bank account can correspond only to one entity.</p> <p>Entities can be internal and external. If internal or external is not explicitly specified, entity means both internal and external.</p> <p>Internal entities are the organisations for which FinTPc manages the financial flows.</p> <p>External entities are business partners of the internal entities</p> <p>Financial transactions from Payments Business Area are issued from internal entities accounts to other internal entities accounts, to external entities accounts or to other accounts.</p> <p>Statements can be received and processed only for internal entities accounts.</p>
10.	User Right	Represents access granted to users in the user interface for actions and data enquiry.
11.	Reconciliation	The matching process between financial transactions based on predefined criteria
12.	Original transaction	<p>Represents the initial form of the transaction:</p> <ul style="list-style-type: none"> - The created form for those transactions that are created directly in FinTPc;

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		- The fetched form for those transactions that are fetched from corporate's core applications
--	--	---

3.2 FinTPc-API Interface processing model

FinTPc is a financial middleware allowing business users to define and control the process of transferring financial transaction between various corporate systems.

Embedded *Financial Transaction Editor* offers the capability of creating new transactions or manually correcting them before processing.

Reports and statistics provides needed insights on processed transactions for business operations.

Transaction processing develops according to the following stages:

1. Fetch financial messages from Application Interfaces
2. Format, Store and Route financial transactions
3. Publish financial messages to Application Interfaces

1. *Fetch stage* assumes the existence of predefined Application Interface. FinTPc can interface with Database Systems, File Systems, Messaging Systems and Web Services.

The purpose of this stage is to reliably interface with other financial application and perform preparation steps for next processing stage.

During this stage the main operations are:

- a. Backup fetched messages
- b. Split messages by transactions
- c. Transform transactions in easily parsing format
- d. Augment transaction with data collected by other application calls (WS, DB)
- e. Transfer transactions to the core application processor

2. *Format, Store and Route stage* is performed by both the core application processor and user interaction. The purpose of this stage is to offer processing control to the users and deliver business capabilities over processed transactions.

Format and Parse. By formatting, the financial transaction content is interpreted and transformed into an understandable application format. FinTPc is required to fully understand financial transactions in order to deliver all the business capabilities. Once transactions are formatted and stored, they are ready to be segregated and operated by a criteria chosen by the user and further checked for duplicates, validated, enriched, grouped, correlated, sent to a reconciliation process (see product features and actions chapter).

Interpreted information is stored in an easily accessible way. After being persisted, transactions are available at any moment for reporting.

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Route. By routing, the users strictly control transactions transfers between application interfaces. The control is applied using:

- queues where transactions are segregated into bundles for each business operations need
- queue's predefined actions in order to distinctly operate in each queue

So segregating transactions and operations, subject to the business operation requirement, is the main purpose of routing capability.

Transactions delivered to the core processor are gathered in entry queues according to custom configuration of fetching stage. Actions performed by core application processor called *routing rules* take control and operate on delivered transactions. Routing rules are user defined, but sequentially executed by the core application processor. *Format and Store* is a mandatory routing rule on entry queues.

During routing, transactions can be held in queues for user audit and routing decisions. User decisions on held transactions are performed by **user actions**.

Transactions can be moved from entry queues to application predefined intermediate queues that deliver features like *duplicate detection* or *investigation of process failed transactions*. Other user defined intermediate queues are possible in order to perform more grained processing segregation on transactions.

In order to have transactions published on the application interface, they need to be previously collected in exit queues. Only exit queues have the capability to push transactions to the publishing stage processing. Each receiving application interface is bound to a publishing stage and usually requires a specific receiving transaction format. Transforming transactions to required format need to be among last actions performed on exit queues.

After being pushed to publishing stage, transactions are no longer available for other operations than correlation with related messages. Published transactions are still available for reporting.

To provide a higher quick overview of processed transactions where there is a status reported on each transaction. Status changes according to relevant actions performed during processing.

Modifying transaction information during routing can conflict with routing decision made on previous values of transaction information. Such conflicts break the reliable and predictable transfer of financial transactions. FinTPc avoids these conflicts by providing limited and strictly controlled transactions modifications mechanisms.

3. Publishing stage. The purpose of this stage is to reliably interface with other financial applications and perform preparation steps according to application interface requirements

During this stage the main operations are:

- a. Group transactions into batches (if required by application interface)
- b. Sign messages (if required by application interface)
- c. Transfer message to existing predefined interfaces according to interface protocol and digital data format

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3.3 Data Structures



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3.3.1 API REST - Consent between the client and the bank

The consent is a necessary agreement between the corporation and the bank in order to access the information about the accounts via API calls.

3.3.1.1 JSON structure – Request - GET

Returns the content of an account information consent object. This is returning the data for the TPP especially in cases, where the consent was directly managed between ASPSP and PSU e.g. in a re-direct SCA Approach.

Path Parameters

Attribute	Type	Description
consentId	String	ID of the corresponding consent object as returned by an Account Information Consent Request

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.
Authorization	String	Conditional	Is contained only, if an OAuth2 based authentication was performed in a pre-step or an OAuth2 based SCA was performed in the current PIS transaction or in a preceding AIS service in the same session, if no such OAuth2 SCA approach was chosen in the current PIS transaction.
Accept	String	Optional	<p>The TPP can indicate the formats of status reports supported together with a prioritisation following the HTTP header definition. The formats supported by this specification are</p> <ul style="list-style-type: none"> • xml • JSON <p>If only one format is supported by the TPP, which is not supported by the ASPSP this can lead to a rejection of the request.</p>

Example:

GET <https://api.testbank.com/v1/consents/qwer3456tzui7890>

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3.3.1.2 JSON structure – Response

HTTP200

Response header

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

Response Body

Attribute	Type	Condition	Description
access	Account access	Mandatory	
recurringIndicator	Boolean	Mandatory	
validUntil	ISODate	Mandatory	
frequencyPerDay	Integer	Mandatory	
lastActionDate	ISODate	Mandatory	This date is containing the date of the last action on the consent object either through the XS2A interface or the PSU/ASPSP interface having an impact on the status.
consentStatus	Consent Status	Mandatory	The status of the consent resource.
_links	Links	Optional	Type of links recommended for this response is "account" and/or "cardAccount", depending on the nature of the consent.

Example:

HTTP/1.x 200 Ok

X-Request-ID: 99391c7e-ad88-49ec-a2ad-99ddcb1f7721

Date: Sun, 06 Aug 2017 15:05:47 GMT

Content-Type: application/json

```
{
  "access":
  {
    "balances":
    [
      {
        "iban": "DE2310010010123456789"
      }
    ],
    "transactions":
    [
      {
        "iban": "DE2310010010123456789",
        "pan": "123456xxxxxx3457"
      }
    ],
    "recurringIndicator": true,
    "validUntil": "2017-11-01",
    "frequencyPerDay": "4",
    "consentStatus": "valid",
  }
}
```

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```
"_links": {"account": {"href": "/v1/accounts"}}
}
```

Remark: This specification supports no detailed links to AIS service endpoints corresponding to this account. This is due to the fact, that the /accounts endpoint will deliver all detailed information, including the hyperlinks e.g. to the balances or transactions of certain accounts. Still due to the guiding principles, the ASPSP may deliver more links in addition, which then will be documented in the ASPSPs XS2A API documentation.

3.3.2 API REST - Read Account List

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.

3.3.2.1 JSON structure – Request - GET

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

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

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No request body

Example:

GET /v1/accounts{query-parameters}

3.3.2.1 JSON structure – Response

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	

3.3.3 API REST - Read Transaction List

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

3.3.3.1 JSON structure – Request - GET

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.

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entryReferenceFrom	String	Optional if supported by API provider	<p>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.</p> <p>If this data element is contained, the entries "dateFrom" and "dateTo" might be ignored by the ASPSP if a delta report is supported.</p>
bookingStatus	String	Mandatory	<p>Permitted codes are "booked", "pending" and "both" "booked" shall be supported by the ASPSP.</p> <p>To support the "pending" and "both" feature is optional for the ASPSP, Error code if not supported in the online banking frontend.</p>
delta_ist	Boolean	Optional if supported by API provider	<p>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.</p> <p>This delta indicator might be rejected by the ASPSP if this function is not supported.</p> <p>If this data element is contained, the entries "dateFrom" and "dateTo" might be ignored by the ASPSP if a delta report is supported.</p>
withBalance	Boolean	Optional	<p>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.</p>

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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 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.
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.
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

Example:

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

3.3.3.1 JSON structure – Response

Response Code

HTTP Response Code equals 200.

Response Header

Attribute	Type	Condition	Description
Content-Type	String	Mandatory	Possible values are: <ul style="list-style-type: none"> • 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

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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. Remark for Future: It is 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.

3.3.4 API REST - Payment Initiation with pain.001 XML message

Financial messages are sent to the corresponding banks in ISO20022 pain.001.001.03 format via a POST type request. In the body of the POST request, the transactions in XML format are inserted.

ISO20022 pain.001.001.03 format: sheet: map FinTPC->pain pynt

3.3.4.1 JSON structure – Request - POST

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

No query parameters

Request Header

Attribute	Type	Condition	Description
Content-Type	String	Mandatory	application/xml
X-Request-ID	UUID	Mandatory	ID of the request, unique to call, as determined by the initiating party.

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PSU-ID	String	Conditional	<p>Client ID of the PSU in the ASPSP's client interface. Might be mandated in the ASPSP's documentation.</p> <p>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.</p>
PSU-ID-Type	String	Conditional	<p>Type of the PSU-ID, needed in scenarios where PSUs have several PSU-IDs as access possibility.</p> <p>In this case, the mean and use are then defined in the ASPSP's documentation.</p>
PSU-Corporate-ID	String	Conditional	<p>Identification of a Corporate in the Online Channels.</p> <p>Might be mandated in the ASPSP's documentation. Only used in a corporate context.</p>
PSU-Corporate-ID-Type	String	Conditional	<p>This is describing the type of the identification needed by the ASPSP to identify the PSU-Corporate-ID content.</p> <p>Mean and use is defined in the ASPSP's documentation.</p> <p>Only used in a corporate context.</p>
Authorization	String	Conditional	<p>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.</p>
Consent-ID	String	Optional	<p>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.</p>
PSU-IP-Address	String	Conditional	<p>The forwarded IP Address header field consists of the corresponding</p>

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			<p>HTTP request IP Address field between PSU and TPP.</p> <p>If not available, the TPP shall use the IP Address used by the TPP when submitting this request.</p>
TPP-Redirect-Preferred	Boolean	Optional	<p>If it equals "true", the TPP prefers a redirect over an embedded SCA approach.</p> <p>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.</p> <p>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.</p>
TPP-Redirect-URI	String	Conditional	<p>URI of the TPP, where the transaction flow shall be redirected to after a Redirect.</p>
TPP-Nok-Redirect-URI	String	Optional	<p>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.</p>
TPP-Explicit-Authorization-Preferred	Boolean	Optional	<p>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.</p> <p>Default: false implicit authorization is assumed (signing basket not supported).</p>

Request Body

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

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3.3.4.1 JSON structure – Response

Response Code

The HTTP response code equals 201.

Response Header

Attribute	Type	Condition	Description
Location	String	Mandatory	Location of the created resource (if created)
X-Request-ID	UUID	Mandatory	ID of the request, unique to the call, as determined by the initiating party.
ASPSP-SCA-Approach	String	Conditional	<p>This data element must be contained, if the SCA Approach is already fixed. Possible values are:</p> <ul style="list-style-type: none"> <input type="checkbox"/> EMBEDDED <input type="checkbox"/> DECOUPLED <input type="checkbox"/> REDIRECT <p>The OAuth SCA approach will be subsumed by REDIRECT.</p>
ASPSP-Notification-Support	Boolean	Conditional	<p>true if the ASPSP supports resource status notification services. false if the ASPSP supports resource status notification in general, but not for the current request. Not used, if resource status notification services are generally not supported by the ASPSP. Shall be supported if the ASPSP supports resource status notification services, see more details in the extended service definition [XS2A-RSNS].</p>
ASPSP-Notification-Content	String	Conditional	<p>The string has the form status=X1, ..., Xn where Xi is one of the constants SCA, PROCESS, LAST and where constants are not repeated. The usage of the constants supports the following semantics: SCA: Notification on every change of the scaStatus attribute for</p>

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			<p>all related authorisation processes is provided by the ASPSP for the related resource.</p> <p>PROCESS: Notification on all changes of consentStatus or transactionStatus attributes is provided by the ASPSP for the related resource.</p> <p>LAST: Notification on the last consentStatus or transactionStatus as available in the XS2A interface is provided by the ASPSP for the related resource.</p> <p>This field must be provided if the ASPSP-Notification-Support =true. The ASPSP might consider the notification content as preferred by the TPP, but can also respond independently of the preferred request.</p>
--	--	--	--

Response Body

Attribute	Type	Condition	Description
transactionStatus	Transaction Status	Mandatory	The values defined in Section 14.13 might be used.
paymentId	String	Mandatory	resource identification of the generated payment initiation resource.
Attribute	Type	Condition	Description
transactionStatus	Transaction Status	Mandatory	The values defined in Section 14.13 might be used.
paymentId	String	Mandatory	resource identification of the generated payment initiation resource.
_links	Links	Mandatory	A list of hyperlinks to be recognised by the TPP. The actual hyperlinks used in the response depend on the dynamical decisions of the ASPSP when processing the request.

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Example:

POST /v1/payments/{payment-product}

POST https://api.testbank.com/v1/payments/pain.001-sepa-credit-transfers

Content-Type: application/xml

X-Request-ID: "123e4567-e89b-12d3-a456-426655440000"

PSU-IP-Address: "192.168.8.78"

PSU-User-Agent: "Chrome_v12"

<Document xmlns="urn:iso:std:iso:20022:tech:xsd:pain.001.001.03">

<CstmrCdtTrfInitn>

<GrpHdr>

<MsgId>MIPI-123456789RI-123456789</MsgId>

<CreDtTm>2017-02-14T20:23:34.000Z</CreDtTm>

<NbOfTx>1</NbOfTx>

<CtrlSum>123</CtrlSum>

<InitgPty>

<Nm>PaymentInitiator</Nm>

<Id><OrgId><Othr><Id>DE10000000012</Id>

<SchmeNm><Prprty>PISP</Prprty></SchmeNm></Othr></OrgId></Id>

</InitgPty>

</GrpHdr>

<PmtInf>

<PmtInfId>BIPI-123456789RI-123456789</PmtInfId>

<PmtMtd>TRF</PmtMtd>

<NbOfTx>1</NbOfTx>

<CtrlSum>123</CtrlSum>

<PmtTpInf><SvcLvl><Cd>SEPA</Cd></SvcLvl></PmtTpInf>

<ReqdExctnDt>2017-02-15</ReqdExctnDt>

<Dbtr><Nm>PSU Name</Nm></Dbtr>

<DbtrAcct><Id><IBAN>DE87200500001234567890</IBAN></Id></DbtrAcct>

<ChrgBr>SLEV</ChrgBr>

<CdtTrfTxInf>

<PmtId><EndToEndId>RI-123456789</EndToEndId></PmtId>

<Amt><InstdAmt Ccy="EUR">123</InstdAmt></Amt>

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```

<Cdtr><Nm>Merchant123</Nm></Cdtr>
<CdtrAcct><Id><IBAN>
DE23100120020123456789</IBAN></Id></CdtrAcct>
<RmtInf><Ustrd>Ref Number Merchant-123456</Ustrd></RmtInf>
</CdtTrfTxInf>
</PmtInf>
</CstmrCdtTrfInitn>
</Document>

```

3.3.5 API REST – Status of a Payment

This action checks the status of a payment initiation:

3.3.5.1.1 JSON structure – Request - GET

Path Parameter

Attribute	Type	Description
payment-service	String	The possible values are “payments”, “bulk-payments” and “periodic-payments”
payment-product	String	The payment product, under which the payment under paymentId has been initiated. It shall be checked by the ASPSP, if the payment-product is matching the payment initiation addressed by paymentId.
paymentId	String	Resource Identification of the related payment

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.
Authorization	String	Conditional	Is contained only, if an OAuth2 based authentication was performed in a pre-step or an OAuth2 based SCA was performed in the current PIS transaction or in a preceding AIS service in the same session, if no such OAuth2 SCA approach was chosen in the current PIS transaction.
Accept	String	Optional	The TPP can indicate the formats of status reports supported together with a prioritisation following the HTTP header definition. The formats supported by this specification are <ul style="list-style-type: none"> • xml • JSON

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			If only one format is supported by the TPP, which is not supported by the ASPSP this can lead to a rejection of the request.
--	--	--	--

Example:

GET <https://api.testbank.com/v1/payments/1234-wertiq-983/status>

Accept: application/json

X-Request-ID: 99391c7e-ad88-49ec-a2ad-99ddcb1f7721

Date: Sun, 06 Aug 2017 15:04:07 GMT

3.3.5.1.2 JSON structure – Response

HTTP200

Response Header

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

Response Body in Case of JSON based endpoint

Attribute	Type	Condition	Description
transactionStatus	Transaction Status	Mandatory	In case where the Payment Initiation Request was JSON encoded as defined in Section 5.3.1, the status is returned in this JSON based encoding.
fundsAvailable	Boolean	Conditional	This data element is contained, if supported by the ASPSP, if a funds check has been performed and if the transactionStatus is "ATCT", "ACWC" or "ACCP".

Example:

HTTP/1.x 200 Ok

X-Request-ID: 99391c7e-ad88-49ec-a2ad-99ddcb1f7721

Date: Sun, 06 Aug 2017 15:04:08 GMT

Content-Type: application/json

```
{
  "transactionStatus": "ACCP",
  "fundsAvailable": true
}
```

3.3.6 API REST – Transaction Reports

Transaction reports are retrieved from the corresponding banks in JSON format via API REST.

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3.3.6.1.1 JSON structure – Request->GET

Attribute	Type	Description
Account-id	String	This identification is denoting the addressed account, where the transaction has been performed
transactionId	String	This identification is given by the attribute transactionId of the corresponding entry of a transaction list
X-Request-ID	UUID (M)	ID of the request, unique to the call, as determined by the initiating party
PSU-IP-Address	String (C)	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
Consent-ID	String (M)	
Authorization	String (C)	Is contained only, if an OAuth2 based authentication was performed in a pre-step or an OAuth2 based SCA was performed in the related consent authorisation

Example:

GET

<https://api.testbank.com/v1/accounts/qwer3456tzui7890/transactions/1234567>

X-Request-ID: 99391c7e-ad88-49ec-a2ad-99ddcb1f7757

Date: Sun, 06 Aug 2017 15:05:46 GMT

3.3.6.1.2 JSON structure - Response

JSON tags	Description	Type	M/O
account	Originator IBAN	IBAN/BBAN/PAN/MSISDN	M
transactions-booked/pending			
transactionId	External reference	String	O
entryReference	Reference	Max35Text	O
endToEndId	Unique end to end identity	Max35Text	O
mandateId	Identification of Mandates	Max35Text	O
checkId	Identification of a Cheque	Max70Text	O
creditorId	Identification of Creditors, e.g. a SEPA Creditor ID	Max70Text	O
bookingDate	The Date when an entry is posted to an account on the ASPSPs books	Date	O
valueDate	The Date at which assets become available to the account owner in case of a credit.	Date	O



transactionAmount			M
currency	Currency	Code 3!c	M
amount	The amount given with fractional digits, where fractions must be compliant to the currency definition. Up to 14 significant figures. Negative amounts are signed by minus. The decimal separator is a dot.	[0-9]{1,14}\.[0-9]{1,3}	M
exchangeRate	Exchange rates	String	O
creditorName	Creditor Name	Max70Text	O
creditorAccount	Creditor Account	IBAN/BBAN/PAN/MSISDN	O
ultimateCreditor	Ultimate Creditor	Max70Text	O
debtorName	Debtor Name	Max70Text	O
debtorAccount	Debtor Account	IBAN/BBAN/PAN/MSISDN	O
ultimateDebtor	Ultimate Debtor	Max70Text	O
remittanceInformationUnstructured	Unstructured remittance information	Max140Text	O
remittanceInformationStructured	Structured remittance information	Max140Text	O
purposeCode	Values from ISO 20022 External Code List ExternalCodeSets_1Q2018 June 2018	Code 4!c	O
bankTransactionCode	This code type is concatenating the three ISO20022 Codes:Domain, Family, Subfamily	Code	O
proprietaryBankTransactionCode	Proprietary bank transaction code as used within a community or within an ASPSP e.g. for MT94x based transaction reports	Max35x	O
links	Transaction details	link	

Example:

```
{
  "account": {
```

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```

"iban": "DE2310010010123456788"
},
"transactions": {
  "booked": [
    {
      "transactionId": "001IDFA183380005",
      "entryReference": "214056045",
      "endToEndId": null,
      "mandateId": null,
      "checkId": null,
      "creditorId": null,
      "bookingDate": "2018-12-04",
      "valueDate": "2018-12-04T00:00:00",
      "transactionAmount": {
        "currency": "RON",
        "amount": -5
      },
    },
    "exchangeRate": null,
    "creditorName": null,
    "creditorAccount": {
      "iban": null,
      "bban": null,
      "pan": null,
      "maskedPan": null,
      "msisdn": null,
      "currency": null
    },
    "ultimateCreditor": null,
    "debtorName": null,
    "debtorAccount": {
      "iban": "RO82BSEA0010000000191014",
      "bban": null,
      "pan": null,
      "maskedPan": null,
      "msisdn": null,
      "currency": null
    },
    "ultimateDebtor": null,

```

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"remittanceInformationUnstructured": "Narrative
:Comision/Taxa Taxa lunara administrare 0.00 RON 30/11/2018 Monthly
Maintenance Fee () Card: 5379 XXXX XXXX 5688 EC/MC",

"remittanceInformationStructured": null,
"purposeCode": "ACCT",
"bankTransactionCode": null,
"proprietaryBankTransactionCode": "Comision Mentenanta
Card",
"_links": null

},

],

"pending": [

{

"transactionId": "1234569",

"creditorName": "Claude Renault",

"creditorAccount": {

"iban": "FR7612345987650123456789014"

},

"transactionAmount": {

"currency": "EUR",

"amount": "-100.03"

},

"valueDate": "2017-10-26",

"remittanceInformationUnstructured": "Example 3"

}

],

"_links": {

"account": {

"href": "/accounts/3dc3d5b3-7023-4848-9853-f5400a64e80f"

}

}

}

}

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3.4 Administration

FinTPc-API Interface ensures the connectivity with the corporation's corresponding banks, with the purpose of using the exposed APIs according to the PSD2 standard.

3.4.1 FAPI01 – User Management

Functional requirements

User rights are defined in the table below:

Category	User Right	Details
Application Administrator	Connectivity management	Defining the connectivity with the bank (access token, refresh token, obtaining consent etc)
Transaction and template access	View	<p>View right granted to users per Internal Entity and Transaction Type;</p> <p>This right allows users to view specific transactions in queues, general report and templates list</p> <p>In addition, the user can also request to view the current balance and the transaction details (transaction status, transaction fees), transaction reports and transactions history</p>

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3.4.2 FAPI02 – Application configurations

Functional requirements

Under PSD2, customer consent is cited as a necessary condition for the initiation of the execution of a payment transaction.

3.4.2.1 API Interfaces configuration

The fields for adding a new connection for API interfaces with the banks are:

- Client id
- Client secret
- User id
- User secret
- Access token URI
- User authorization URI
- Redirect URD
- User info URI
- Expiration date
- Grant type
- Authentication scheme
- Client authentication scheme
- connect.token_en_US
- Bank

3.4.2.2 Consent configuration

The consent is required once as a form of initial agreement between the corporation and the bank and updated periodically.

For information about the structure of a consent request, please see: [The consent between the client and the bank](#)

3.4.2.3 API - Sync internal accounts lists

The sync is done through an API call to the bank and it is possible only for those banks that have previously set up the connectivity.

In order to sync the internal accounts, the user can select a bank from a drop down list and as a result all its related accounts are fetched.

3.4.2.4 API - Set-up time intervals for transaction reports

In order to automatically fetch transaction reports, time intervals should be defined. For scheduling this automatic action, only those banks that have previously set up the connectivity as well as the accounts imported in the internal accounts list through synchronization, can be selected.

Depending on each bank's business, these intervals may be configured in various forms eg. EoD, twice per day, once a week, once a month.

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3.5 Application Interface

3.5.1 FAPI03 – External application interface method for financial transactions – Payments

Functional requirements

FinTPc-API Interface publishes financial messages to external applications in the following format:

- file format (FIN - MT101, XML ISO20022- pain.001.001.03)
- API format (XML ISO20022- pain.001.001.03)

3.5.1.1 API - ISO format

Interface method: XMLs are published directly on the bank interface via API calls

FinTPc groups financial transactions by any predefined fields, formats them according to each bank specification and batches them.

Financial message structure:

The structure is described in: [ISO20022 pain.001.001.03 format](#)

3.5.2 FAPI04 – External application interface method for financial transactions – Transaction reports

Functional requirements

FinTPc-API Interface fetches transaction reports from external applications in the following format:

- JSON format

3.5.2.1 API JSON format

Interface method: files fetched directly from on the bank interface via API calls

Financial message structure:

The structure of file is described in:

[JSON structure – Request->GET](#)

[JSON structure - Response](#)

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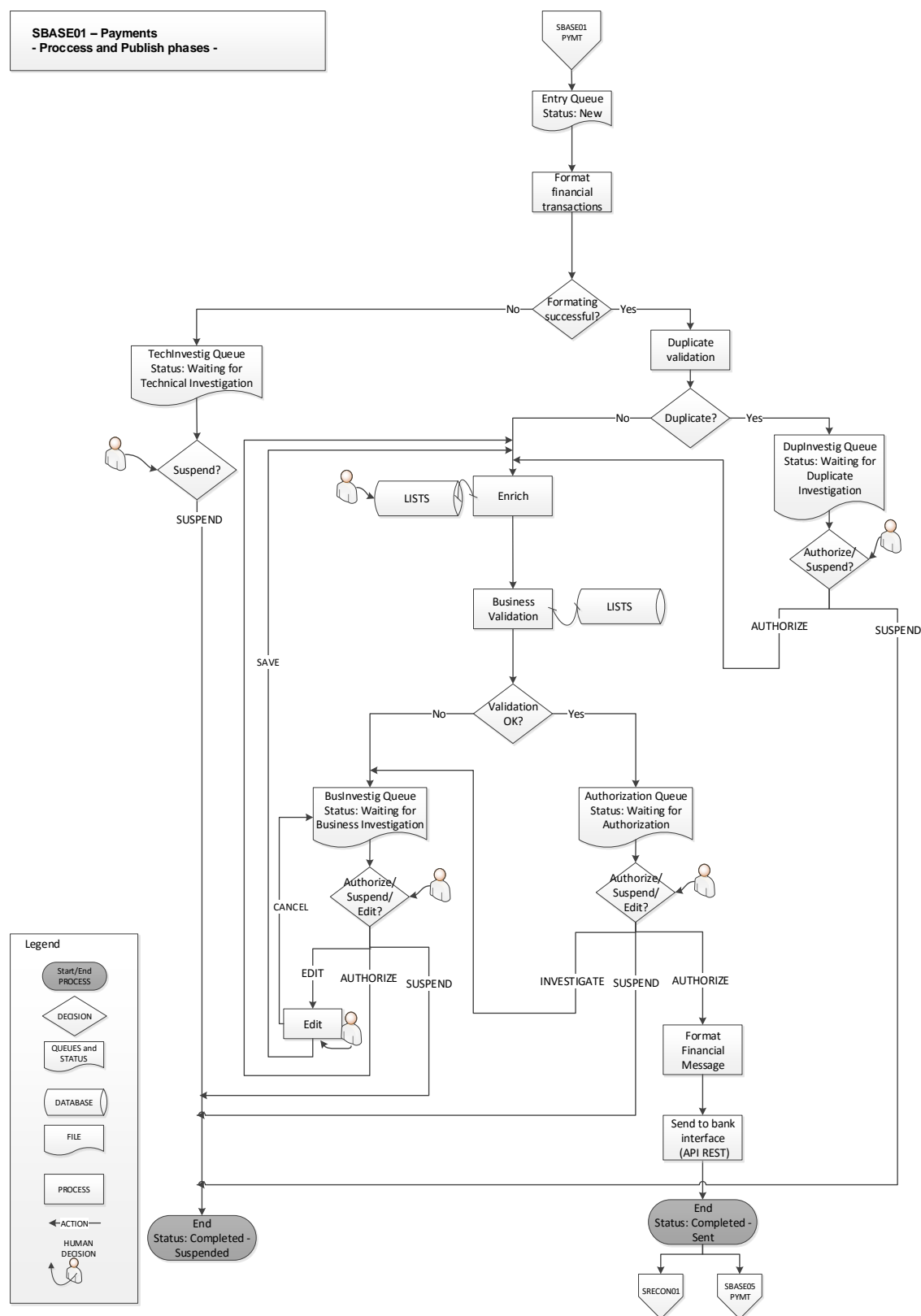


3.6 Transactions processing

3.6.1 SAPI01 – Payments: Process and Publish phases

Scenario

SBASE01 – Payments
- Process and Publish phases -



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Functional requirements:

[FAPI01 – User Management](#)

[FAPI02 – Application configurations](#)

[FAPI03 – External application interface method for financial transactions – Payments](#)

[FAPI08 - Transactions](#)

[FAPI09 – Transform financial messages and transactions](#)

[FAPI18 – Audit Trails](#)

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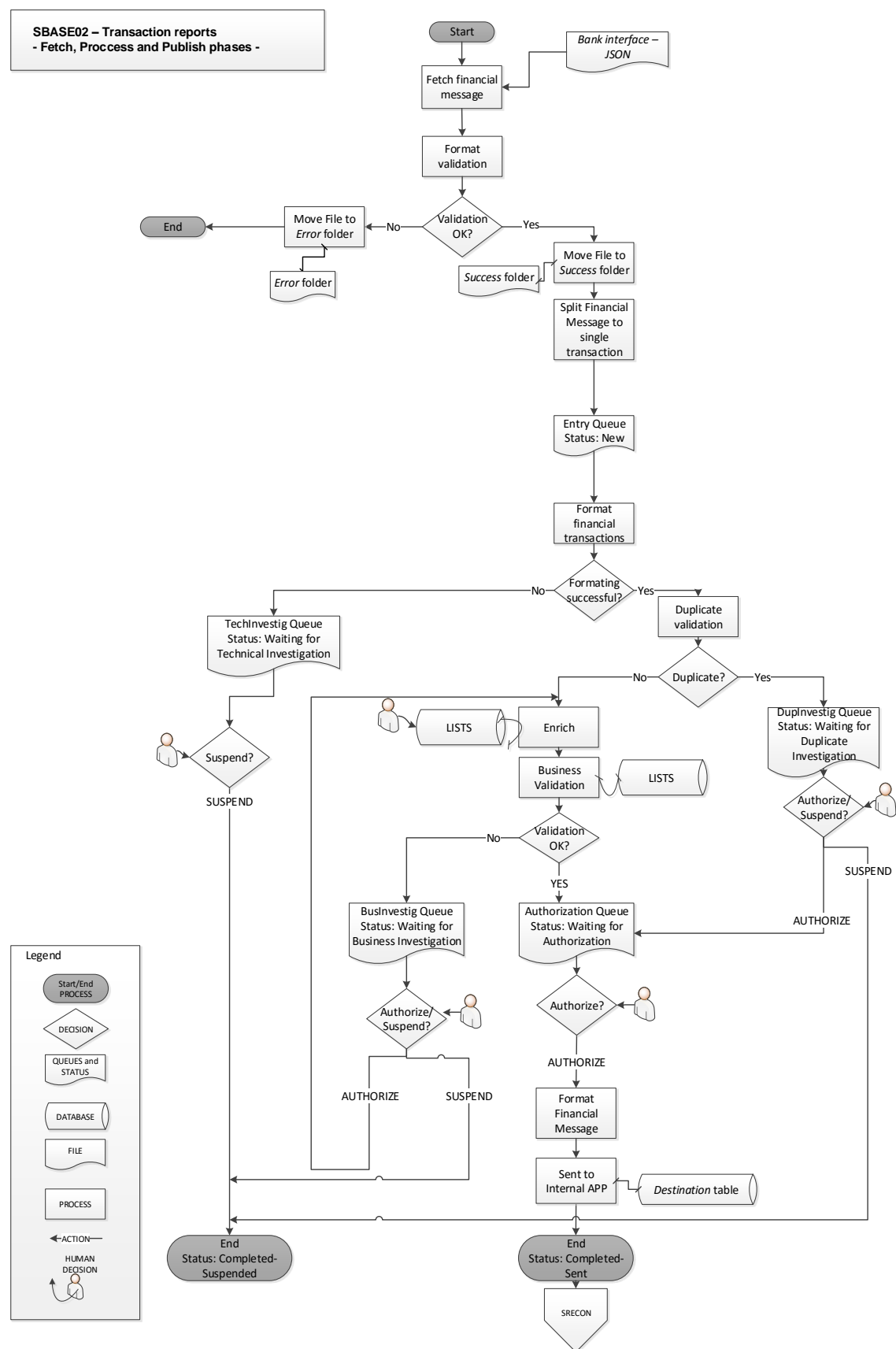


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3.6.2 SAPI02 – Transaction reports: Fetch, process and publish phases

Scenario



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Functional requirements:

[FAPI01 – User Management](#)

[FAPI02 – Application configurations](#)

[FAPI07 – External application interface method for financial transactions
– Transaction reports](#)

[FAPI08 - Transactions](#)

[FAPI09 – Transform financial messages and transactions](#)

[FAPI16 – Reports and statistics](#)

[FAPI18 – Audit Trails](#)

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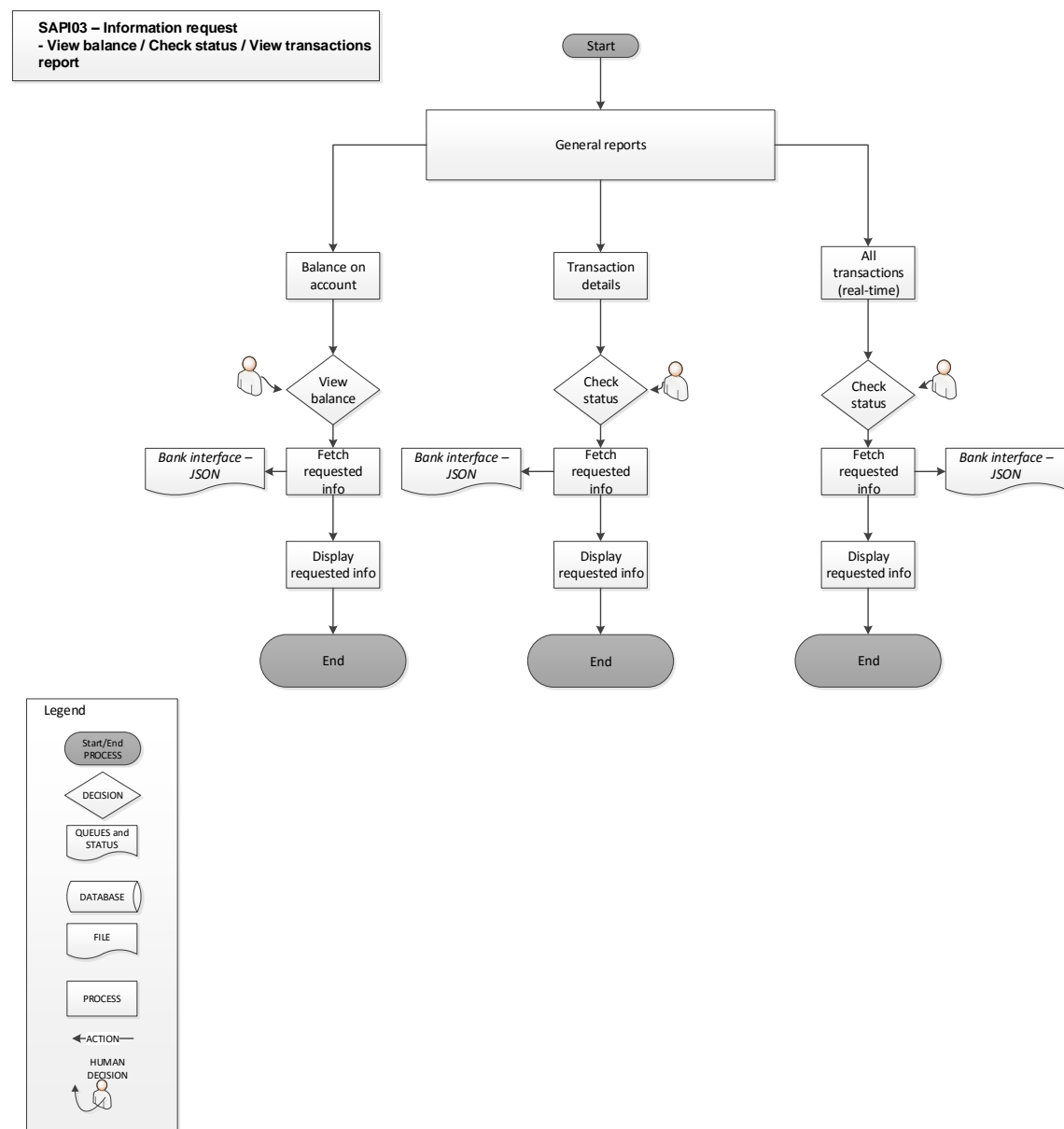


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3.6.3 SAPI03 – Accounts - Information request: View balance / Check status / View transactions report

Scenario



Functional requirements:

[FAPI01 – User Management](#)

[FAPI02 – Application configurations](#)

[FAPI08 - Transactions](#)

[FAPI16 – Reports and statistics](#)

[FAPI18 – Audit Trails](#)

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3.6.4 FAPI05 - Transactions

Financial transactions (manually created in FinTPc-API Interface or fetched from internal/ external application) are routed to specific queues depending on their Business Area and other business needs. The user can view the transactions that have been sent to the external applications from the authorisation queues. These transactions are pushed automatically on the bank's interface.

In the reports section on the FinTPc-API Interface, the user can view the balance of a specific account, according to its predefined Transaction and template access rights described in [FAPI01– User Management](#).

3.6.4.1 FinTPc-API Interface transactions formats

3.6.4.1.1 Transactions report

Sheet: map External -> FinTPc transaction reports (JSON)

3.6.4.2 User Action Types

Transactions held in reports (for the outgoing flow) may be operated by users with the following actions:

- View balance (*Transaction level action*): Displays the balance for each account corresponding to a specific transaction. This involves the following details of the balance: transaction status, transaction fees and transaction history
- Check status (*Transaction details level action*): Provides the status of a specific transaction
- View transactions report (*Transaction level action*): Displays all the transactions for a specific interval in real-time. The purpose of this action is not to process the information corresponding to the request, but only to be viewed.

The structure of the actions above-mentioned are described in [Data Structures](#)

3.6.5 FAPI06 – Transform financial messages and transactions

According to each specific scenario, FinTPc-API Interface:

- fetches financial messages from internal or external applications, formats and splits them into single financial transactions according to scenario they belong to
- groups more financial transactions, formats, compiles into batches and publishes them to internal applications and automatically to the external interfaces according to the scenario they belong to

The transformation of a transaction from a specific format to another one is made based on the corresponding mapping.

See mappings in “data structures and mapping.xlsx” attached in the [Data Structures](#) as follow:

- FinTPc to external application, Payments Business Area: sheet “map FinTPc->pain pymt”

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- External application to FinTPc, Statements Business Area: sheet “map External->FinTPc transaction reports

3.7 Reporting

3.7.1 FAPI07 – Reports and statistics

Functional requirements

FinTPc-API Interface provides various types of reports, built based on real-time information via APIs:

- Available balance (filtering by bank/accounts)
- Transaction details (including the transaction fees)
- Transaction status

All the information provided by APIs on API interfaces are not processed stored by FinTPc.

3.8 Audit Trails

3.8.1 FAPI08 – Audit Trails

Functional requirements

FinTPc-API Interface collects and records various logs and events such as errors, informational events and warnings needed for further investigation.

Events are available for users with predefined rights described in [FAPI01– User Management](#).

The following **events** are recorded by FinTPc-API Interface:

- The action decisions performed by each user that result in modifying application content or financial transactions’ content or status (including reason – Operation details)
- Successful and failed application authorization attempts
- Application components startup and shutdown
- Application failures
- The synchronisation of internal accounts or real-time reports for each API call
- Any other event that deviates from the normal behaviour of the application

Events can be traced and investigated running [Events Report](#). All the details recorded for an event can be viewed by accessing the event. Older events are archived and still accessible in the future as is required by incidents or investigation.

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4 External Interface Requirements

4.1 User Interfaces

<Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that will appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed. Details of the user interface design should be documented in a separate user interface specification.>

The user interface of **FinTPc-API Interface**

- Is web-based and compatible with popular web browsers such as Chrome, Internet Explorer and Mozilla Firefox
- Is easy to use, intuitive and simple to navigate through. The design (layout, colours, fonts and sizes) provides user with easy to read information and feedback
- There shouldn't be any unnecessary elements that bring ambiguity and complexity
- Is able to support multiple languages – either through mechanisms embedded application or through third-party add-ons to the web browsers
- Most application screens provide a contextual help facility that describes the purpose of the screen & possible actions
- Navigating through screens should take into account that users are familiar with the web browser actions – Refresh, Back, Forward. This behaviour should not lead to errors or unexpected behaviour
- Implements high security mechanisms and protection against most common attacks (SQL Injection, access to unauthorized data, etc) defined by OWASP

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4.2 Hardware Interfaces

<Describe the logical and physical characteristics of each interface between the software product and the hardware components of the system. This may include the supported device types, the nature of the data and control interactions between the software and the hardware, and communication protocols to be used.>

Hardware interfaces are out of the scope of this document.

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4.3 Software Interfaces

<Describe the connections between this product and other specific software components (name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Identify the data items or messages coming into the system and going out and describe the purpose of each. Describe the services needed and the nature of communications. Refer to documents that describe detailed application programming interface protocols. Identify data that will be shared across software components. If the data sharing mechanism must be implemented in a specific way (for example, use of a global data area in a multitasking operating system), specify this as an implementation constraint.>

FinTPc is a financial middleware that integrates various systems, heterogeneous from technological perspective, and provides operational and business functionality to end-users. In this respect, FinTPc represents a client-server application, where users and administrators connect through a dedicated user interface, web browser based, to perform various actions related to the workflows defined. At the same time, the server side is configured to perform processing, automating financial flows inside the corporation by integrating other applications from the payment system.

The following FinTPc interfaces are defined:

- Between FinTPc components. These interfaces are described in the architecture documents of FinTPc, where the relations between application components detailed
- Between FinTPc and other applications. These interfaces are usually bi-directional -> messages are fetched from an application and imported into FinTPc and messages are send to an application from FinTPc. The interfaces between applications are described in detail in chapter 3, from a technological perspective (files, database, web service, and so on) and from a data format perspective (flat file, xml, csv/excel, fin)
- Between FinTPc and users. The interaction is ensured by user interface, available as a web based application

FinTPc has to be aligned to the latest versions of prerequisite software, in order to benefit from support ensured either by vendors or other open source communities.

Choices of software prerequisites are out of the scope of this document.

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4.4 Communications Interfaces

<Describe the requirements associated with any communications functions required by this product, including e-mail, web browser, network server communications protocols, electronic forms, and so on. Define any pertinent message formatting. Identify any communication standards that will be used, such as FTP or HTTP. Specify any communication security or encryption issues, data transfer rates, and synchronization mechanisms.>

FinTPc has to be able to interface with any application that generates or imports financial transactions in a structured data format. This document can't contain all possible interfaces, but describes most popular data formats, technologies and protocols that have to be implemented by FinTPc. FinTPc has to be able to implement data formats and interfaces other than the ones described in this document with reasonable development / configuration effort.

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5 Other Non-functional Requirements

5.1 Performance Requirements

<If there are performance requirements for the product under various circumstances, state them here and explain their rationale, to help the developers understand the intent and make suitable design choices. Specify the timing relationships for real time systems. Make such requirements as specific as possible. You may need to state performance requirements for individual functional requirements or features.>

5.1.1 PERFAPI01 – Concurrent user access

FinTPc is an application used by corporations to automate their financial flows. Typical users are from IT side and Operational side (Treasury, Human Resources, Accounting, and Management). FinTPc has to be able to handle request from an estimated number of 50 concurrent users. Each request should be resolved in a reasonable time – for normal navigation users should not wait longer than 1 second, while for complex processing (generating complex reports with specific criteria) responses should not take longer than 5 seconds.

5.1.2 PERFAPI02 – Performance process transaction

The processing in FinTPc is dependent to business hours, because data generation from other applications, banks and FinTPc happen during these times. FinTPc has to be able to comfortably process daily volumes estimated by corporations (usually less than 10 000 daily transactions). The application should have to be able to scale by adding hardware resources, to some extent.

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5.2 Safety Requirements

<Specify those requirements that are concerned with possible loss, damage, or harm that could result from the use of the product. Define any safeguards or actions that must be taken, as well as actions that must be prevented. Refer to any external policies or regulations that state safety issues that affect the product's design or use. Define any safety certifications that must be satisfied.>

Details of complying with safety best practices from industry are out of the scope of this document. The application configuration has to accommodate various deployment scenarios, backup and restore mechanisms, resiliency capacities in line with industry standards (ISO 9001, ISO 270001) and that can be accommodated to internal policies of corporations.

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5.3 Security Requirements

<Specify any requirements regarding security or privacy issues surrounding use of the product or protection of the data used or created by the product. Define any user identity authentication requirements. Refer to any external policies or regulations containing security issues that affect the product. Define any security or privacy certifications that must be satisfied.>

5.3.1 SECUBASE01 - Lock unauthorized access

FinTPc provides protection against unauthorized access to data, through user interface or other communication protocols. Users have to be granted special access rights.

This requirement is implemented across all application component (User Interface, Application Interfaces, business rules engine)

- User interface:
 - User authentication is performed by integrating with Active Directory or another LDAP application. Users log in the application using their domain credentials.
 - Users are granted access to FinTPc in the LDAP application, which also manages password complexity & expiration, locked account status
 - User authorization is performed based on the rights defined in FinTPc
- Application Interfaces, Business rules engine:
 - Data transfer at communication level supports latest version of SSL encryption
 - Communication protocols are configured using the secure protocol when the other applications support it as well (FTPS instead of FTP, HTTPS instead of HTTP)
 - Data should be stored in encrypted format
 - All passwords are encrypted in configuration files

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5.4 Software Quality Attributes

<Specify any additional quality characteristics for the product that will be important to either the customers or the developers. Some to consider are: adaptability, availability, correctness, flexibility, interoperability, maintainability, portability, reliability, reusability, robustness, testability, and usability. Write these to be specific, quantitative, and verifiable when possible. At the least, clarify the relative preferences for various attributes, such as ease of use over ease of learning.>

5.4.1 SQABASE01 – Availability

FinTPc shall meet or exceed 99.99% uptime.

FinTPc shall not be unavailable more than 1 hour per 1000 hours of operation.

FinTPc needs less than 20 seconds to restart after a failure 95% of the time.

5.4.2 SQABASE02 – Maintainability

Upgrades to FinTPc are usually dictated by changes to the applications it is interfacing with, technology upgrades of its prerequisites, updates on the financial standards and regulation implemented and integration of new workflows and functionality.

Any upgrades of FinTPc, irrespective of the motive, should be implemented taking into account the impact they have on the functionality and historical data processed.

Changes to FinTP, irrespective of the motive, should not affect historical data. All past processing data corresponding to FinTPc has to be displayed in the various reports implemented.

5.4.3 SQABASE03 – Flexibility

The application shall have the ability to make changes quickly and cost effectively, in case of extension with new functionality or deleting unwanted capabilities.

5.4.4 SQABASE04 – Portability

No more than 5% of the system implementation shall be specific to the operating system.

When the replacement of the current database with another database version or type is needed, no data loss should ensue.

5.4.5 SQABASE05 – Reusability

The application should have the ability to reuse as many components from existing applications when creating new applications.

5.4.6 SQABASE06 – Robustness

The application should not have data loss in case of a major disaster such as a fire or a flood, or even a minor one like a local power outage or disk crash.

This requirement may be implemented through:

- Using HW with corresponding mechanism (RAID, mirroring)HW with UPS
- Operational procedures that provide procedures of save, monitoring, data restore

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5.4.7 SQABASE07 – Usability

The application and subsequent patches should be able to be easily installed by an administrator (small number of steps have to be followed).

Application installation kit and patches should be able to be downloaded from a special location via a secured interface (e.g. secure ftp).

5.4.8 SQABASE08 – Reliability

No more than 1 per 1000000 transactions shall result in a failure requiring a system restart.

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<Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>

Appendix A: Glossary

<Define all the terms necessary to properly interpret the SRS, including acronyms and abbreviations. You may wish to build a separate glossary that spans multiple projects or the entire organization, and just include terms specific to a single project in each SRS.>

AISP = Account Information Service Provider
 API = Application Programming Interface
 ASPSP = Account Servicing Payment Service Provider
 BIC = Bank Identifier Code
 PISP = Payment Initiation Services Provider
 PSD2 = Payment Service Direct 2
 PSP = Payment Services Provider
 PSU = Payment Services User
 SCA = Strong Customer Authentication
 SMEs = Small and Medium-sized Enterprises
 TOSS = Treasure Open Source Software
 TPP = Third Party Provider

Appendix B: Analysis Models

<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams.>

Appendix C: Issues List

< This is a dynamic list of the open requirements issues that remain to be resolved, including TBDs, pending decisions, information that is needed, conflicts awaiting resolution, and the like.>

Appendix D: Definitions

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