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 From:
 Alexandru Para-Goropceanu

 Subject:
 SRS- Benchmarking Tool Release FinTP Tracker



Project: TOSS - Benchmarking Tool Release FinTP Tracker

Version: 2 Date: 15.11.2017

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 Subject:
 SRS- Benchmarking Tool Release FinTP Tracker



Document Control

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Author:	Alexandru Para

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Subject: SRS- Benchmarking Tool Release FinTP Tracker

Introduction

1

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.>

In computing, a benchmark is the act of running a computer program, a set of programs, or other operations, in order to assess the relative performance of an object, normally by running a number of standard tests and trials against it. The term 'benchmark' is also mostly utilized for the purposes of elaborately designed benchmarking programs themselves.

Benchmarking is usually associated with assessing performance characteristics of computer hardware, for example, the floating point operation performance of a CPU, but there are circumstances when the technique is also applicable to software. Software benchmarks are, for example, run against compilers or database management systems.

Benchmarks provide a method of comparing the performance of various subsystems across different chip/system architectures.

Benchmarks are designed to mimic a particular type of workload on a component or system. Synthetic benchmarks do this by specially created programs that impose the workload on the component. Application benchmarks run real-world programs on the system. While application benchmarks usually give a much better measure of real-world performance on a given system, synthetic benchmarks are Systems (Alevo) SRL useful for testing individual components, like a hard disk or networking device, or software components like certain component responsible for some processing from the overall workflow.

FinTP Tracker is a benchmarking tool that performs relevant performance analysis for FinTPc.

FinTP Tracker has to be able to support

- 1. different deployment architectures
 - a. different hardware configuration;
 - b. distributed or single server architectures;
 - c. clusters;
 - d. different versions of prerequisites
 - e. different technical interfaces with other applications
- 2. different operational architectures



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- a. features
- b. flows
- c. custom configurations

FinTP Tracker addresses mostly technical teams, ranging from engineers in infrastructure, administration and operational support that are responsible for implementing and maintaining FinTPc to developers and testers who might need to investigate bottlenecks and other performance issues discovered on certain configurations.

FinTP Tracker provides relevant performance analysis that assists technical teams in investigating performance issues and in validating a combination of deployment architectures (hardware and software) and operational architectures (different flows and configurations).

The role of FinTP Tracker is to provide benchmarking reports for technical personnel that ensure validation and confidence for the FinTPc deployment solution, required for planning the promote to production in different scenarios:

- new deployments of FinTPc with specific configurations
- technological upgrades, new hardware platforms on existing deployments of FinTPc
- new business flows or changes in the existing flows on existing deployments of FinTPc

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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 2.2 Product Features, all features are listed with a short description and priority associated

- Priority 1 mandatory feature
- Priority 2 nice to be feature

In chapter 3 System Features, scenarios and functionalities will have names like

- SUNXX scenario number xx, mandatory
- FUNXX functionality number xx, 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.>

Business analyst Solution architect Developer Tester Implementer Project manager

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12.03.2020







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1.4 **Project Scope**

<Provide a short description of the software being specified and its purpose,</p> 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, corporations, public administrations, and micro-financing institutions to:

- 1. consolidate business work flows
- 2. Create flexible interfaces for various market infrastructures
- 3. Process various kinds of funds transfers (such as credit transfer, direct debit, debit instruments, treasury flows) while providing safe operations and duplicate detection
- 4. 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 **Business Information** reliable messages delivery (with persistent End To End transactions, assurance Systems (Allevo) SRL that messages are delivered and not duplicated) and its processing capacity Sediu social: 23 Coltei S 23 Coltei St., 030245 Bucharest, Romania (number of messages processed over a period of time, eliminating the waiting Sediu executiv: 23C Calea Vitan, 031281 times). Bucharest, Romania

In 2017 Allevo starts the TOSS project, aimed to develop FinTPc, an innovative +40212554577 +40212554577 software solution for the processing of financial transactions for corporations, ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁹ Website: www.allevo.ro distributed in open source. FinTPc can be seen an extension of FinTP, following^{Capital social: 2.412.000 lei} the same high-level architecture, but will feature a new user interface and reworked^{CIF: RO5258486}_{SWIFT PIC: PTSAROAA} DUNS: 55-244-8078 functionalities and workflows, addressing specific corporate flows. Certificat ISO 9001:2015

FinTPc is an application suite that provides corporate treasuries with the following functionality: Intertek

Certificat ISO/IEC 27001:2013 Integration of all payments initiated by ERP systems, human resources, etc. of the corporation - representing supplier invoices; taxes, duties and excise duties; salaries etc. .; Intertek

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- 2. Creating automatic / manual payment instructions;
- 3. Organization of payments by type or by paying company (according to the internal nomenclature);
- 4. Defining layouts and layout lists for repetitive or multiple payments;
- 5. Manual payment correction;
- 6. Enrichment of payment instructions with useful information for registration, monitoring, reconciliation and reporting;
- 7. Report by supplier, appropriate account in the accounting plan, location, reporting codes;
- 8. Validation of payment instructions (created manually or imported from ERP);
- 9. Detecting possible duplicate instructions based on configurable criteria;
- 10. Checking supplier accounts with 'black' lists;
- 11. Validating the IBAN format;
- 12. Investigating, correcting, canceling and / or authorizing payment instructions;
- 13. Generating Swift standard payment messages (MT101, ISO20022 pain.001);
- 14. Initiating the accounting for manual payment instructions;
- 15. Importing statements of account;
- 16. Routing incoming messages (receipts or confirmations) to internal applications (ERP, accounting, human resources, etc.);
- 17. Reconciliation of payments with supplier invoices;
- 18. Reconciliation of receipts with invoices issued;
- 19. Reconciliation of accounting records with account statements;
- 20. Pre-defined reports and client-specific customization (supplier reports, bank reports, possible duplicates, canceled instructions, search for payment instructions according to various criteria);
- 21. Defining and managing user groups by their role profile;
- 22. Auditing user activity;
- 23. Archiving transactions and reporting archived data;

- Business Information Systems (Allevo) SRL Sediu social: 23 Coltei St., 030245
- 24. Comprehensive product documentation source and rewrite code, operation and administration of FinTPc executable code.

FinTP Tracker will be developed as a feature of FinTPc, providing performance ^{Tel}/fax: reports required by infrastructure architects in corporations. Having the possibility ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁸ ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁸ ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁹ to request a benchmark for a particular architecture and configuration, and the ^{Website: www.allevo.ro} Capital social: 2.412.000 lei possibility to add a monitoring capability for a critical production environment, adds ^{RC: J402067/94} CIF: RO5258486 credibility to FinTPc and might be a decision-driver for a potential FinTPc adopter. ^{SWIFT PIC: PTSAROAA} DUNS: 55-244.8078



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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
- FinTPc SRS
- FinTPc Architecture and Design document
- Documentation on benchmarking process for computing and software

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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.>

There are two sets of performance metrics which have to be closely monitored.

The first one is the transactions processing rate, which can be measured on certain checkpoint along the configured business flow. The transactions processing rate represents the volume of transactions (or number) which are successfully processed during a period of time. Each processing step on the end to end flow is done transactional, meaning it will only commit changes if the action succeeds or otherwise everything is rolled back. Each completed processing step, either ended with success or failure, generates an event in the FinTP application which includes a unique transaction ID, processing details and a timestamp. The transactions processing rate is measured based on these events.

The Second set of performance metrics measures the computational resources used by the application for the load, indicating whether there is adequate capacity to support the load, as well as possible locations of a performance bottleneck or an under-sizing of the hardware resources. Measurement of these Systems (Alevo) SRL quantities establishes an empirical performance baseline for the application. The Sediu social: 23 Coties tt, 030245 baseline can then be used to detect changes in performance. Changes in Sediu executiv: performance can be correlated with external events and subsequently used to 23 Coties Viano (23 Coties Via

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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.>

# Requirement - functional	Priority	Notes	
 Collect performance data from computing components with different tools 	1	Find tools, configure to start & record performance indicators for different hardware components	
2. Generate benchmark reports that cover overall processing, with possibility to add filter criteria like flow, component, time interval	1	 Built in natively in FinTPc, allows users to configure the performance measurement environment: All financial instruments included in performance evaluation data sets corresponding to external communication channels and back-office / ERP systems Defining intermediate measurement points Monitor and control the measurement record and report measurement results support for investigating components that introduce additional latanaica 	Business Information Systems (Allevo) SRL Sediu social: 23 Coltei SL, 030245 Bucharest, Romania Sediu executiv: 23C Calea Vitan, 031281 Bucharest, Romania Tel / fax: +40212554577 +40212554578 +40212554578 +40212554579 Website: www.allevo.ro Capital social: 2.412.000 lei RC: J40/2067/94 CIF: RO5258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015



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0.	Calculate complexity of processing flow	2	develop a complexity matrix that takes into account routing rules, technologies and other parameters that influence the performance
4.	Save context configuration for a certain benchmark test (hardware and software resources, routing logic)	2	archives the history of measurement results together with the context in which they are performed (configuration, software versions, data set versions)
5.	Provides support for defining test data and performance evaluation scenarios by guiding user through procedures and templates	2	 Depending on the complexity - defining, importing and editing performance evaluation scenarios Depending on complexity - defining, importing and editing data sets
#	Requirement – non functional	Priority	Notes
#	Requirement–nonfunctionalFinTPcupgradesdon'taffectbenchmarks(pastor future)	Priority 1	Notes must be periodically updated for compliance with the new regulations and the new applicable financial standards



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3.	Source code is published on GitHub with the same	1	FinTP Tracl source	ker is ar	an open
	license as FinTPc		published	on .	GitHub
			(source	code	and
			executable	code	fintp.org der the
			GPL V3 lice	ense a	s well as
			FinTPc		

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<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 favored user classes from those who are less important to satisfy.>

FinTP Tracker will be used mostly in the following situations

- 1. by potential adopters of FinTPc, in order to gain confidence that the application can process the target configuration for the estimated volumes and establish the hardware resources needed to safely exploit the application
- 2. By existing adopters of FinTPc, when the payment system is going through anticipated changes (new or different workflows, increase in volumes, software/functional upgrades, hardware upgrades or migration to different environment, and so on). This ensures confidence that the system will perform as expected after the planned changes are implemented

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Operating Environment 2.4

<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.>

FinTP Tracker has to be able to run on all architectures supported by FinTPc.

FinTPc has the following logical architecture:



The above architecture illustrates FinTPc connectivity to other applications, as well Certificat ISO 9001:2015 as the main layers of the application and data flows. Further on, the logical and B B physical architecture characteristics are described. UKAS MANAGEMENT SYSTEMS









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Logical architecture:

- 1. Presentation layer: the user interface (UI) is web based. It
 - a. uses direct access to data for business/operations reports
 - b. translates user's action into jobs for the business components (e.g. authorize, reject etc.) and publishes them in the job queues
- 2. Business: the main components are the Routing Engine and the Events Monitor. It
 - a. fetches jobs from the job queues and executes them in parallel
 - b. automates financial messages tasks, such as technological reconciliation, batching and de-batching
 - c. synchronizes and publishes events related to performance/count of transactions from all components
- 3. Data: Connectors:
 - a. Using a transactional transport layer, the connectors fetch/publish data to the partner applications (back-office / ERP, SWIFT, treasury etc.)
 - b. Ensure for message batching / de-batching
 - c. Embed business data in an envelope that allows non-invasive tracking and audit to be performed
 - d. Send events related to performance/count of transactions
 - e. Perform various data validations against lists and algorithms

The native internal data format is ISO20022.

Physical architecture¹²:

- 1. Scenario 1: Single server installation (recommended for a low number of transactions³ - i.e. several thousand a day)
 - a. All components are installed on a single machine.
 - b. The connectors will access remote or local data.
- 2. Scenario 2: Single server with distributed data (preferred installation type for a Business Information Systems (Allevo) SRL medium number of transactions - i.e. several tens of thousands a day) Sediu social: 23 Coltei St., 030245
 - a. All components except connectors are installed on a single machine.
 - Bucharest, Romania b. The connectors are deployed as close to the business data source as Sedu executive possible and will use a transactional transport layer to send data back ^{23C Calea Vitan, 031281} Bucharest, Romania and forth to the server. Tel / fax: +40212554577
- 3. Scenario 3: Multi server installation (optimized for scalability i.e. several +40212554578 +40212554579 hundred thousand transactions a day) Website: www.allevo.ro
 - a. Routing Engine can be deployed to a dedicated server. It will use the Capital social: 2.412.000 lei available number of processors to run parallel jobs. available number of processors to run parallel jobs. SWIFT PIC: PTSAROAA
 - b. Events Monitor can be deployed to a dedicated server.

¹ All scenarios support high availability cluster architectures for improved resiliency and

³ End to end transactions (including all acknowledgments, confirmations and so on)

² All scenarios support virtual environments (VMWare, HyperV and so on)

c. Data server can be deployed to a dedicated server or multiple servers.

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Finanțat în cadrul POC, Axa prioritară 2, Acțiunea 2.1, Prioritate de investiții 2b, Cod MySMIS: 115724, Nr. Contract Finantare: 101/16.08.2017

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- d. Web application server and application can be deployed to a dedicated server.
- e. The connectors are deployed as close to the business data source as possible and will use a transactional transport layer to send data back and forth to the server.

A sample low complexity architecture



In this sample architecture, all components are installed on a single server - Intertek Inter



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applications (External: Internet Banking, SWIFT Network⁴; Internal: ERP for different types of transactions) is ensured by files on the local server.

A sample high complexity architecture



multiple platforms as follows:

Capital social: 2.412.000 lei 1. AMQ is installed on a Linux server, with cluster configuration for HA -RC: J40/2067/94 failover mechanism on a second node in standby. The application is SWIFT PIC: PTSAROAA DUNS: 55-244-8078 installed on both nodes, while the data is on a common SAN Storage in Certificat ISO 9001:2015 RAID configuration, shared between the two nodes.



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⁴ SWIFT provides infrastructure for RTGS Systems (High Value Payments) and cross boarder payments, for the banking industry world-wide. Finanțat în cadrul POC, Axa prioritară 2, Acțiunea 2.1, Prioritate de investiții 2b,







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- 2. **FinTPc** is installed on a Linux server, with cluster configuration for HA failover mechanism on a second node in standby. The application is installed on SAN Storage in RAID configuration, shared between the two nodes.
- 3. **Postgres** is installed on a Linux server, with cluster configuration for HA failover mechanism on a second node in standby. The application is installed on both nodes, while the data is on a common SAN Storage in RAID configuration, shared between the two nodes. There is also a standby database on a backup environment, replicated with dataguard
- **4. Apache Tomcat** is installed on a Linux configured in cluster, with load balancing on two nodes. The User Interface and API are called through an Apache HTTP Server, who manages the workload between the two nodes
- 5. FinTPc Connectors are installed either on the FinTPc Server (for external interfaces to Internet Banking via Files and SWIFTNet via sftp) or on the backoffice system (for internal applications, interfacing through WebServices or Database Tables and sending messages to FinTP through AMQ)

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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 Tracker is a tool dedicated to generate performance reports based on FinTPc transaction processing flows. In this respect, all technologies, message flows, components, interfaces, architectures supported and implemented by FinTPc have to be compatible with the way FinTPc is built.

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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 described in the following Manuals of FinTPc:

- User manual
- Installation and administration manual

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<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).>

The performance experienced by end users of the application is out of the scope of FinTP Tracker. The impact that the user interactions have on the overall load of the application is not considered, mainly because of the design and characteristics of FinTPc. First of all, the application is usually accessed by a reduced number of users in the BackOffice operations department. Second, the user actions which can affect the performance (generating various reports and so on) are interacting mostly with different database objects than the processing queues. Third, we ignore the delays in processing which are generated by steps in the flow that wait for user decision and action, either by configuring an STP workflow or by ignoring the time elapsed between the hold status trigger and the user decision.

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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 behavior 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.>

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overview of FinTPc. FinTPc interfaces with the corporation's applications and with the bank interfaces. FinTP-Tracker collects data from transaction processing Intertek Certificat ISO/IEC 27001:2013 and computing and the delivers various report to users that provide insights into the performance of the system.



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3.1 SUN01 – Log performance metrics on computational resources

Scenario

#	Requirement - functional	Priority	Notes
1.	Collect performance data from computing components with different tools	1	Find tools, configure to start & record performance indicators for different hardware components

FinTP Tracker can be prompted to collect performance metrics of computational resources used by the application components, during a scheduled load/volume test or anticipated processing peak on the FinTPc environment. The logged data indicates whether there is adequate capacity assigned on the system to support the load, as well as possible locations of performance bottlenecks or under-sizing of the hardware resources. Measurement of these quantities establishes an empirical performance baseline for the application. The baseline can then be used to detect changes in performance. Changes in performance can be correlated with external events and subsequently used to predict future changes in application performance.

The main performance indicators that have to be monitored during processing are processor, CPU, disk I/O and network traffic. The tools which can be used to monitor these resources vary depending on the operating system, virtualization, and others. It is out the scope of this document to describe such monitoring mechanism. Some available tools include vmstat, iostat, topas and Systems (Allevo) SRL Sediu social: nmon. The results are however very important, because if either of these indicators 23 Coltei St., 030245 Bucharest, Romania reach levels close to 100%, then a hardware upgrade would provide a boost of Sediu executive 23C Calea Vitan, 031281 performance. Bucharest, Romania Tel / fax:

+40212554577 The collected data should include the following information. The format has +40212554578 +40212554579 to be user friendly, but not necessarily respect the layout below. Website: www.allevo.ro Capital social: 2.412.000 lei

	FinTP	Start of	End of	CPU		RAM		Disk I/O		CIF: R05258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078
	Component	Processing - Timestamp	Processing Timestamp	Average	Peak	Average	Peak	Average	Peak	
1	FinTP BackOffice connector	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%	Intertek W OKANY Certificat ISO/IEC 27001



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2	FinTP Message Collector	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
3	Routing Engine	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
4	FinTP External Connector	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
5	Application server	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
6	Database	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
7	Middleware	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%
8	Overall System	2017-10- 10T10:56:26	2017-10- 10T13:56:26	<70%	80%	<6GB	8GB	<60%	90%

SUN02 – Benchmark Reports 3.2

Scenario

#	Requirement - functional	Priority	Notes	
1	Generate benchmark reports that cover overall processing, with possibility to add filter criteria like flow, component, time interval	1	 Built in natively in FinTPc, allows users to configure the performance measurement environment: All financial instruments included in performance evaluation data sets corresponding to external communication channels and back-office / ERP systems Defining intermediate measurement points Monitor and control the measurement record and report measurement results 	Business Information Systems (Allevo) SRL Sediu social: 23 Coltei St., 030245 Bucharest, Romania Sediu executiv: 23C Calea Vitan, 031281 Bucharest, Romania Tel / fax: +40212554577 +40212554579 Website: www.allevo.ro Capital social: 2.412.000 lei RC: J40/2067/94 CIF: RO5258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015



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	support for investigating components that introduce
	additional latencies

FinTPc has dedicated predefined reports for FinTP Tracker. FinTP Tracker reports are available for users with the Application Administration right assigned in the application. Users can login into FinTPc and retrieve benchmark data by accessing the dedicated Tracker Reports.

The reports can be logically split into three categories, based on their scope:

- 1. Performance Monitoring These reports are useful for live environments that follow business patterns of transactions processing and represent a performance baseline for the specific system, configuration and workflows. The reports indicate if the system performs business processing in a timely manner and can represent a baseline useful when rolling out changes to the system (business/technological upgrades, new functionalities, workflows, configurations). These reports do not reflect the maximum processing performance, given that performance is influenced by external factors (interfaces with other applications, user intervention, and specific use cases). Users can generate these reports based on static data. The static data is automatically collected daily and contains performance processing information.
- 2. Benchmark Reporting These reports are useful to determine the best performance of a system with specific hardware/software configuration and specific workflows. These reports can be generated mostly on test environments, where external factors that might impact performance of FinTP can be contained (like interfaces with other applications, user ^{Business Information} systems (Alevo) SRL intervention, and specific use cases). Users can generate these reports ^{Sediu social: 23 Colte SL, 030245} based on static data. The static data is automatically collected daily and ^{Sediu sediu transplaced Vitan, 031281} Bucharest, Romania
- 3. Live Reports These reports are useful to determine the processing ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁷/₊₄₀₂₁₂₅₅₄₅₇₈ performance of a system in real time, indicating if there are issues that need ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁹/₊₄₀₂₁₂₅₅₄₅₇₉ to be further investigated and resolved. These reports can impact the ^{Website: www.allevo.ro} Capital social: 2.412.000 lei RC: J40/2087/94 CIF: R05258486

In order to generate relevant benchmark or performance reports, the following conditions have to be met:

The transactions are available in the live database of FinTPc when the user tries to generate the report or when the data collection occurs – e.g.
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 Transactions were not archived or purged



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2. The transactions are processed in larger volumes, not distributed throughout the day – i.e. the reports are generated for load tests, processing during peak volumes, and so on

The following chapters (named FUN %) contain information on the FinTP Tracker reports – type of information which can be received, availability, and so on.

3.2.1 FUN01 – General Report

The general report provides a dashboard overview of all transaction processing in the application during a business day.

The data for this report is scheduled to be collected and stored for every business day (defined as a workday in business day calendar). This process takes place outside business hours or when the transaction volumes processed are estimated to be low (for instance, at the beginning of each day) and it's performed for the previous day.

When the user wants to generate the General Report, he has to select the date of the business day. The report is displayed based on the data stored from the scheduled data collection process. The user can select a date only if data is available, otherwise the date will not be available for selection. The user can also generate a live report that will be dynamically generated for the current day. In case of generating a live report, the user will receive a notification stating that the report is dynamically generated and this might impact performance for processing or other users. An user cannot generate a live report if a live report is Business Information Systems (Allevo) SRL already being generated at the request of another user. Live reports are not Sediu social: stored as scheduled reports, but can be saved by the user in multiple formats. Sediu executiv:

The following data should be presented to the user after the criteria has been set

Business Area	Nr of Tx	Total Idle Time	Total Processing Time	Transaction Processing Rate
Payments		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators

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Invoices	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators
Statement Transactions	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators

The application has to display the following information:

- Number of error Events in the specified interval, as this might be linked to technical or business (format) errors on components that are involved in processing and thus impact the performance on the end-to-end processing flow
- Number of Management Events in the specified interval, as this might be linked to restart of components that are involved in processing and thus impact the performance on the end-to-end processing flow
- Complexity of FinTPc workflows

Note: Total processing time + Total idle time = 24h

3.2.2 FUN02 – Specific Report – Component

The Specific Report for components provides performance information for a specific component.

The data for this report is scheduled to be collected and stored for every business day (defined as a workday in business day calendar). This process takes place outside business hours or when the transaction volumes processed are estimated to be low (for instance, at the beginning of each day) and it's performed for the previous day.

When the user wants to generate the Component Report, he has to select the ⁺⁴⁰²¹²⁵⁵⁴⁵⁷⁹/_{Website: www.allevo.ro} date of the processing day, the Component (Multiple selection options - FinTP BackOffice connector, FinTP Message Collector, Routing Engine, FinTP External SWIFT PIC: PUSAROAA DUNS: 55-244-8078 Connector, Events Watcher) and direction (dropdown selection: Publisher, Fetcher, All). The report is displayed based on the data stored from the scheduled data collection process. The user can select a date only if data is available, otherwise the date will not be available for selection. The user can also generate a live report that will be dynamically generated for the current day. In case of generating a live report, the user will receive a notification stating that the



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Business Information

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report is dynamically generated and this might impact performance for processing or other users. An user cannot generate a live report if a live report is already being generated at the request of another user. Live reports are not stored as scheduled reports, but can be saved by the user in multiple formats.

The following data should be presented to the user after the criteria has been set

Component	Direction	Nr of Events	Total Idle Time	Total Processing Time	Transaction Processing Rate	
FinTP BackOffice connector	Publisher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	
	Fetcher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	
FinTP External Connector	Publisher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	
	Fetcher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	Business Information Systems (Allevo) SRL Sediu social: 23 Coltei St., 03024 Bucharest, Romania Sediu executiv: 23C Calea Vitan, 03 Bucharest, Romania
FinTP Message Collector	Publisher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	Tel / fax: +40212554577 +40212554578 +40212554579 Website: www.allevo.rc Capital social: 2.412.00 RC: J40/2067/94 CIF: RO5258486
	Fetcher		Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events	Swift Pric: PTSAROA DUINS: 55-244-8078 Certificat ISO 9001:20 Intertek Certificat ISO 9001:20 UKAS Intertek Certificat ISO/IEC 2700





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Routing Engine	Publisher	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events
	Fetcher	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of Events
Events Watcher	Publisher	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of All Processing Events
	Fetcher	Defined in 3.2.5 Performance indicators	Defined in 3.2.5 Performance indicators	Total processing time / Nr of All Processing Events

The application has to display the following information:

- Number of error Events in the specified interval for each component, as this might be linked to technical or business (format) errors on components Systems (Alevo) SRL and would impact performance
 Number of Management Events in the specified interval for each
- Number of Management Events in the specified interval for each component, as this might be linked to restart of components and would impact performance
- Complexity of FinTPc workflows

Note: Total processing time + Total idle time = 24h

3.2.3 FUN03 – Specific Report – Live Performance



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The Live Performance Report provides live information on the performance of the application that helps administrators analyze possible performance issues with processing. Users generate live reports for one of the following reasons:









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- They want to know how many & what types of routing jobs are pending for each operation type
- They want to know how many & what routing jobs are processed during a selected time interval
- They want assurance that the application is performing as expected. Lack of performance in processing can lead to further investigations & decisions towards setting priorities for remaining routing jobs

The user has to be able to select one the following criteria before generating the report:

- Time Interval: up to 60seconds
- Saved Live Report: select a report generated previously

The following data should be presented to the user after the criteria has been set

Report Criteria	Information (available for the selected interval)	Errors	
Start/Stop timestamps for the report	Initial # of RoutingJobs Final # of RoutingJobs Total # of RoutingJobs processed	Number of error events	
	List with breakdown of initial RoutingJobs		
	List with breakdown of processed RoutingJobs List with breakdown of remaining RoutingJobs		Business Information Systems (Allevo) SR Sediu social: 23 Coltei St., 030: Bucharest, Roma Sediu executiv:

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When generating a live report, the user will receive a notification stating that the report is dynamically generated and this might impact performance for processing or other users. An user cannot generate a live report if a live report is RC: J40/2067/94 already being generated at the request of another user. Generated live reports are stored and can be accessed by all users.



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3.2.4 FUN04 – Availability







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The data for the reports is scheduled to be collected and stored for every business day (defined as a workday in business day calendar). This process takes place outside business hours or when the transaction volumes processed are estimated to be low (for instance, at the beginning of each day) and it's performed for the previous day. The collected data is based on transactions and processing events stored in the application. The reports are generated based on the collected data at the specific request of the user - except the live performance report. The reports can be generated only for days marked as working in the application calendar. The reports can be exported in text, excel or pdf formats, if they are needed to be stored as a reference for a longer period of time. In order to be relevant, context information should be exported and stored as well by the user.

3.2.5 FUN05 – Performance indicators

Total processing time is the time spent by components (FinTP BackOffice connector, FinTP Message Collector, Routing Engine, FinTP External Connector and Events Watcher) on processing. This time is calculated based on the timestamp associated to processing events (e.g. sum of intervals where processing events exist). The outcome is measured in seconds.

Total idle time is the time spent by components (FinTP BackOffice connector, FinTP Message Collector, Routing Engine, FinTP External Connector, and Events Watcher) without performing any actions. This time calculated based on the timestamp associated to processing events (e.g. sum of intervals where no processing events exist). The outcome is measured in seconds.

Timestamp identifies when a certain processing event occurred, giving date and time of day, accurate to the second (hh:mm:ss).

Total processing time + total idle time for a day = 24 hours (per day).

Total processing time and total idle time can be calculated for each component or for a business area.

Calculating total processing time and total idle time for a component means counting the number of distinct timestamps associated to processing events for that component. An exception is for EventsWatcher – the total processing time and total idle time are calculated by counting the number of distinct timestamps associated to processing events for all components.

Calculating total processing time and total idle time for a business area means Intertek counting the number of distinct timestamps associated to processing events for the components involved in processing for that business area, except

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EventsWatcher. Calculating total processing time and total idle time for a







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business area has to take into account that some components are involved in processing on more than one business area - FinTP Message Collector, Routing Engine. For these components, only the events associated to processing on a particular business area have to be counted.

The transactions processing rate represents the volume/number of transactions processed during a period of time. The transaction processing rate can be calculated by dividing the number of messages to the total processing time.

There are two scenarios in which the reports are generated. From a technical perspective the reports are generated implementing the same logic in FinTP-Tracker, but from practical perspective the difference is the first scenario represents a Benchmark Report while the second one represents a Performance Report (see SUN02 for details)

First possibility (for generic test environments)

- the flows are be configured STP (Straight Through Processing) or user actions are either automated or are applied to all available messages in bulk (e.g. all messages are routed at the same time, not individually)
- processing in FinTPc is set to start after all the messages are available from the other applications it interfaces with

This ensures that the interfaces between the applications will not represent bottleneck which can affect the performance results for FinTPc - for example, if the transactions processing rate in the BackOffice application is slower than in FinTP on the outgoing flow.

This scenario represents a benchmark report for FinTPc, and its results show the application best processing performance in a certain configuration.

Note: Wait times (messages waiting user intervention) have impact on the Business Information SRL overall results event because some processing activities are done sequentially 23 Coltei St., 030245 (e.g. when flows are not configured STP, the flow is split into two distinct parts, Bucharest, F Bucharest, Romania 23C Calea Vitan, 031281 which could otherwise overlap - import from connectors & internal processing -Bucharest, Romania steps 1,2,3 on the diagram below - and internal processing & export to connectors [16]/fax: +40212554577 +40212554578 steps 3,4,5 on the diagram below). +40212554579

Second possibility (for specific client / live environments)

- RC: J40/2067/94 the flows are configured as the business requirements dictate, with hold^{OIF: RO5258486} SWIFT PIC: PTSAROAA status on transactions where user approval is needed DUNS: 55-244-8078
- the processing in FinTPc is done as business dictates and messages are imported from other applications as soon as they are generated in the application interface Intertek

In this scenario, the interfaces between the applications might represent a bottleneck which can affect the performance results for FinTPc - for example, i



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the transactions processing rate in the BackOffice application is slower than in FinTP on the outgoing flow. This has to be taken into account when analyzing performance reports.

This scenario is more realistic and represents a relevant measurement of an end-to-end workflow, but it consists a performance report not a benchmark reports.









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The role of the EventsWatcher is to load the processing events generated by each of the FinTPc components into the central database. The timestamp of these processing events is used to determine the total elapsed time.

3.2.7 FUN07 - Breakdown of incoming workflow

Steps to be considered in this scenario (see picture from FUN05)

1. Retrieve transactions from External/Gateway application -> FinTPc External Connector

2. Load transactions into FinTPc Database -> FinTPc Message Collector

3. Routing in FinTPc to exit-point -> Routing Engine

4. Exit from FinTPc -> Routing Engine

5. Publish messages to BackOffice Application -> FinTPc BackOffice connector

The role of the EventsWatcher is to load the processing events generated by each of the FinTPc components into the central database. The timestamp of these processing events is used to determine the total elapsed time.

3.2.8 FUN08 - Complexity of workflows

#	Requirement - functional	Priority	Notes	Systems (Ailevo) SRL 23 Coltei St., 030245 Bucharest, Romania Sediu executiv: 23C Calea Vitan, 03128
1	Calculate complexity of processing flow	2	develop a complexity matrix that takes into account routing rules, technologies and other parameters that influence the performance	Bucharest, Romania Tel / fax: +40212554577 +40212554578 +40212554579 Website: www.allevo.ro Capital social: 2.412.000 le RC: J40/2067/94 CIF: RO5258486 SWIFT PIC: PTSAROAA

The complexity of the workflows is useful when analyzing and evaluating performance or benchmark reports, because it is linked tightly to the processing performed. As the application flows are processed in parallel, the complexity is performed at the application level.



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The complexity is a rough assessment of the defined workflows, indicating how intense processing is inside FinTPc, on the defined workflows. Given the fact that technological considerations are not taken into account (hardware, software, deployment architecture), and the fact that the complexity is not expressed very granular, users should expect that similar complexities can have different performance results.

FinTP-Tracker automatically calculates the complexity of its workflows on a daily basis.

This information is scheduled to be collected and stored for every business day (defined as a workday in business day calendar). This process takes place outside business hours or when the transaction volumes processed are estimated to be low (for instance, at the beginning of each day) and it's performed for the previous day.

The complexity of workflows defined in FinTPc presented to the end user is a qualitative degree which can have the following potential values:

- 1. Low -> threshold should be at three generic workflows without any complex validations / enriches / transaction filtering
- Medium -> threshold should be at three generic workflows with duplicate detection configured and one validation / enrich / filtering for each flow
- 3. High -> anything that exceeds Medium threshold

The criteria based for the calculation has to take into account what types of processing is performed at application level and the impact on performance. The following information has to be scanned from the application and then classified based on the impact it has on performance.

- Routing Rules -> all routing rules are counted, each of them with its specific value indicating the impact on processing
- Lists -> all lists which are used as part of processing (validation, filtering, and enrichment) have impact on overall performance. The number of records and data volume is a factor in deciding the impact on processing
- Exit Point -> all processing conditions that impact processing are taken into consideration-> duplicate detection, xsd validations, xslt transformation and other conditions that can be defined on ExitPoints

At the end, an aggregate result has to be evaluated and the application is assigned one the values above as complexity of workflows.

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3.3 SUN03 – Save context configuration

Scenario

#		Requirement - functional	Priority	Notes
	1.	Save context configuration for	2	archives the history of measurement
		a certain benchmark test		results together with the context in which
		(hardware and software		they are performed (configuration,
		resources, routing logic)		software versions, dataset versions)

The context configuration refers to any configuration details of the specific system that influence the processing and the performance.

Context configuration refers to the following information:

- Hardware computational resources for each environment that hosts
 FinTP components: RAM, CPU, DISK
- Software all versions of software involved in processing, for each platform: OS, Cluster, Transport Layer, Database Layer, Application Server, Internet Browser, Interfaces with other applications
- Application all configuration related to defined workflows in FinTPc, as defined in *FUN09 - Complexity of Workflows*, like Routing Rules, Validations, Lists, Exit Points and so on

All this information is relevant when analyzing the results of performance reports.

The following table presents what information on hardware and software configuration is relevant for the performance reports.

Server	CPU	RAM	DISK	Software	Version	Arch	+40212554577 +40212554578 +40212554579
BackOffice Server	Intel(R) Xeon(R)	16GB		OS	Windows 2003 Server	x64	Capital social: 2.412.000 lei RC: J40/2067/94 CIF: RO5258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015
	CPU E5620 2 x 2.40GHZ			Transport Layer Client	Apache MQ client	x64	



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			SSD SAN	Interface	Oracle 11g Enterprise Edition	x64
	Intel(R)	16GB	SSD	OS	Linux	x64
	Xeon(R) CPU		SAN	Cluster	Linux HA Cluster	x64
FinTP Application	2.40GHZ			Database Client	Postgres Client	x64
Server				Application Server	JBOSS 7	x64
				Transport Layer	Apache MQ server	x64
FinTP Database	Intel(R) Xeon(R) CPU E5620 2 x 2.40GHZ	16GB	SSD SAN	OS	Linux	x64
Server				Cluster	Linux HA Cluster	x64
				Database	Postgres	x64

FinTP-Tracker does not assist users in saving the Hardware / software configuration. FinTP-Tracker has to provide the means to save the configuration for the application (baseline).

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3.4 SUN04 – Generate data for load test

Scenario

#	Requirement - functional	Priority	Notes
	Provides support for defining test data and performance evaluation scenarios by guiding user through procedures and templates	2	 Depending on the complexity - defining, importing and editing performance evaluation scenarios Depending on complexity - defining, importing and editing data sets

This requirement is implemented in another FinTPc feature – FinTP-AT (automated testing). This functionality is useful only for test platforms. The following scenarios functionalities in FinTP-AT SRS describe how data is automatically generated.

- SDATA01 DATA GENERATION FOR PAYMENTS
- FDATA01 DATA GENERATION TEMPLATE FOR PAYMENTS
- FDATA02 DATA GENERATION FOR PAYMENT USING TEMPLATES
- SDATA02 DATA GENERATION FOR STATEMENTS
- FDATA03 DATA GENERATION TEMPLATE FOR STATEMENT
- FDATA04 DATA GENERATION FOR STATEMENT USING TEMPLATES
- SDATA03 DATA GENERATION FOR INVOICES
- FDATA05 DATA GENERATION TEMPLATE FOR INVOICES
- FDATA06 DATA GENERATION FOR INVOICES USING TEMPLATES
- SDATA04 DATA GENERATION FOR RECONCILIATION

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3.5NF01 – Dependencies & Maintainability

Scenario

#	Requirement – non- functional	Priority	Notes
	FinTPc upgrades don't affect benchmarks (past or future)	1	must be periodically updated for compliance with the new regulations and the new applicable financial standards

FinTPc is a financial middleware application that integrates various applications (ERPs, accounting, human resources, core-banking systems, external gateway applications, and so on) and processes financial transactions according to industry standards and regulation. Therefore the changes to FinTPc are dictated by changes to the applications it interfaces with, technology upgrades of its prerequisites, updates on the financial standards and regulation implemented and integration of new workflows and functionality.

Changes to FinTP, irrespective of the motive, should be implemented taking into account the impact they have on the usage of FinTP-Tracker. FinTP-Tracker has to be able to provide the same functionality after any changes brought to the system.

Changes to FinTP, irrespective of the motive, should not affect historical data on the performance processing. All past processing data corresponding to FinTP-Tracker can be displayed in the various reports implemented in FinTP-Tracker.

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3.7 NF02 – Impact on performance

Scenario

#	Requirement – non- functional	Priority	Notes
	FinTP Tracker has to be able to run on all types of environments (test, live, backup) without affecting the processing flows	1	depending on the architecture of each corporation, must allow easy installation and configuration on any FinTPc platform - production, backup, pre-production or testing

FinTP-Tracker is a feature of FinTPc that monitors performance and generates performance and benchmark reports. The input data for these reports is represented by the business messages processed and the processing events generated by each component. These processing events pinpoint the checkpoints every message passes in the end-to-end processing flow.

FinTP-Tracker is available on all types of environments – test (DEV, UAT, PRELIVE) or production. Because of this, running FinTP-Tracker should not impact performance of processing flows.

The input data is collected and processed outside business hour, and the result is then presented to the user. This ensures minimal intrusion and no impact on performance.

The Live Reports collect additional data upon request of users, usually during business/processing hours, in order to gather relevant statistics for the application administrators. Because this extra data collection can impact performance, restrictions have to be put in place (for instance, only one user at a time can run a live report, or the live report can be run over a limited period of time).

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3.8NF03 – Distribution

Scenario

#	Requirement – non- functional	Priority	Notes
	Source code is published on GitHub with the same license as FinTPc	1	FinTP Tracker is an open source application published on GitHub (source code and executable code fintp.org respectively) under the GPL V3 license as well as FinTPc

FinTP-Tracker is a feature part of FinTPc/FinTP, an open source application share publicly on GitHub and on www.fintp.org. This mean that all code related to the feature has to be compliant with the GPL v3 license used for FinTP.

/* * FinTP - Financial Transactions Processing Application * Copyright (C) 2013 Business Information Systems (Allevo) S.R.L. * * This program is free software: you can redistribute it and/or modify * it under the terms of the GNU General Public License as published by * the Free Software Foundation, either version 3 of the License, or * (at your option) any later version. * * This program is distributed in the hope that it will be useful, * but WITHOUT ANY WARRANTY; **Business Information** Systems (Allevo) SRL without even the implied warranty of * MERCHANTABILITY or FITNESS FOR A Sediu social: PARTICULAR PURPOSE. See the * GNU General Public License for more details. * * You should have received a copy of the GNU General Public License * along with this program. If not, see <http://www.gnu.org/licenses/> * or contact Allevo at : 031281 Bucuresti, 23C Calea Vitan, Romania, * phone +40212554577, office@allevo.ro <mailto:office@allevo.ro>, www.allevo.ro<http:// +40212554579 Website: www.allevo.ro www.allevo.ro>. */

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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.>

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<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.>













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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.>

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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.>

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5. Other Nonfunctional 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.>

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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.>













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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.>













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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.>

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6. Other Requirements

<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.>













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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.>

Abbreviation	6.1.1.1.1.1 Definition		
	6.1.1.1.1.2		
AIX	Advanced Interactive Executive		
AML	Anti-money Laundering		
API	Application Programming Interface		
AMQ	Apache Message Queuing		
CPU	Central Processing Unit		
DB	Database		
DEV	Development		
ERP	Enterprise Resource Planning		
FinTPc	Financial Transaction Processing for Corporates		
FinTP	Financial Transaction Processing		
GPL V3	General Public License version 3 Business Information Systems (Allevo) SRL		
НА	High Availability 23 Coltei St., 030245 Bucharest, Romania		
НАСМР	High-Availability Cluster Multi-Processing		
HTTP	Hypertext Transfer Protocol		
HTTPs	Hypertext Transfer Protocol Secure Website: www.allevo.ro		
I/O	Input/output RC: J40/2067/94 CIF: RO5258486		
IBAN	International Bank Account Number SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015		
ISO	International Organization for Standardization		
JMS	Java Message Service		







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LDAPS	Lightweight Directory Access Protocol over SSL
MQ	Message Queuing
МТ	Message Type (SWIFT MTs)
RAID	Redundant Array of Independent Disks
RAM	Random-access Memory
RTGS	Real Time Gross Settlement
qPI	qPayIntegrator
OS	Operating System
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SAN	Storage Area Network
SFTP	SSH File Transfer Protocol
SRS	Software Requirements Specification
SSL	Secure Sockets Layer
STP	Straight Through Processing
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TMS	Treasury Management System
TOSS	Treasure on Open Source Software
UAT	User Acceptance Testing
UI	User Interface
URL	Uniform Resource Locator

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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: Targeted System

FinTP Tracker is a benchmarking tool that performs relevant performance analysis for FinTPc. This annex details the system that needs to be analyzed by FinTP Tracker.

System to be analyzed		
Components Involved	 Web Server (Apache Tomcat) Native C/C++ (Connectors and Routing Engine) Database (Postgres) Middleware (Apache MQ) 	
Sample scenarios	 The following scenario can be considered for benchmarking: A few messages are generated in DB table, the 1st FinTP Connector retrieves them and place them in an AMQ Queue The 2nd FinTP Connector retrieves the messages form AMQ and writes them to database repository (PostgreSQL) An user connects to the web application and takes the decision to batch these messages (send them in bulk) The Routing Engine processes the messages according to the standard flow configured in FinTPc, which eventually results in publishing the bulk of messages on an AMQ Queue The 3rd FinTP Connector retrieves the bulk of messages from AMQ and publishes it to an external application (either a file or an AMQ message) 	Business Information Systems (Allevo) SRL Sediu social: 23 Coltei St., 030245 Bucharest, Romania Sediu executiv: 23C Calea Vitan, 031281 Bucharest, Romania Tel / fax: +40212554577 +40212554578 +40212554578 +40212554578 +40212554579 Website: www.allevo.ro Capital social: 2.412.000 lei RC: J40/2067/94 CIF: RO5258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015







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System to be analyzed		
Special entry-points into the use cases?	- X Some message (JMS/MQ/MSMQ) or remoting call (RMI, WCF)	-
Brief description of system architecture and software architecture.	- See picture below. On a single standalone - Linux server, there will be 1/ 5 C++ Apps 2/ PostgreSQL Database 3/ AMQ 4/ Apache	
Database	PostgreSQL	
Communication technologies are used between the application components?	e JMS	
Duration (in minutes) for starting/restarting time application servers, web servers	r Depends on architecture	
IDEs (integrated developmen environment) used for development	t Eclipse and Visual Studio r	
Continuous integration tools	jenkins	
Which Services / Virtualization , Cloud solutions used	/x_VMWare	
Web server(s)	Apache Apache 2.2 X Apache 2.4	Business Information Systems (Allevo) SRL Sediu social: 23 Coltei St., 030245 Bucharest, Romania Sediu executiv:
Webserver architecture:	32 bits 🗙 64 bits	23C Calea Vitan, 031281 Bucharest, Romania
Operating System:	X Linux Windows Aix Solaris	+40212554577 +40212554578
Operating System version:	RHEL 7, CENTOS	+40212554579 Website: www.allevo.ro
cookies policy	allowed	Capital social: 2.412.000 lei RC: J40/2067/94
Which technologies and JS/AJAX-frameworks (version, vendor) do you use?	x jQuer y	CIF: R05258486 SWIFT PIC: PTSAROAA DUNS: 55-244-8078 Certificat ISO 9001:2015
Application server	Apache HTTP server, standalone	Certificat ISO/IEC 27001:201







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Subject: SRS- Benchmarking Tool Re	elease FinTP Tracker	THINKING EVOLU
Operating System: Operating System version: Frameworks used?	X Linux Window Aix s CentOS, RHEL Hibernate security, Spring	
Java Virtual Mach specifications:	hine Vendor: x Oracl IBM e IBM Version 1.6 1.7 x 1.8 : Architecture: 32 x 64 bit bit	
Number of application (components) written in C C++	ons 5 C++ Applications or	
Application Architecture – 32 64 bit?	2 or x64	
Tables	C++ applications for Routing, Rej Jersey, HTML5, JQuery for Web / Prerequisites: Message Oriented Middleware: Database: PostgreSQL Presentation: Apache	pository Application Apache ActiveMQ
FinTP Connector C++ Fetch/Publish Events/Monitoring	inTP Server on Linux C++ FinTP Connector Database Data	Database Config)n RL)245 ania
FinTP Connector C++ Fetch/Publisk Events/Monitoring	Business C++ Routing engine Presentation Web Application	, 03126 ania
)B Tables		