

TECHNICAL SPECIFICATION FOR TICKETING SYSTEM

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Annexes

Annex No. 1. Initial specification of the functional requirements for the ticketing system (with processes)

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Definitions and abbreviations used

The main definitions, abbreviations, and explanations thereof used in this document are provided for in the table below (See **Klaida! Nerastas nuorodos šaltinis.Klaida! Nerastas nuorodos šaltinis.**).

Table 1. Klaida! Nerastas nuorodos šaltinis.

| Klaida! Nerastas nuorodos šaltinis. | Explanation |
|-------------------------------------|---|
| TS | Ticketing system |
| Contracting authority, Customer, LG | AB "Lietuvos geležinkeliai" |
| LEG | Legislation |
| Supplier | The supplier who will supply the goods comprising the object of the procurement and perform the established services |
| XML | A descriptive language of general-purpose data structures and their contents recommended by the World Wide Web (W3) Consortium, http://www.w3.org/TR/REC-xml |
| mySAP | A financial accounting and business management system used by AB "Lietuvos geležinkeliai" |
| UML | Modeling and specification development language for specifying, depicting, and constructing documentation of objectively-oriented applications, http://www.omg.org/technology/uml/index.htm . |
| SAP (GL/BO) | Business management system |
| PIS | Passenger Information System |
| PMPIS | Personnel Management and Payroll Information System |
| GDPR | European Union's General Data Protection Regulation |

1. PROCUREMENT OBJECT

The Contracting Authority is planning to procure a developed and operational ticketing system (hereinafter referred to as the TS) configurable according to the needs of the Contracting Authority with the efficient use of its existing competencies employing (but not developing) a new seamless TS system.

The main components of the TS:

1. INTERNET PORTAL*
2. MOBILE APPLICATION*
3. PROVISION OF THE TS SERVICE THROUGH THE DATA CENTER, AND INTEGRATED INTERFACES
4. AUTOMATIC TICKET VENDING MACHINES (ATVMs) AT STATIONS**
5. AUTOMATIC TICKET VENDING MACHINES (ATVMs) ON TRAINS**
6. TICKET INSPECTION ON BOARD**
7. CONDUCTOR APPARATUS**

** The user and administrator environment must be ensured.*

*** The purchase of the specified components, together with the software for these components, does not comprise the object of this procurement; however, the TS intended to be procured shall ensure the integration, including but not limited to, with the intended components and their software.*

The TS shall be procured through software as a service leasing, including the necessary services of hardware, network infrastructure, data storage, data processing, and similar services. The services must be rendered through a functioning and reliable data centre the needs for which will be formulated taking into account the requirements of reliability, cybersecurity, data protection, etc.

The Contracting Authority does not currently possess the appropriate infrastructure and necessary resources to install, operate and maintain the TS system; thus the TS (including all its components) shall be procured through leasing, including the knowledge of the supplier of the TS and his best international practices for installing and operating such systems.

1.1. Field of application of the procurement object

1.1.1. Description of the object

AB "Lietuvos geležinkeliai" intends to procure a ticketing system (hereinafter referred to as the TS).

1.1.2. Objectives of the project

The goal of this project is to procure a new **ready-to-use ticketing system tested through practise at passenger transport companies** including new sales channels (a web page, a mobile application, automatic ticket vending machines (ATVMs)* at railway stations and on board*) as well as new automated control mechanisms* which will help to ensure the passenger and ticket inspection.

** The purchase of the specified components, together with the software for these components, does not comprise the object of this procurement; however, the TS intended to be procured shall ensure integration, including but not limited to, with the intended components and their software.*

The system must be versatile, able to perform the same function in different ways, have no restrictions on integrations or data formats, and be of a kind that allows for the integration of all the mobility systems used by the Company presently or available on the market, and help to manage and grow the business.

The new ticketing system (TS) must not only be functional and customer-oriented, enabling the clients to purchase tickets in a convenient and simple way, it must also be clear, with real-time updated information that will help the businesses to make decisions quickly. Having tools for

analysis, dynamic pricing and sales promotion at hand, the Company will be able to personalize travel offers, create target audience groups, change fares based on train availability, time, season, or other parameters of the Company's choice.

The system must also have a revenue management module, which must be able to adjust the price of the trip without human intervention, according to customised logic algorithms for pricing. A tandem of analytics and control mechanisms will allow having accurate real-time statistics on how many passengers are traveling, on what routes, how many people are illegally present on board. If the number of passengers travelling without tickets exceeds the tolerable percentage, the passenger control process will be initiated. The scope of the project includes a passenger inspection team that will check the tickets of the passengers on board as and when required as well as on a regular basis.

The goals:

- To effectively introduce a state-of-the-art, customer-oriented TS that will meet the needs of the customers,
- To attract more passengers, to improve customer satisfaction,
- To introduce flexible and up-to-date business management tools (tools for analysis, sales promotion, dynamic pricing) and thus to increase the Company's financial performance.
- The introduction of the TS must significantly optimize the use of human resources.
- To improve the quality and accessibility of the rendered rail transport services by developing new ticketing channels;
- To automate the process of ticket inspections on board;
- To reduce the use of paper tickets by converting reusable paper ticket media to digital media;
- To ensure a single instrument for the management of passenger tickets, goods and services;
- To automate and accelerate ticketing reporting.

The new TS must be equipped with new ticketing channels:

- A mobile application for passengers;
- A website;
- Automatic ticket vending machine (ATVMs) at stations and on board;
- Passenger counting and ticket inspection solutions;
- In addition, an option of selling tickets through intermediaries.

The following activities must be implemented in order to achieve the procurement objectives:

- The scope of the services of the introduction of the system, including, but not limiting to the following major introduction steps and the number of iterations coordinated with the Contracting Authority for each introduction area and the required integrations between the functional components and other information systems shall cover:
 - Analysis;
 - Preparation of future operational processes (upon designing of a certain installation area and/or functional component);
 - Designing and the development of a prototype;
 - Programming and configuration;
 - Data migration, implementation of the solutions needed to ensure integrations and the continuity of other business processes;
 - Testing;
 - Training;
 - Commissioning
 - Pilot operation;

- Project management;
- Additional support and development services;
- After-sales service;
- Maintenance and after-sales service.

1.1.3. Legislation

The installer shall propose and coordinate the solutions with the Contracting Authority pursuant to the following relevant legislation and recommendations of the European Union and the Republic of Lithuania:

- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation);
- Law on Legal Protection of Personal Data of the Republic of Lithuania;
- Law on Cyber Security of the Republic of Lithuania;
- Methodology for the Development of Electronic Services (defining the penetration resistance requirements) approved by the Order No. 3-416 (1.5 E) of 7 October 2015 of the Minister of Transport and Communications of the Republic of Lithuania;
- “Description of Organizational and Technical Requirements for Cybersecurity Applied to Infrastructure of Critical Significance and State Information Resources” approved by the Order No. 387 of 20 April 2016 of the Government of the Republic of Lithuania;
- Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers’ rights and obligations;
- Railway Transport Code of the Republic of Lithuania;
- Law on Transport Privileges of the Republic of Lithuania;
- “Rules for Carriage of Passengers and Luggage by Railway Transport” approved by the Order No. 262 of 22 May 1995 of the Minister of Transport and Communications of the Republic of Lithuania (edition of the Order No. 3-26 of 17 January 2003 of the Minister of Transport and Communications of the Republic of Lithuania);
- The Service Provider shall follow the legislation versions in force at the time of the implementation of the Contract. The Service Provider shall also be bound by any legislation newly accepted/modified during the implementation of the Contract, insofar as they relate to the implementation of the Contract. If the newly adopted/modified legislation is in conflict with the requirements described in this Technical Specification, the Service Provider shall implement the requirements in accordance with the versions of the legislation adopted/modified during the implementation of the Contract.

1.2. Current status and the target status of the ticketing system

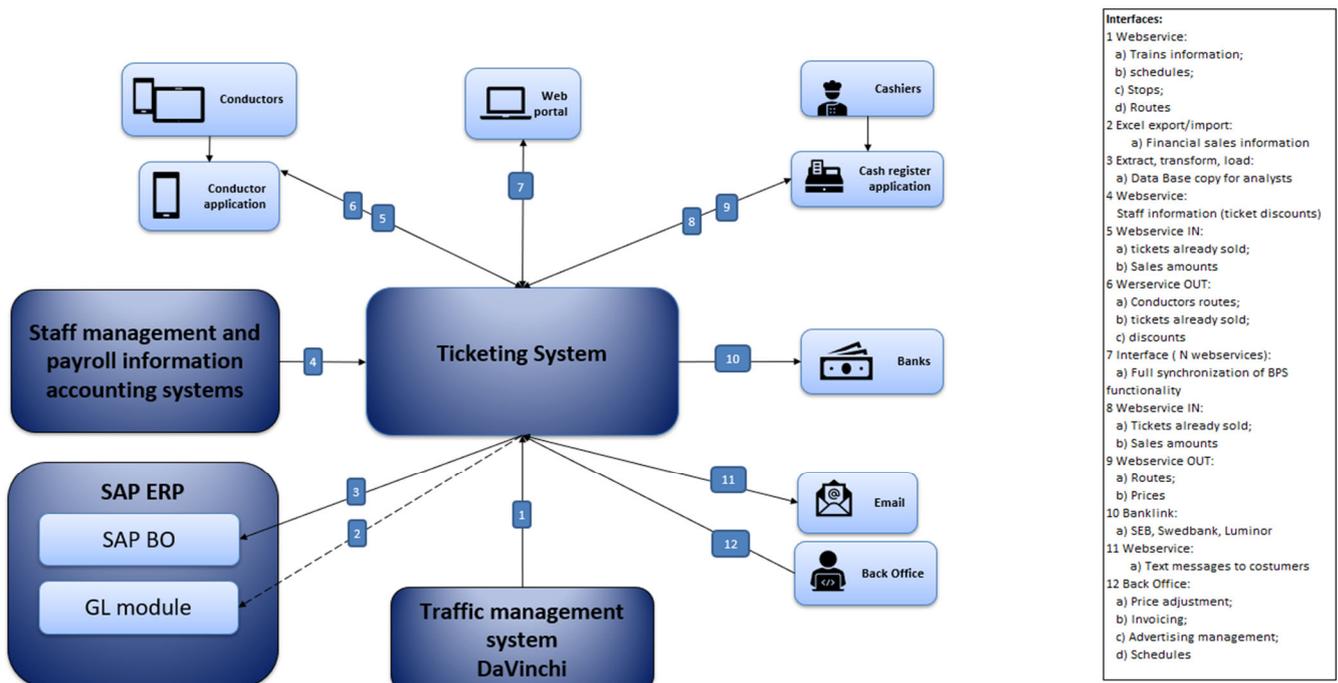
1.2.1. Current status

The ticketing system currently used has been developed five years ago; the information technology staff of AB “Lietuvos geležinkeliai” had established the technical requirements and tasks to the installer during the development of the above-mentioned system. The main tasks were as follows: a new ticket sales channel – a website – and integration with the POS Raso-12 conductor system. The architecture of the ticketing system was designed without considering further integration with other systems, nor does it operate properly with other systems introduced within the Company. For instance, there is still no integrated accounting system SAP, and this has resulted in fifteen employees manually entering the ticketing information into the accounting system presently. The

POS Raso-12 conductor machines system is also poorly integrated: conductors constantly ask for adjustments or changes to the information on the devices since the ticketing system does not have the ability to show what discounts or privileges are being applied. Other information is also showed in an inconvenient format.

With the current ticketing system, the development of new sales channels is unreasonably expensive, both in terms of human resources and time. For instance, it takes a year to improve the existing functionality, to implement integrations with other mobility systems, or to develop a reporting system on ticket sales. The current system does not reflect the needs and trends of modern e-business (e. g., it is not possible to develop a dynamic pricing module that can be real-time administered, sales promotion tools, etc.).

Fig 1. Current functional architecture



1.2.2. Major deficiencies of the current ticketing system

- Inconvenient, time- and human resource-consuming ticketing system;
- Underdeveloped, non-functional sales channels;
- Lack of convenient, real-time analytics tools required for rapid response to the market;
- No sales promotion tools;
- No dynamic pricing;
- No possibility to integrate end-to-end solutions with other travel platforms (e. g., taxi, city and long-distance, car/bike rental);
- Lack of integrated passenger information tools;
- No integration with the accounting system;
- Ticket inspection is based on the human factor.

1.2.3. Goals to be achieved

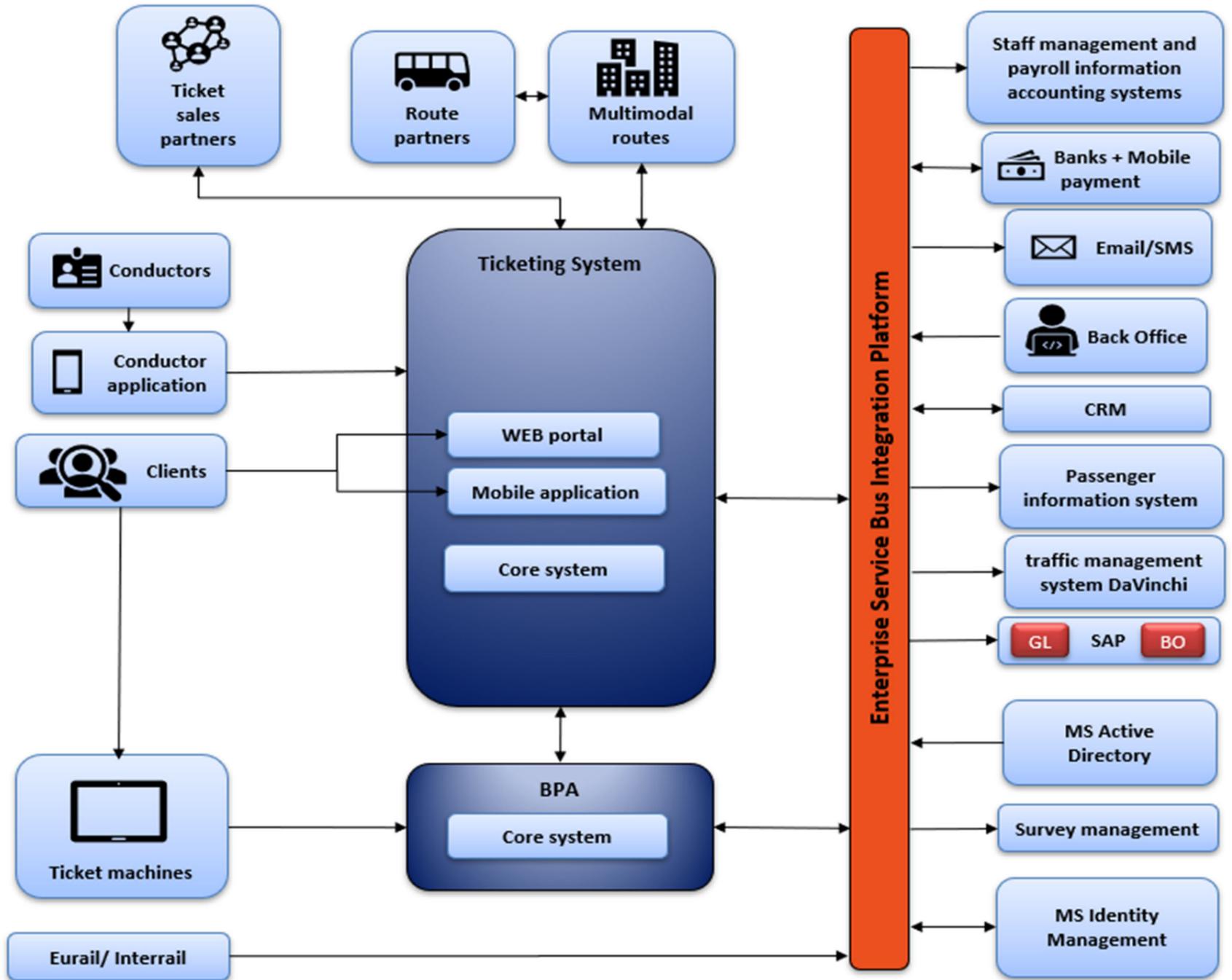
A modern, integrated (DaVinci, SAP (BO/GL), PIS, PMPIS, etc.), automated, standardized, user-friendly, and customer-oriented ticketing system that will allow for:

- Optimisation of activities, optimal use of resources;
- Implementation of functional sales channels;
- Exploiting of dynamic pricing opportunities, sales promotion tools;
- Automisation of ticket inspection;
- Making of data-driven decisions;
- Easy configuration and flexible adaptation of the system to the changing market or business needs;
- Increase in ticket sales.

1.2.4. Functional architecture intended in the new system

The functional requirements specified in this Technical Specification as Annex 1 are designed so to meet the operational requirements at best. However, the Service Provider will be able to propose changes or additions to the functional requirements during the analysis, structure preparation and designing phase as to meet the operational requirements. Functional requirements may only be modified with the approval of the Contracting Authority. During the testing, when delivering the project, the Service Provider shall be required to demonstrate all functional requirements listed below and adjusted/supplemented functional requirements, if any.

Fig 2. Functional architecture intended in the new system



1.3. Project implementation phases

Ticketing system project implementation

Phase 1. Establishing the scope and planning:

- Analysis of comprehensive business needs and processes;
- Detailed system architecture;
- Detailed schedule of project activities;
- Validation of the project management model.

Phase 1 shall include the determination of the scope of the project, ensuring the coordination of the set requirements, and assessing the impact that the changes to the new ticketing system will have on the Contracting Authority and its processes and the existing systems. In addition, a detailed risk assessment and a mitigation plan shall be prepared.

Phase 2. Implementation and commissioning of the new system

- The project scope is fully implemented in the new system;
- A strategy for the transition period is defined;
- A transition plan is prepared and staff training is planned;
- Trial commissioning of the system;
- Commissioning of the completed system version;
- Decommissioning of the existing ticketing system.

Phase 2 shall cover the implementation and commissioning of the new system.

Table 2. Planned phases and activities

| Phases and activities | |
|---|--|
| IMPLEMENTATION FO THE PROJECT: PHASE 1 Establishing the scope and planning | |
| 1. | A tender for the public procurement of a TS is called |
| 2. | Contracts with suppliers signed |
| 3. | <i>Preparatory works</i> on the implementation of the new TS |
| 4. | Integration of systems with the TS |
| 5. | Development of TS testing scenarios |
| 6. | TS testing (with multiple iterations) |
| 7. | Staff training |
| 8. | Process review and adaptation |
| 9. | Commissioning the system in the working environment |
| 10. | Installation of equipment at stations |
| COMPLETION OF THE PROJECT | |
| 11. | Transfer of service provision from the Project to Support |
| 12. | Completion of the project |

1.4. Main project activities and expected results

Implementation of a state-of-the-art and customer-oriented TS.

Table 3 below provides the intended objectives and expected results of the planned main activities of the project.

Table 3. Main planned activities of the project

| No. | Project activity | Intended objectives | Expected results |
|-----|---|--|--|
| | Analysis and preparation of the structure | <p>To assess the risk.</p> <p>To prepare a work schedule according to the planned phases and the activities listed in Table 1.</p> <p>To carry out a detailed analysis of the processes carried out by the Client and related to the introduction of the TS, and to prepare the relevant documents.</p> <p>To perform a detailed analysis of the related internal information systems of the Customer, and to prepare the relevant documents.</p> <p>To prepare design documentation.</p> | <p>Project risk management plan.</p> <p>Project work schedule.</p> <p>Documentation of the analysis of the processes carried out by the Customer and related to the introduction of the BPS.</p> <p>Specification of the Customer's information systems and the TS's interfaces, and the description of the implementation</p> |
| TS | Designing | <p>To prepare documentation of the TS architecture and introduction, describing the implementation of the defined functionality.</p> <p>To update the analysis phase documentation.</p> | <p>Documents of TS architecture and the documentation required for introduction.</p> <p>Block logic diagrams of software components.</p> <p>Physical data model.</p> <p>Updated analysis phase documentation.</p> |
| | Installation of the TS in the testing environment and its testing | <p>To provide the hardware and software necessary for the operation of the TS.</p> <p>To perform the necessary designing and/or technical and software configuration works, and to implement the functional and non-functional requirements.</p> <p>To develop a development and testing environment.</p> <p>To perform component testing, system testing, interfaces testing with other systems and registers (integration).</p> <p>To develop admission test scenarios.</p> <p>To perform internal tests.</p> <p>To prepare reports on the results of internal tests: defects identified during internal testing must be evaluated, the ways for their removal must be provided as well as the status, and recommendations for further operation must be made.</p> | <p>The equipment necessary for the operation of the TS provided.</p> <p>The TS software is installed in a testing environment.</p> <p>Admission test scenarios.</p> <p>Reports on internal test results.</p> <p>Updated analysis phase documentation.</p> |
| | Installation of | To perform the necessary designing | The TS software installed in |

| | | | |
|--|---|--|---|
| | the TS in the operational environment and its testing | <p>and/or technical and software configuration works.</p> <p>To prepare the operational environment.</p> <p>To prepare data migration profiles, which should include, at a minimum: a description of data migration volumes, data transformation rules, problem-solving mechanisms, data migration technologies, data integrity testing rules, data integrity testing methods, data migration statistics, a detailed schedule of data migration activities, etc.</p> <p>To develop automated migration tools and to perform the migration.</p> <p>To prepare instructions for users and administrators.</p> <p>To perform admission tests.</p> <p>To prepare admission test results reports.</p> | <p>the operational environment.</p> <p>Automatic migration tools prepared, data migration performed.</p> <p>User and administrator documentation prepared.</p> <p>Admission test results reports.</p> |
| | Pilot operation | <p>To perform the necessary designing and/or technical and software configuration works.</p> <p>To update user and administrator instructions.</p> <p>To prepare a warranty maintenance procedure document.</p> <p>To carry out pilot operation.</p> | <p>Updated documentation for users and administrators.</p> <p>Warranty maintenance document.</p> <p>Pilot operation plan.</p> <p>Pilot operation results report.</p> |
| | Training | <p>To update documentation.</p> <p>To perform admission tests.</p> <p>To prepare test result reports.</p> <p>To train users and administrators.</p> | <p>Updated documentation.</p> <p>A training program prepared and the training carried out.</p> <p>Admission test results reports.</p> |
| | Warranty maintenance | <p>To perform warranty servicing and maintenance in accordance with the warranty service procedures.</p> <p>To update documentation according to changes made.</p> | <p>Warranty servicing reports.</p> <p>Updated documentation.</p> |
| | Addition programming of the TS | <p>Implementation of additional functionality of the TS.</p> <p>Changes to the TS's functionality.</p> <p>Implementation of additional TS integration with the Customer's internal information systems.</p> <p>Implementation of the TS integration with external information systems, implementation of additional functionality.</p> <p>Testing of changes and their implementation.</p> <p>Adjustment of documentation according to the changes performed.</p> | <p>Implementation of the TS updates, changes, and additional functionality.</p> <p>Updated documentation.</p> |

1.5. Review of requirements

The definition “there must be an option (there shall be an option)” or “it must be able (it shall be able)” used in the established requirements means that the identified system function must be implemented in the proposed TS. A user of the installed system, who has the necessary permissions, must be able to perform the function without further modification (or development) of the system.

The definition “following the established rules (subject to the established rules)” also includes the cases where the TS automatically performs the intended actions under certain conditions.

The examples or details mentioned in the set requirements are for information only and will be specified in detail at the time of drafting the TS introduction project.

The tenderer must provide a detailed description of the TS indicating how the proposed TS meets each and every requirement. The requirements also include requirements specified in the chapters on the project objectives and the status.

The system must be versatile, able to perform the same function in different ways, have no restrictions on integrations or data formats, and be of a kind that allows for the integration of all the mobility systems used by the Company presently or available on the market, and help to manage and grow the business.

The new ticketing system (TS) must not only be functional and customer-oriented, enabling the clients to purchase tickets in a convenient and simple way, it must also be clear, with real-time updated information that will help the businesses to make decisions quickly. Having tools for analysis, dynamic pricing and sales promotion at hand, the Company will be able to personalize travel offers, create target audience groups, change fares based on train availability, time, season, or other parameters of the Company’s choice.

The system must also have a revenue management module, which must be able to adjust the price of the trip without human intervention, according to customised logic algorithms for pricing. A tandem of analytics and control mechanisms will allow having accurate real-time statistics on how many passengers are traveling, on what routes, how many people are illegally present on board. If the number of passengers travelling without tickets exceeds the tolerable percentage, the passenger control process will be initiated. The scope of the project includes a passenger inspection team that will check the tickets of the passengers on board as and when required as well as on a regular basis.