

Autoridad del Canal de Panamá



CANAL DE PANAMÁ

**Request for Information (RFI) for
a
Enhanced Booking System
December 2025**



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1. Introduction

This is a Request for Information (RFI) regarding Booking System Software for Panama Canal Operations and related commercial and financial activities. As you may review in the high-level functional requirements presented below, the Panama Canal Booking System and its rules and procedures are essential for Canal operations, business success, and its customers. It is well regulated and structured. However, ACP requires an enhanced version of the tool to accommodate and automate new processes and rules that will improve the system's efficiency, functionality, and overall customer experience and satisfaction.

This document describes the functional requirements for the new Booking System Software for the Panama Canal. We have identified that new applications are required to facilitate situational awareness and decision-making, as well as booking-slot management, planning all vessel movements, enhancing customer experience of the application as well as the transit service itself. ACP anticipates the possibility of obtaining optimizing or decision-support systems at a future date. This RFI refers only to the booking/auction system.¹

Please review the high-level functional requirements and submit or present your proposed systems, their functionality, environment, and recommendations to improve current processes. This submission is due no later than Friday, February 13th, 2026 at 16:15 Panama Time. This may be either a customized version of your current software or a newly developed system. Explain the areas in which your systems have already been implemented and submit a budgetary estimate or guidance for implementation. ACP will allow an open period for clarifications, additional questions or to schedule a virtual presentation from the publication of this document until Friday, January 30th, 2026 at 16:15 Panama Time.

For submission of documentation, clarifications, additional questions or to schedule a virtual presentation please contact the following emails: acp-arquitectura@pancanal.com and molivares@pancanal.com.

Since this is a Request for Information (RFI), it does not constitute a tender or a purchase order, nor does it represent a commercial commitment with the ACP.

This document shall not be construed as a request or authorization to perform work for the ACP. Any work performed by a supplier will be at their own discretion and expense. Therefore, this Request for Information does not represent a commitment to purchase or lease. The submission of a response constitutes acknowledgment that the provider has read and agreed to these terms. The ACP intends to submit a Request for Proposal or tender for the functionality described in this document by Q3 of Fiscal Year 2026 (from October 2025 until September 2026). In such a case, it will be published through the official mechanisms of the contracting office via a public tender, and the proponents must comply with all the requirements of the tender to be considered. The information contained in this document serves as a guide to crafting the final Request for Proposal, based on what the market can offer to meet our requirements. It is expected that a proper response be provided to each requirement to determine the level of compliance. When a requirement cannot be satisfied, an alternative shall be provided to enrich the evaluation process so that the ACP can balance requirements while maintaining the widest possible competition among participants.

¹ However, the new booking system software should be compatible with a future to-be-defined optimizing or decision-support system as well as ACP's current accounting and information systems.

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Responses must be submitted in writing to the email addresses described previously. The functionality and approach to implementation and integration with current ACP systems shall be described in the proposed document. Please provide all necessary information to fully understand the functionality and work required to implement such applications. Any information of a confidential or proprietary nature contained in the response from a provider must be clearly marked as "PROPRIETARY" or "CONFIDENTIAL" per element or at the top of each page. Reasonable precautions will be taken to safeguard any part of the response identified by a provider as confidential or proprietary. All responses, once delivered, become the property of the ACP.

1.1. 1.1 Key Definitions

For the purposes of this document, the following definitions are established:

- ACP (Panama Canal Authority): Autonomous legal entity of Public Law responsible for the administration, operation, conservation, maintenance and modernization of the Panama Canal.
- Canal: Refers exclusively to the physical infrastructure of the Panama Canal (locks, channels, lakes, etc.).
- Booking System: Technology platform managed by ACP to handle vessel transit reservations.

1.2. 1.2 Purpose of this RFI

This is a Request for Information (RFI) regarding Booking System Software for Panama Canal Operations and related commercial and financial activities. The ACP Booking System and its rules and procedures are essential for Canal operations, business success, and its customers.

Important Notice: This document does not constitute a tender or a purchase order, nor does it represent a commercial commitment with ACP. The submission deadline is February 13, 2026 at 16:15 Panama Time.

2. Background information

The Panama Canal Authority (ACP) is an autonomous legal person of Public Law created by Title XIV of the Political Constitution of the Republic of Panama, and which is exclusively responsible for the administration, operation, conservation, maintenance and modernization of the Canal of Panama, as well as its related and complementary activities, in accordance with the constitutional and legal norms in force, in order for it to function in a safe, continuous, efficient and profitable manner.

The Organic Law of the ACP, of June 11, 1997, establishes the norms for its organization and operation. Due to its importance and nature, the ACP enjoys financial autonomy, its own assets and the right to administer it. The Board of Directors has among its constitutional powers the exclusive approval of the regulations that develop the general rules on the contracting, purchasing and all matters necessary for the better operation, maintenance, conservation and modernization of the Canal.

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The ACP is directed by an Administrator and a Deputy Administrator, under the supervision of a Board of Directors made up of 11 members. The Administrator is the highest-ranking executive officer, legal representative of the entity and responsible for its administration and for the execution of the policies and decisions of the Board of Directors.

The Panama Canal is approximately 80 kilometers long between the Atlantic and Pacific Oceans. This waterway was cut through one of the narrowest saddles of the isthmus that joins North and South America.

The Canal uses a system of locks compartments with entrance and exit gates. The locks function as water lifts: they raise ships from sea level (the Pacific or the Atlantic) to the level of Gatun Lake (26 meters above sea level); ships then sail the channel through the Continental Divide.

Each set of locks bears the name of the town site where it was built, among others: Gatun and Agua Clara (on the Atlantic side), and Pedro Miguel, Miraflores and Cocoli Locks (on the Pacific side).

The Panamax locks are 33.53 meters (110 feet) wide by 304.8 meters (1,000 feet) long. The maximum dimensions of ships that can transit the Panamax locks are: 32.3 meters (106 feet) in beam; 294.1 meters (965 feet) long (depending on the type of ship); and draft or depth reach 12 meters (39 feet 6 inches) in Tropical Fresh Water.

The dimensions of the Neopanamax locks are 427 meters (1,401 feet) long, 55 meters (180 feet) wide, and 18.3 meters (60 feet) deep. Neopanamax vessels with a beam more than 106.20 feet, with an overall length equal to or less than 1215 feet, and with a maximum draft of 50.0 feet (15.24 meters) in tropical fresh water.

The water used to raise and lower vessels in each set of locks comes from Gatun Lake by gravity; it comes into the locks through a system of main culverts that extend under the lock chambers from the sidewalls and the center wall.

The narrowest portion of the Canal is Culebra Cut, which extends from the north end of Pedro Miguel Locks to the south edge of Gatun Lake at Gamboa. This segment, approximately 13.7 kilometers long, is carved through the rock and shale of the Continental Divide.

The Canal has a work force of approximately eight thousand employees and operates 24 hours a day, 365 days a year, providing transit services to vessels of all nations without discrimination. In addition, provides the coordination and pilots to move vessels through the Canal entrance channel to the Port terminals located at both ends of the Panama Canal. Please note that the same entrance channel is used for the canal transits and for the harbor movements, either northbound, southbound, and docking/undocking movements. The Panama Canal is not responsible for and therefore does not operate the Port terminals.

Ships from all parts of the world transit daily through the Panama Canal. Some 13 to 14 thousand vessels use this waterway every year, and based on recent rules of the booking system, all of them require a reservation to transit. In addition, the booking system offers a variety of products and services to customers, like the regular booking slot competitions, auctions, special competitions, long-term slot

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allocation and added value services and options like swaps, substitutions, cancellations, daylight transits, same day transits, transits in advance, and changing date among others.

The Panama Canal Authority (ACP) and the Republic of Panama strive to maintain the waterway as the route of choice for international commerce. In fact, commercial transportation activities through the Canal represent approximately 5% of world trade.

In its ongoing efforts to satisfy the demands of the maritime industry, the ACP reaches its customers to get a better understanding of the markets it serves and to make better decisions regarding Canal's plans.

Part of the ACP's Corporate Mission is to build lasting relationships with Canal customers, understand and anticipate their needs, add value to their business, and offer outstanding quality service. Thus, direct contact with its users is vital to the business of the Canal.

This market study seeks to refine planning, managing capacity, decision-making, risk mitigation, and improving customer service levels. There is a need to enhance situational awareness in real-time, reduce manual processes, and enhance our systems to better accommodate current rules and potential initiatives to maintain business growth and revenue generation for the Canal.

3. Purpose

This Request for Information (RFI) is issued to gather information on possible service providers and alternatives to achieve the following objectives, by using an Enhanced Booking System Software:

1. Increase and enhance agility in the operation, administration, capacity management, proactive decision-making, and risk mitigation during the planning and execution of the booking system processes, including all categories such as regular booking, auctions, and all additional booking options or services.
2. Integrate booking and auction processes/systems into one integrated solution, providing a better collaboration framework among all functional teams and at the same time building on automation of all processes to eliminate manual steps reducing probability of errors.
3. Enhance current systems capacity for implementation of enhanced processes, new initiatives and functionality, including potential concepts that could be implemented in the medium term, that could result in potential revenue and other gains for the organization.
4. Gain visibility and dynamic control over the booking slots inventory in real-time to maintain adherence to planning and compliance with regulations, while providing feedback to influence operational planning, revenue management, and other functions.
5. Enhance customer experience by improving service levels through an enhanced booking system, providing real-time information, full transparency, and overall satisfaction.

4. Information requested in this RFI

Please submit the following information to answer this RFI:

4.1. General Considerations

- This project will be conducted in English language and note that Spanish fluency would also be beneficial for its development.

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- The proponent shall be willing to work with ACP under our regulations and contracting procedures. This includes disagreements or conflict resolutions, payments/invoicing, and overruns.
- General company information and relevant experience
- References from similar projects (minimum 3 verifiable references)
- List of current clients in the maritime or critical infrastructure sector
- Relevant certifications (ISO 27001, SOC 2 Type II, etc.)

4.2. Company profile

The company profile shall contain the following:

Company Profile Item	Description
Company Background	Provide a brief history of the company, including its official website, business divisions, years of operation, and an overview of its customer base.
Areas of Expertise	Detail the company’s core areas of expertise, specifying the number of years of experience in each area and any specialized solutions offered for vertical industries.
HQ Location and Global/Regional/Local (Panama) presence	Include the address of the main office or headquarters, along with information on regional offices, subsidiaries, and global partner networks—highlighting presence in Panama and across the Americas.
Successful Projects	Describe relevant services or solutions implemented for customers with needs comparable to those outlined in this RFI, emphasizing outcomes and impact.
Annual revenue for the last three years	Provide the company’s annual revenue figures for the past five fiscal years, preferably supported by official financial statements or reports.
Point of contact for this RFI.	Include the full name, title or position, telephone number, and email address of the designated contact person for this RFI.

4.3. Technical proposal to implement the software

The technical proposal must clearly describe the provider’s approach to executing the implementation project, outlining each phase with a structured delivery plan that includes defined milestones, timelines, and dependencies. It should map user requirements to the proposed software functionalities to ensure alignment with business needs (including integration capabilities and security plan). The document must also address user experience considerations, training programs, adoption strategies, and a change management plan to support a smooth transition. Additionally, it should detail the implementation team’s composition, specifying roles, responsibilities, and qualifications of key personnel. Critical elements such as risk identification and mitigation, quality assurance, deployment methodology, and post-implementation support must be included to ensure successful project delivery.

Proponents must provide quotes under the following three licensing models:



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Model	Description
Option A	Perpetual license + annual maintenance
Option B	SaaS / Subscription

4.4. Budgetary estimates

A budgetary estimate should clearly group the cost into the following concepts:

4.4.1. Implementation fee

It is cost for the complete implementation of the software solution that meets 100% of the requirements of a project. This should include a fully functional software system hosted on ACP's cloud subscription (AWS or Azure) or within ACP's on-premises data center. The price should encompass all necessary configuration, development, deployment, and technology stack needed for the implementation period, including integration with other ACP applications², and initial setup activities to achieve operational readiness. The term "technology stack needed" shall be understood as any technology starting from the operating system all the way to a purpose-specific technology. The amount for the implementation fee shall be broken down into remote services and on-site³ services. Onsite services are subject to tax retention of 12.5% tax withholding of total onsite services, while remote services are exempt from this tax retention. Therefore, the implementation fee must be divided into two amounts, one for onsite services and the other for remote services.

4.4.2. Annual subscription or service support fee

The annual subscription fee covers the use of intellectual property as described in Rights of using intellectual property in this document, and the 24/7 Support services.

Intellectual Property Use: this includes the ongoing access use of the offeror's intellectual property for unlimited users. This fee shall cover maintenance, support, enhancement of the base product, custom code developed for ACP, bug fixing, technology stack cost if any, to name some. The offeror must provide a detailed breakdown or list in detail what is included within this fee, ensuring it supports the continuous improvement and reliability of the solution.

24/7 Support: 24/7 support services and maintenance as described in the support services section of this document. This includes:

1. End-user support
2. Regular maintenance of the Periodic platform and ACP solution maintenance (covering both software and infrastructure components)
3. Schedule upgrade for the Periodic platform and ACP solution upgrades (software and infrastructure)
4. Bug fixing for the entirety of the solution, including custom code developed for ACP and modifications made to the base product as part of its lifecycle maintenance.
5. Management service to meet the system availability and other SLA⁴ every month.

² In addition to integration with current ACP applications, software should be designed to integrate with potential future systems (e.g., revenue/schedule optimizing, business intelligence, etc.).

³ Onsite refers to the Republic of Panama.

⁴ service level agreement

4.4.3. Optional on-demand services for changes and enhancements

Provide a single hourly rate for on-demand services that enable ACP to request and implement changes or enhancements to the existing solution. This service is optional and may be initiated at ACP's discretion. The proposed rate must accommodate the use of various specialist roles as needed, without requiring separate pricing per role.

ACP will compensate based on actual hours worked following the release of the software into production, contingent upon meeting the defined acceptance criteria. Payment will not exceed the maximum number of hours specified in the corresponding purchase order. The requested solution may be delivered through multiple production releases.

For further details, refer to the section titled "Respond to on-demand request for change and enhancements" for additional details.

4.5. Detail considerations regarding Enhanced Booking System

As the Canal undertakes an RFI to implement a new Enhanced Booking System, it is essential to gather comprehensive information regarding the system's requirements, including the standards and protocols it follows. This will ensure a clear understanding of its operational framework and support effective integration.

4.6. Demo the new Enhanced Booking System proposal to the user

Vendors must be prepared to demonstrate the proposed new Enhanced Booking System intended to replace the existing software, showcasing its capabilities in relation to the requirements outlined in this document, as well as any additional functionalities that may enhance the safety, efficiency, and overall effectiveness of Canal operations.

5. Rights of using intellectual property (licensing)

This section outlines the ownership and usage rights associated with the software provided or developed under this contract, distinguishing between software ownership and data ownership.

5.1. Software Ownership

The software offered by the vendor comprises both the base product and custom-developed code tailored to meet the functional requirements of ACP's solution. The complete solution is delivered either as a cloud-based Software-as-a-Service (SaaS) model or as an on-premises software implementation, with the vendor retaining full responsibility for the software.

The offeror must ensure that the licensing of its base product to ACP includes safeguards to prevent any potential breach of license terms by ACP. These safeguards may involve the implementation of preventive or corrective controls at predefined intervals. The offeror is responsible for providing enough licenses to cover ACP's solution and must implement appropriate mechanisms to prevent violations or misuse of the license terms, thereby absolving ACP of any liability related to such infringements.

If the offeror's base product incorporates third-party technologies, the offeror remains fully responsible for managing all associated licensing agreements. These responsibilities must be fulfilled within the scope of the subscription fees, ensuring that ACP's use of the offeror's intellectual property remains fully compliant and does not incur any additional costs.

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If there are other important licensing details- number of users allowed at the same time, renewal conditions, it should be clearly stated to ensure transparency and alignment with ACP’s needs.

5.2. Data Ownership

All data collected, processed, or otherwise obtained through ACP’s solution shall be considered the exclusive property of ACP. The use of such data for any purpose is strictly prohibited without prior express authorization or coordination from ACP.

6. Offeror responsibilities

The selected offeror is responsible for delivering a comprehensive maritime software solution that not only leverages their base product but also extends its functionalities to meet all of ACP’s specified requirements. This section outlines the key obligations that the offeror must fulfill as part of this contract, including the delivery of formal documentation and communication necessary for ACP’s review and acceptance. of the initial software and potential updates over time.

7. Roles and Responsibilities (RACI Matrix)

To clarify the roles involved in the Enhanced Booking System operations and their responsibilities, the following RACI matrix is provided based on the user stories defined in this document. Proponents should consider these roles when designing user interfaces, workflows, and access controls.

RACI Legend:

- R = Responsible (performs the work)
- A = Accountable (final decision authority)
- C = Consulted (provides input)
- I = Informed (kept updated)

Functionality	Customer	Booking Agent	Booking Coordinator	Planner	Supervisor	Control Center (OPCT)
Booking/Competitions	R	R	A	C	A	I
Auctions	R	R	A	I	A	I
LoTSA	R	R	A	C	A	I
Cancellations	R	I	A	I	C	I
Change Date	R	I	A	R	C	I
Substitutions	R	R	A	R	A	I
Swaps	R	R	A	R	A	I
Daylight Transit	R	I	A	R	A	R

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Last-Minute Transit	R	I	C	A	C	R
Same Day Transit	R	I	C	A	C	A
TIA (Transit in Advance)	R	I	C	A	C	I
JIT (Just-In-Time)	R	I	C	A	C	I
Void Transaction	I	R	A	I	A	I
Parameter Configuration	I	I	C	C	A	I
Slot Inventory Management	I	I	R	R	A	C
Reports & KPIs	I	I	R	R	A	I

7.1. Project Implementation responsibilities

Conduct Comprehensive Requirement Analysis

The offeror is responsible for performing a thorough requirement analysis, beginning with the specifications outlined in this document. This process must include a detailed evaluation of ACP’s operational/related needs, strategic objectives, and any existing constraints. The goal is to establish a clear and shared understanding of the solution’s scope and expectations. The offeror shall collaborate closely with ACP stakeholders to refine, validate, and expand upon the initial requirements, identifying any additional needs or adjustments necessary to ensure the solution is fully aligned with ACP’s operational and commercial context and long-term goals.

Revise and Align System Architecture

Following the requirement analysis, the offeror shall revise the system architecture to ensure full alignment with both functional and non-functional requirements. This includes considerations for high availability, scalability, security, and maintainability. The revised architecture must support current operational demands while remaining adaptable to future growth and evolving needs. The offeror is expected to present a comprehensive architecture plan that demonstrates how the proposed solution will meet ACP’s expectations and integrate effectively within its existing technology landscape.

Implement a Human-Centered Design Process

The offeror shall apply a human-centered design process to define and deliver an optimal user experience (UX.) for ACP staff, its customers, and associated parties. This involves engaging directly with end-users and stakeholders to gather insights, prototype design concepts, and iteratively refine the interface based on feedback. The objective is to develop an intuitive, efficient, and user-friendly interface that enhances productivity and user satisfaction across ACP’s operations.

Provisioning on ACP Infrastructure

The offeror is responsible for provisioning the development, pre-production, and production environments on ACP’s infrastructure, which may be cloud-based or on-premises, in accordance with the revised system architecture. This includes configuring all necessary resources, tools, and services to support the development lifecycle and ensure optimal performance, security, and reliability throughout deployment and operation.

Develop and Integrate the Solution

The offeror shall develop the new software solution—intended to replace the existing system—by leveraging its base product, incorporating the approved UX design, and implementing all required functionalities to meet ACP’s specifications. Development must be guided by the requirement analysis and system architecture to ensure robustness and adaptability. A key responsibility includes the seamless integration of the new solution with ACP’s existing maritime applications, enabling efficient data exchange and interoperability through well-documented APIs or other integration mechanisms as specified in the RFI.

Ensure Quality Assurance

The offeror must implement a rigorous quality assurance strategy combining automated testing, user feedback, and continuous validation. This approach ensures that the solution meets all technical specifications, performance benchmarks, and usability standards. The offeror shall adopt continuous integration and continuous delivery (CI/CD) practices to support iterative development, rapid issue resolution, and timely delivery of high-quality software.

Establish Agile Project Management

The offeror is responsible for implementing an agile project management framework that supports iterative development, stakeholder engagement, and flexibility. This framework must ensure consistent progress with demonstrable monthly deliverables aligned to the agreed delivery plan including performance metrics. It should also include user acceptance testing, comprehensive user training, and proactive risk management to address both technical and organizational challenges.

Manage Risks Proactively

Effective risk management is essential to the success of the project. The offeror must identify and assess risks related to technology implementation and organizational change early in the project lifecycle. Mitigation strategies must be developed and communicated regularly to ACP, ensuring transparency and preparedness for potential disruptions. The offeror must ensure that both the technical solution and ACP’s operations remain resilient and adaptable throughout the implementation process.

Optimize Execution Team Performance

The offeror must ensure that the execution team possesses the necessary expertise, experience, and commitment to deliver the project successfully. If ACP determines whether any team member is underperforming or unsuitable, the offeror shall promptly replace them at no additional cost to ACP and ensure a seamless transition through adequate training and knowledge transfer. The offeror must continuously monitor team performance and project progress, proactively identifying any need for additional resources. Any proposed changes to the team must be justified, submitted for ACP’s approval, and must not increase the overall project cost or compromise the quality of deliverables.

7.2. Warranty

The offeror shall warrant that all specified requirements are implemented in full compliance with the acceptance criteria throughout the development phase and for a period of one year following the official go-live date.

This one-year warranty shall cover all work and resources necessary to resolve any incidents or issues affecting the production environment, provided such issues arise from unforeseen

conditions not identified during the acceptance phase. The offeror shall assign a dedicated team to maintain the solution during this period, at no expense for the ACP.

In the event of an issue, the offeror must submit a formal action plan detailing the steps required to deliver a new version of the software with the issue resolved, within a timeframe mutually agreed upon with ACP. While the permanent fix is being developed, the offeror shall also provide an interim action plan that enables ACP to achieve the intended functionality without disruption through a suitable workaround.

7.3. Support services

7.3.1. Supported environments

The offeror shall provide full support services for the Development, Pre-Production, and Production environments. All three environments must be treated as productive environments, as each fulfills a critical business function for ACP.

Each environment shall maintain consistency in system architecture to ensure uniformity in performance, functionality, and integration. While variations in computing power are acceptable—given that non-production environments typically handle lower workloads—the architectural design must remain equivalent across all environments to support reliable testing, seamless deployment, and operational continuity.

7.3.2. End user support

The offeror shall provide timely and effective support services⁵ to assist end-users experiencing issues or requiring guidance with the software. Support shall include responding to inquiries, troubleshooting problems, and offering usage assistance through a dedicated support portal provided by the offeror. Additionally, alternative channels for submitting support requests—such as email, phone, or in-application chat—must be available to ensure accessibility and convenience.

When necessary, the offeror shall utilize remote support tools to assist users directly and resolve issues efficiently. A comprehensive knowledge base and technical documentation must also be provided to empower users with self-service resources for common how-to questions and operational guidance.

Support services shall be available 24 hours a day, 7 days a week (24/7), ensuring continuous assistance. It is important to ensure service quality and accountability, with escalation protocols, resolution timelines and performance metrics regularly reviewed in coordination with ACP.

Response times must be determined based on the severity and impact of each issue, and classified according to the following criteria:

7.3.2.1. Priority 1: Critical Impact

Description: This priority level is assigned to incidents that result in a complete loss of service or a significant feature that is critical to business operations. It represents situations where there's an immediate and significant impact on the user's ability to perform essential tasks, potentially affecting multiple users or entire departments.

Examples: System outages, data loss, functionality failures preventing business transactions.

⁵ as documented in an SLA

Response Time: Immediate, with initial response aimed within 1 hour.

Resolution Goal: As quickly as possible, aiming for a workaround within 2 hours and a permanent fix as per the severity and impact analysis.

7.3.2.2. Priority 2: Major Impact

Description: Incidents under this category affect normal operation but do not completely halt business activities. These are significant issues that reduce the functionality of the software, affecting the performance of certain operations but have workarounds or affect only a subset of users.

Examples: Performance degradation, intermittent issues, non-critical feature malfunctions.

Response Time: Within 4 hours.

Resolution Goal: Target to provide a workaround within 8 hours and a permanent solution in accordance with the development and release cycle.

7.3.2.3. Priority 3: Minor Impact/Inquiry

Description: This priority is for incidents that have a minimal impact on business operations or for general inquiries that do not affect the functionality of the software. These are typically “how-to” questions, requests for information, or minor issues that do not significantly impede users’ operations.

Examples: Usage questions, cosmetic issues, requests for documentation.

Response Time: Within 1 business day.

Resolution Goal: Resolve inquiries or provide information within 2 business days. For minor issues, schedule fixes in future updates or releases depending on the severity and impact.

7.3.2.4. Service Level Agreements must include

- Response time for critical incidents: < 15 minutes
 - Resolution time for critical incidents: < 4 hours
 - Guaranteed availability: 99.9%
- Penalties for non-compliance

7.3.3. Platform maintenance

Objective: Ensure the software platform remains operational, secure, and up to date. Through structured maintenance practices.

Activities: Regular maintenance activities include continuous performance monitoring, application for security patching, and new releases to implement bug fixes, functional changes, and enhancements.

Schedule: Maintenance will be performed during off-peak hours to minimize impact and monthly frequency. Maintenance shall avoid the need for downtime; however, if a downtime window is required, the window should not exceed the time allowed by the monthly established SLA for system availability.

Unplanned maintenance window: An approval is required from the Operation Control Integrated Center Manager in case an unplanned maintenance window is required. The window must be within the time allowed by the monthly established SLA for system availability.

7.3.4. Platform upgrade

Objective: Deliver enhancements and new features through software upgrades to support evolving business requirements and ensure the software stacks up to date. These enhancements shall be in accordance with the roadmap for the base product and enhancements or changes requested by the ACP. The roadmap should be published annually to keep a five-year horizon to ensure strategic alignment.

Frequency: Major upgrades will be scheduled annually, with minor updates or patches released as required, as part of the monthly maintenance schedule. If a downtime window is required, the window should not exceed the time allowed by the monthly established SLA for system availability.

Notification: Users will be notified of upcoming upgrades at least 60 days in advance, including comprehensive details on new features and changes and potential impacts.

Support: Training and documentation will be provided to facilitate a smooth transition to the upgraded software.

7.4. Respond to on-demand request for change or enhancements

Objective: Address the need for modifications or enhancement in the software's functionality to adapt to evolving business requirements and operational priorities.

Procedure: Requests must be submitted through a designated portal or via email, detailing the change required and its business justification. The offeror shall provide a monetary estimate for the work and the time frame to do it. The ACP and the offeror shall reach an agreement on the scope and final price to proceed to authorize the change, which shall be communicated to the offeror by following ACP's contracting standard procedure.

Response time: Each request shall be evaluated by the offeror based on its impact, feasibility, and alignment with the system architecture and design. A response is expected within the next 5 business days to clarify the requirements, and the proposal for the change shall be delivered within the next 10 business days after all clarifications have been made. The response shall be in the form of a detailed proposal from the offeror including scope of work, delivery plan, estimated hours, hourly rate as per the price section on this document for this service, and a total estimated cost.

Implementation: Approved changes shall be scheduled and implemented in a manner that minimizes disruption to business operations according to the development and release cycle.

Warranty: The offeror shall warrant that all requirements are implemented in compliance with the acceptance criteria during the development phase of the request and for one (1) year after the go-live date for the request. The warranty for one year after the go-live shall cover any work or resources required to fix an incident or problem that may be impacting on the service in production due to an unforeseen condition that was not detected during the acceptance phase. The offeror shall dedicate a team to work on the solution. The effort to solve the issue shall be formally described in an action plan to deliver a new version with the issue fixed. In the meantime, the offeror shall provide an action plan to allow the ACP to achieve what was intended with a workaround to the issue.

Impact on ACP Solution support services: Once the request goes-live, the base code for the request must become part of the overall solution and all support services must apply to it as if it were developed as part of the implementation phase.

8. Software requirements

8.1. Functional requirements

System requirements can be derived from user stories, as intended in this document, where the user story defines the "what" and "why" of a feature from an end-user's perspective, and the functional and non-functional requirements define the "how" by detailing the specific system capabilities and qualities needed to achieve that user need.

A User Story is a requirement well-expressed from the perspective of an end-user goal. The User Story format has become the most popular way of expressing requirements in Agile for several reasons:

- It focuses on the viewpoint of a role who will use or be impacted by the solution
- It defines the requirement in language that has meaning for that role
- It helps to clarify the true reason for the requirement
- It helps to define high level requirements without necessarily going into low level detail too early

User goals are identified, and the business value of each requirement is immediately considered within the user story. Choosing User Stories to define requirements demonstrates an intention to work collaboratively with the users to discover what they really need. The user story format helps to ensure that each requirement is captured in a feature-oriented, value-oriented way, rather than a solution-oriented way.

As part of the documentation used as reference in the user stories, the N-07 Notice to Shipping is mentioned within this section to provide clarity on how the current procedure is established compared to the aspiration of "To Be" processes being included in this request for information. Every year, The Panama Canal issues an updated version of this Notification at the beginning of the calendar year, and updates are notified as advisories to shipping during the year. Proponents should understand that when "To Be" processes are implemented, the N-07 Notice to Shipping will be updated based on the new processes.

Before describing details of each functionality, below is a classification or summary of the main functionalities that are envisioned in this new tool, including a general description and objective. The following table summarizes the main functionalities envisioned for this new tool and should aid proponents to understand the overall concept and use of the new tool.

8.2. Requirements Prioritization (MoSCoW)

To facilitate proponents' understanding of critical versus optional functionalities, requirements have been prioritized using the MoSCoW methodology:

Priority	Functionalities	Description
MUST	Booking/Competitions, Cancellations, Auctions, LoTSA	Core functionalities required for MVP. System cannot go live without these.
SHOULD	Change Date, Substitutions, Swaps	Important functionalities to be implemented after MVP if possible.
COULD	TIA, JIT, Same Day Transit	Desirable functionalities for future phases if time and resources permit.

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WON'T (this phase)	AI/ML Optimization Capabilities	Out of scope for initial implementation. See Section 10 for future roadmap.
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8.3. Requirements functional mayor items

Functional mayor items		Description	Objective
1	Product Parameter Setup and Adjustments	Manage rules, number of slots, periods, fees, restrictions, vessel sizes, market segments, operational restrictions, auction parameters,	Configure the operational and business rules that govern the entire system.
2	Slot Configuration (Dynamic Slot Engine)	Manage availability, expirations, operational constraints, daily slots, IDs generation, and capacity projections.	Real-time management of slots portfolio, usage and availability based on parameter setup
3	Customer-Facing Slot Visualization	Operational view of the slot inventory: available, sold, auctioned, tentative, released, canceled.	Provide accurate and up-to-date visualization for agents and customers (internal/external).
4	Booking Requests (Ordinary Reservations)	Processes ordinary reservation requests based on capacity, availability, and rules.	Manage the reservations system.
5	Slot Competitions	Manages competitions, validates applications, executes selected tie-breaker criteria, determines recommendations of winners, publishes results.	Assign slots through regulated and auditable competitive processes.
6	Auctions	Manage auctions: publishing, bidding, validations, auto-close, winner notification.	Allow dynamic allocation of slots through bidding.
7	LOTSAs (Long Term Slot Allocation)	Sealed-bid auctions, package creation, special windows, LoTSA reservation validation.	Manage long-term slot allocation with specific rules
8	Booking Options, Processing and Evaluation	Apply different booking options or services such as cancellation, date change, substitution, swap, release and reallocation of slots.	Allow modifications to a reservation in compliance with operational rules.

8.3.1. General System Requirements

Product Parameter Setup and Adjustments

As a Supervisor, I want a user-friendly interface to create and adjust booking parameters for Regular Reservations, LoTSA, Auctions, and Competitions so that offerings can be managed without technical support.

As a Supervisor, I want to define rules by period (such as days offered, vessel segments, vessel sizes, prices for products, and special conditions) so that each transit slot product aligns with operational and commercial strategy.

As a System Requirement, the system shall accept numeric parameter values (for duration, quantity, limits, etc.) and automatically restore default values when a parameter's validity period expires.

As a System Requirement, the system shall record or save every parameter change request and approval with timestamps and user IDs to provide full traceability.

As a Booking coordinator/booking agent/operation service agent we want automated notifications sent internally and to shipping agents when parameter changes are approved so that all stakeholders are informed in real time.

As a Supervisor, I want the system to support a configurable approval workflow for parameter changes so that complex or role-sensitive changes are verified before going live.

Service Request and Approval Workflows

As a Supervisor, I require the ability to configure multi-stage workflows for service requests (including evaluation, approval, handoff) by defining responsible actors and stage durations so that the booking lifecycle is transparent, auditable and predictable.

As a Booking coordinator/booking agent/operation service agent, Planner or Supervisor, I expect to receive timely reminders ahead of workflow deadlines so that I can act proactively and prevent delays.

As a System Requirement, the system shall dynamically apply approved parameters across downstream processes so that operational behavior always reflects the latest settings without requiring manual updates or intervention.

Notifications, Bulletproof, Language, and Documentation Search

As a System Requirement, the system shall include functionalities to bulletproof and audit human-made decisions that fall outside rule-based logic, to detect potential bias or inequity in slot allocation or auction practices.

As a system requirement, the system shall create AI-powered templates that automatically generate clear and accurate messages regarding rule and parameter changes, ensuring that advisories and client communications remain consistent, professional, and easy to understand.

As a booking agent/operation service agent, I require a smart search capability that can distinguish between public and sensitive documents, and retrieve relevant advisories and process notes to enable fast and accurate resolution of customer inquiries.

As a Supervisor, I require the system to generate concise summaries and draft reports of configured parameters and rules, to support the development of advisories to shipping and internal planning activities.

As a Customer, I require access to a digital assistant (chat/FAQ) that can respond to common queries and escalate complex cases to a human specialist, offering the option of calling or chat to ensure timely and effective support.

As a Customer, I want to interact with an AI-powered virtual agent so that I can quickly inquire about my reservations, auctions, and maritime regulations, enabling faster and more efficient responses.

Slot Configuration Based on Operational Capacity

As a supervisor, I want to configure transit slot parameters based on daily operational capacity and lock-specific restrictions, so that slot availability can be accurately generated and dynamically adjusted for defined validity periods.

As a System Requirement, the system shall generate a unique identifier (ID) for each daily transit slot and record its associated operational restrictions, enabling comprehensive tracking throughout the slot lifecycle.

As a supervisor, I need the ability to assign transit slots per categories and periods (Ordinary Booking or Competitions, Auctions, LoTSA) based on vessel segments and predefined business rules, so that slot allocation aligns with strategic priorities.

As a Supervisor, I need the ability to review transit slot configurations in a staging environment prior to deployment, to ensure accuracy and validate compliance with operational constraints.

As a Supervisor, I need access to slot usage records and change history, including edits to critical parameters, so that I can conduct compliance checks and perform audit activities effectively.

As a supervisor, I need access to a comprehensive transaction log covering the entire lifecycle of each transit slot from creation to cancellation (including resale history, product category, client details, and pricing) to ensure full traceability and auditability.

Dynamic Slot Management Engine

As a Booking Coordinator, I need access to a real-time dashboard displaying all transit slot types, including slot identifiers (ID) and historical usage data, so that daily operations can be effectively monitored and managed

As a Planner, I need visibility into sold and unsold slots, including their associated restrictions and effective dates, so that I can approve offers across different booking services.

As a Supervisor, I need access to analytical views of slot availability and parameter trends, so I can recommend optimal sales channels (auction, competition, direct booking) to maximize utilization.

As a Booking Coordinator, I need automated tracking of slot expirations and offering deadlines, so that inventory can be proactively managed.

As a Supervisor, I need the system to generate key performance indicators (KPIs) such as slot turnover, usage frequency, and sales performance to support data-driven decision-making.

As a Booking Coordinator/Booking Agent, I need to be notified of open auctions or waitlist opportunities when no slots are available, so I can still plan my transit through the canal effectively.

As a Supervisor/Planner, I want an AI-powered assistant that allows me to query auction data and provide real-time statistics (such as bid trends, availability, and pricing insights), so I can make informed booking decisions quickly and accurately.

Customer-Facing Slot Visualization

As a Customer, I need to view available transit slots filtered by my customer type and operational constraints (day/night, vessel size, restrictions, date) so that I can identify suitable transit opportunities.

As a System requirement, the system shall provide a dynamic calendar view that highlights all slot status—including available, auctioned, sold, scheduled, tentative, and confirmed slots—while also surfacing newly released slots resulting from cancellations or rescheduling.

This visibility shall enable customers to plan their transit strategy effectively, make informed purchasing decisions, and take timely action on emerging opportunities.

As a supervisor, I need the ability to control and configure all parameters of the dynamic calendar, and highlight updates triggered by cancellations or rescheduling.

As a customer, I need the system to recommend reservation options based on my historical activity, so that I can easily find available slots or alternative dates when my preferred schedule is unavailable.

Booking Options, Processing and Evaluation

As Booking Coordinator/Booking Agent, I need prioritized lists and filters for booking option requests (cancellations, substitutions, exchanges, change dates), along with alert notifications, so I can respond efficiently and manage requests in a timely manner.

As a System Requirement, the system shall notify clients in real time once their booking option request has been processed, ensuring transparency and timely communication (real time).

As a System Requirement, the system shall identify candidates for booking options based on previously failed attempts due to capacity limitations, enabling proactive alternative offerings.

As a Planner, I need to proactively identify opportunities for TIA or Last-Minute transits using real-time vessel positions and estimated time of arrival (ETAs), to improve slot utilization and operational efficiency.

As a System Requirement, the system shall maintain a historical record of all booking option requests to support audit processes and performance analysis.

8.3.2. Booking / Competitions Request

***Summary:** Transit slot allocation at the Panama Canal is primarily managed through the Competitions process, which awards slots via regular and special competitions held during defined periods established and administered by the ACP. The system is responsible for validating applications, recommending winners, and automating the processing of both successful and unsuccessful entries.*

***Note:** While the Competition process is the most common mechanism for slot allocation, there are cases where the number of slots exceeds the number of customers interested; then this process is not required.*

1. **As a System Requirement**, the system shall validate all applications for a competition against predefined rules and criteria⁶, including HML status and direction, as configured in the parameters module.
2. **As a System Requirement**, the system shall provide a consolidated interface that displays all applications associated with a specific competition.
3. **As a System Requirement**, depending on market or strategic considerations, the competition process could consider application of a tie-breaker criteria other than a customer ranking. The system shall include functionality that allows us to update the tie-breaker procedure desired for a competition (vessel criteria or other type of auction) as part of the product parameter setup.
4. **As a Booking Coordinator**, I want the system to provide a recommendation for the winner of a competition based on configured rules, including customer ranking, but allow me to make the final selection.

⁶ This may include both current business rules as well as future options. These may be both static and dynamic.

5. **As a System Requirement**, upon publishing the winner of a competition, the system shall automatically reject all applications that did not win a transit slot.
6. **As a System Requirement**, the system shall provide a dedicated screen to display the results of each competition.
7. **As a System Requirement**, the system shall integrate with the billing system and VUMPA to apply the appropriate charges for the awarded transit slot.
8. **As a Booking Coordinator**, I need the system to automatically generate the transit booking fee and assign the arrival and transit times when I approve a reservation from a competition.
9. **As a System Requirement**, the system shall update the display of reserved transit slots in real-time as transactions are processed.
10. **As a System Requirement**, when a transit slot is released in a period that previously had no availability, the system shall automatically generate special competition and notify the Booking Coordinator for validation prior to alerting customers.

8.3.3. Auctions

***Summary:** The Auctions process provides a platform for auctioning available transit slots for vessels in the Panama Canal. This service automates the process of publishing available slots, notifying customers notifications, bid management, and awarding slots to winning bidders.*

1. **As a System Requirement**, the system shall automatically display available transit slots, including those released from carryovers, cancellations, or other events, with full traceability of their history and characteristics.
2. **As a Booking Coordinator/Booking Agent**, I need to view a screen showing transit slot availability by period, including existing requests and restrictions or direction variants, to accurately assess availability and generate potential auctions.
3. **As a System Requirement**, the system shall automatically send email notifications to subscribed customers when a new auction is opened.
4. **As a Booking Coordinator/ Booking Agent**, I need access to a dashboard showing the status of scheduled auctions with key indicators such as number of views, bids, and preliminary amounts, to monitor performance and make informed decisions.
5. **As a System Requirement**, the system shall automatically generate a winning customer code and notify the winner upon the close of an auction.
6. **As a Booking Coordinator/ Booking Agent**, I want the system to automatically create a reservation request for the auction winner, pre-filled with the visit data and indicating it originated from an auction.
7. **As a Customer**, I want to register in the system to be able to place bids in auctions.
8. **As a System Requirement**, the system shall conduct the auction process using the type of auction defined in the rules and conditions. The system shall permit the application of different types of auction procedures such as regular bidding auction, sealed bid auction, reverse auction, among others.
9. **As a System Requirement**, the system shall validate all bids against predefined business rules and mandatory fields (like vessel, customer, and visit number) by integrating internal and external data sources.

10. **As a System Requirement**, the system shall place non-winning bidders on a waiting list and notify them if a similar transit slot becomes available for auction within their specified date range.
11. **As a Customer**, I want to be able to suggest an alternative preferred date after winning an auction, in case a more suitable transit slot becomes available.
12. **As a Booking Coordinator**, I need the system to notify me when a transit slot becomes available that matches the winning customer's preferred alternative date, so I can offer it to them before publishing it as a new auction.
13. **As a System Requirement**, the system shall support simultaneous auctions for different vessel categories, such as Super, NEO, and Regular, and determine one or multiple winners based on predefined parameters.
14. **As a System Requirement**, the system shall provide an analytics dashboard with KPIs for internal and external users to track auction performance.
15. **As a System Requirement**, the system shall automatically perform the reconciliation of auctions and provide the ability to view and export historical transaction data.

8.3.4. Long Term Slot Allocation (LoTSA)

***Summary:** The LoTSA (Long Term Slot Allocation) is a comprehensive product that allows customers to purchase packages of transit slots through a sealed bid auction and then book individual transits using those purchased slots.*

1. **As a LoTSA Supervisor**, I want a configuration screen to define and adjust the parameters for the sealed bid auction, LoTSA product, including rules for booking periods, applicable segments, vessel sizes, and validity, and create and modify LoTSA transit slot packages and slot ID used for traceability and audit purposes.
2. **As a Booking Agent**, I require the ability to create and publish LoTSA package auctions by selecting parameters from predefined lists, with options to edit and preview the auction before it goes live.
3. **As a System Requirement**, the system shall automatically notify all agencies via email when a LoTSA package is published, including a direct link to the auction page.
4. **As a Customer Participating in a LoTSA Auction**, I need the system to validate my bid information, including customer code, bid amount, and payment method, and confirm that my bid has been successfully submitted.
5. **As a System Requirement**, upon the closing of a LoTSA package auction, the system shall notify all participants whether they have won or not, without disclosing winning bid amounts or other participants' identities.
6. **As a Booking Agent**, I need the system to monitor my LoTSA package booking window and send me email notifications at the start of the window and as the expiration date approaches.
7. **As a Customer**, I need a dynamic calendar view of available transit slots with their conditions (day/night, size, restrictions) to help me select and request reservations from my LoTSA package.
8. **As a Customer**, when creating a LoTSA reservation request, I need the system to validate that the request complies with the offer parameters and that the booking date is within the allowed window.

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9. **As a Booking Agent**, I need the system to validate incoming LoTSA reservation requests against direction and restriction limits, the number of LoTSA slots per day, and the offer conditions before approval.
10. **As a System Requirement**, if a customer's LoTSA reservation request is for an unavailable date or is made after the booking window has closed, the system shall place the request on a waiting list for an agent to evaluate and offer alternatives.
11. **As a Booking Agent**, I need the system to manage a waiting list that compares available transit slots with the conditions of pending requests and notifies me when a suitable match is found.
12. **As a System Requirement**, the system shall monitor the monthly consumption of LoTSA transit slots and, if a slot is unused, initiate a billing process by notifying the customer to create a bank guarantee for the charge.

Together with the major functionalities, the booking system offers several items or procedures considered as booking options to help manage the slot portfolio from the date a slot is awarded until the transit date or booking date. Below is a table that summarizes the booking options that are currently part of the procedure and will be considered as the “To Be” scenario.

Booking options or services		Description	Objective
1	Cancellations	Calculation of fees, application of surcharges, approval, reversal of cancellations.	Process cancellations with applicable fees.
2	Change Date	Validates availability, windows, restrictions, HML and LoTSA constraints	Provide rule-based date changes.
3	Substitutions	Validates vessel replacement based on segment, size, alliances/Vessel Sharing Agreements, daylight restrictions.	Allow vessels to be replaced in compliance with rules and regulations.
4	Swaps	Exchange of dates between two vessels of the same customer.	Optimize operations for customers with multiple vessels.
5	TIA (Transit In Advance)	Evaluate anticipated transit, availability, parameters and rates.	Offer earlier transits according to regulations.
6	Just-In-Time (JIT)	Validates vessel eligibility for transit on arrival, applies fees and restrictions.	Offer optimized slots at the exact time of arrival.
7	Last-Minute Slot	Manages slots offered close to the transit date, selection, and tie-breaking criteria.	Maximize use of last-minute slots, improve utilization.
8	Same Date Transit	Handles a Forfeit Request, considering penalties, pending approval.	Manage late arrivals with clear and standard rules.

8.3.5. Cancellation Transaction

***Summary:** The Cancellation as a booking option manages the process of cancelling a vessel's transit reservation. It allows customers to request cancellations, provides cost estimates based on configurable rules, and handles the approval and processing of these requests.*

1. **As a Customer**, I expect to request the cancellation of my reservation, subject to the business rules outlined in the N7 notice, ensuring compliance with regulatory and operational guidelines.
2. **As a Customer**, I expect the system to provide an estimated cost for the cancellation before I confirm the request.
3. **As a System Requirement**, the system shall automatically generate the cancellation form once the request is approved by the Booking Coordinator.
4. **As a Booking Coordinator**, I require the ability to review and approve cancellation requests.
5. **As a System Requirement**, the system shall apply different cancellation fee structures based on whether the reservation was a regular booking, a LoTSA booking, or an auction win, and these rules must be configurable.
6. **As a System Requirement**, the system shall apply a cancellation surcharge for requests submitted less than two days before the required arrival time and which do not arrive within seven days after their required arrival time, in addition to cancellation fee. This surcharge shall be waived if the vessel arrives in canal waters.
7. **As a Booking Coordinator**, I require the ability to reverse a cancellation transaction (void the cancellation) to return the reservation to its original status if an error occurs or exceptional circumstance.
8. **As a System Requirement**, the system shall not charge a fee for void cancellations, ensuring operational flexibility.
9. **As a System Requirement**, when a transit slot is freed due to cancellation, the system shall notify the Booking Coordinator and automatically check for evaluation of the waiting list for potential replacements.

8.3.6. Change Date Request

***Summary:** The Change Date booking option enables customers to request a change in their transit reservation date. This option validates these requests against business rules, checks slot availability, and manages an approval workflow involving Planners and Coordinators to ensure compliance and operational integrity.*

1. **As a Customer**, I want to request a change to my reservation date, subject to the rules for regular and LoTSA transit slots as described in the N-07 notice to shipping.
2. **As a System Requirement**, the system shall automatically generate the date change form upon approval of the request.
3. **As a System Requirement**, the system shall validate all date change requests against availability, direction compatibility, and applicable restrictions to prevent scheduling conflicts.

4. **As a System Requirement**, the system shall prevent vessels designated with HML denied (high mast lighting) from making a date change.
5. **As a System Requirement**, the system shall ensure that LoTSA slots can only be changed once and within a five-day window, while regular slots can be changed multiple times, with these rules being configurable.
6. **As a Booking Coordinator**, I require the ability to reverse a date change transaction (void the change) to restore the original reservation date in case of an error or exceptional circumstance.
7. **As a System Requirement**, for LoTSA customers requesting a date change when there is no availability, the system shall place them on a waiting list and provide a view for both Booking Agent and Booking Coordinator to track the request status.
8. **As a System Requirement**, when a suitable transit slot becomes available for a request on the waiting list, the system shall notify the Booking Coordinator for evaluation and potential reassignment.
9. **As a Planner**, I require a screen to evaluate date change requests, and upon my approval, the system should send a validated transaction confirmation to the Booking Coordinator for final approval.
10. **As a System Requirement**, when a LoTSA vessel changes their reservation date, or vessel with different restrictions, the system shall validate and add an indicator flag to denote that the guaranteed In-Transit-Time (ITT) is no longer applicable, based on configurable rules.

8.3.7. Daylight Transit Request

***Summary:** The Daylight Transit booking option offers guaranteed daylight passage through the Panama Canal for eligible vessels. The system automates the identification of eligible vessels, validates their transit schedule, and manages the offering and application of this premium service.*

1. **As a System Requirement**, the system shall automatically identify if a vessel is eligible for the Daylight Transit service, which applies only to regular vessels of the following types: Passenger, Military, Non-commercial Government, and Yachts.
2. **As a System Requirement**, the system shall validate that the vessel's transit schedule allows for passage through the first two sets of locks and the Culebra Cut during daylight hours, based on data from the transit scheduling system. In case of southbound transit, the passage through Gatun Locks, Gatun Lake and Pedro Miguel Locks.
3. **As a System Requirement**, if a vessel is eligible and the schedule permits, the system shall offer the Daylight Transit booking option for an additional, configurable cost.
4. **As a System Requirement**, the system shall allow for the cancellation of the Daylight Transit booking option, applying for a cancellation charge based on a configurable fee table.
5. **As a System Requirement**, if the vessel fails to meet the daylight transit time requirements during its passage, the system shall change the service status to "Not Granted", ensuring accurate service records and billing adjustments if applicable

8.3.8. Last-Minute Transit Request

Summary: *The Last-Minute booking option provides an opportunity for vessels already in Canal waters to secure a transit slot on short notice. Planners offer these slots based on operational availability, and the system assists in identifying and validating eligible candidate vessels.*

1. **As a Planning Supervisor**, I require configuring the parameters for the Last-Minute service.
2. **As a System Requirement**, the system shall display available Last Minute transit slots in Period 3 to Planners, using a distinct visual indicator, based on operational capacity and the current mix of reservations.
3. **As a Planner**, I want the system to provide visibility of arrived vessels that are potential candidates for the Last-Minute service, based on established parameters, and suggest which customer should receive the offer based on a configurable preference
4. **As a Customer**, I want to request the Last-Minute service, and I want the system to validate my eligibility based on the participation parameters, allowing me to submit the request if I qualify and notify me of the outcome.
5. **As a System Requirement**, the system's rules engine shall indicate whether a vessel is eligible for the Last-Minute service based on configurable rules from the N -07 notice to shipping and scheduling and last-minute service rules and procedures (service guides), such as having unsuccessfully attempted to get a reservation in the last 7 days.
6. **As a System Requirement**, the Last-Minute service shall not apply to certain vessel types, such as passenger vessels, intra-maritime cluster, vessel of war and auxiliary vessels from the United States and Republic of Panama.
7. **As a Planner**, I need a screen to manage the adjudication of Last-Minute slots, from which I can send the offer to the customer.
8. **As a Planner**, I want if there are multiple interested vessels for a Last-Minute slot, I need to automatically resolve the tiebreaker based on defined criteria.
9. **As a System Requirement**, Last Minute reservations cannot be cancelled, swapped, or substituted.
10. **As a System Requirement**, a specific charge shall be applied for the Last-Minute service based on the vessel's category (Regular, Super, Neo).

8.3.9. Same Date Transit Request

Summary: *The Same Date Transit booking is designed to manage vessels that arrive late for their scheduled transit, a situation known as "Late Arrival." The enables the vessel to transit on the same day, if possible, subject availability, to approval and the application of a penalty.*

1. **As a System Requirement**, when the system identifies that a vessel has arrived after its required arrival time, it shall automatically change the reservation status to "Forfeit request" and move it to a separate queue for handling. (It's thinks goes if the vessel doesn't request the same date transit)
2. **As a System Requirement**, the system shall notify Control Center Supervisor (OPCT) when there are pending "Forfeit requests" that require their review and approval.

3. **As a Control Center Supervisor (OPCT)**, I need to be able to approve or reject a "Same Date Transit" request for a late vessel.
4. **As a System Requirement**, upon approval of Same Date Transit, the reservation in the booking application shall remain in "BOOKED" status but will be marked with a penalty indicator, and a penalty charge will be applied based on the rules in the N-07 notice to shipping.
5. **As a system requirement**, when a vessel has the status "BOOKED" with the penalty indicator active, the system shall automatically change the status to "Forfeit Request" and forward it to the supervisor for approval.
6. **As a System Requirement**, if the OP-CP Supervisor approves the request, the status shall change to "Forfeited" and this status shall be communicated to the EVTMS (Enhanced Vessel Traffic Management System).

8.3.10. Slot Substitution Request

Summary: The Substitution booking option enables a customer to substitute one vessel for another on an existing reservation. The system enforces a complex set of rules that differ for regular and LoTSA bookings and manages an approval workflow that may involve both Booking Coordinators and Planners.

1. **As a customer**, when requesting a substitution, I want the system to validate that the replacement vessel meets all established parameters, and if it does not, the system should prevent the request and display a message indicating the reason for rejection.
2. **As a System Requirement**, the system shall validate that substitution requests are made at least 24 hours before arrival for regular slots and at least 2 days before arrival for LoTSA slots.
3. **As a System Requirement**, for full container segments, the system must validate that the customer codes of the two vessels belong to the same valid alliance or Vessel Sharing Agreement (VSA).
4. **As a System Requirement**, the system shall validate that the replacement vessel has the same or smaller attributes (e.g. size, class) for regular slots but allow for substitutions between different sizes and restrictions (e.g., HML) for LoTSA slots.
5. **As a Booking Coordinator**, I require a screen for pending substitution requests that show all relevant information, including VSA/Alliance indicators, and indicate if a request has been routed to a Planner for additional validation.
6. **As a Planner**, I require a screen to evaluate LoTSA substitution requests where the vessels have different HML restrictions, and upon my approval, the system should send a validated transaction confirmation to the Booking Coordinator/Booking Agent.
7. **As a System Requirement**, when a LoTSA substitution involves different HML restrictions, the system must add an indicator to the reservation signifying that the guaranteed In-Transit-Time (ITT) no longer applies.
8. **As a System Requirement**, upon final approval of a substitution, the system shall automatically update the Transit Booking List and notify the customer.
9. **As a Booking Coordinator/Booking Agent**, I require a waiting list screen for LoTSA substitution requests that were rejected due to operational capacity, and I want the system to notify me when a slot becomes available so I can offer it to the customer.

10. **As a System Requirement**, the system shall apply a configurable charge for regular substitutions based on the timing of the request and the current tariff, as defined in the N-07 notice to shipping.

8.3.11. Swap Slot Request

***Summary:** The Swap booking option enables a customer to exchange the reservation dates of two of their already-booked vessels. This process is governed by a detailed set of rules and involves an approval workflow that can include both Coordinators/Booking Agents and Planners.*

1. **As a customer**, when requesting a swap, I want the system to display a list of my eligible vessels and validate that the selected vessels meet all criteria, such as being within the same alliance, having reservation dates no more than 21 days apart, and complying with segment and restriction rules.
2. **As a System Requirement**, the system shall enforce that swap requests are made at least 24 hours before arrival for regular slots and 48 hours for LoTSA slots.
3. **As a System Requirement**, the system shall limit regular customers to a configurable number of swaps per visit, while LoTSA customers have unlimited swaps.
4. **As a Booking Coordinator/Booking Agent**, I require a screen for pending swap requests that differentiate between pre-approved requests and those requiring my evaluation, and which also shows requests that have been routed to a Planner.
5. **As a Planner**, I need a screen to evaluate swap requests involving LoTSA vessels with different HML restrictions and upon my approval, the system should send a validated transaction confirmation to the Booking Coordinator/Booking Agent.
6. **As a System Requirement**, when a LoTSA vessel is part of a swap involving different HML restrictions, the system must add an indicator to the reservation to indicate that the guaranteed In-Transit-Time (ITT) is no longer applicable, even if the reservation is later transferred to a non-LoTSA customer.
7. **As a System Requirement**, upon final approval of a swap, the system shall automatically update the Transit Booking List, notify the customer, and trigger the billing system to apply any applicable charges.
8. **As a Booking Coordinator/Booking Agent**, I need a waiting list for valid swap requests that were rejected due to operational capacity, and I want the system to notify me if a suitable transit slot becomes available.
9. **As a System Requirement**, when a transit slot becomes available, the system shall check if it can be assigned to a pending swap request on the waiting list and notify the Coordinator/Booking Agent if a match is found.
10. **As a System Requirement**, the system shall provide AI-powered suggestions to Planners to help them evaluate the impact of a swap, suggesting the most convenient vessel to move and assess the impact on revenue and customer service.

8.3.12. Transit In Advance (TIA) Booking Option

***Summary:** The TIA (Transit in Advance) booking option allows a vessel to transit earlier than its originally scheduled date, based on operational availability. This option is primarily managed by Planners, who can offer it to various vessel segments or process requests from Full Container vessels.*

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1. **As a System Requirement**, the system shall display operational availability and available transit slots to Planners, enabling them to evaluate whether to offer the TIA service.
2. **As a Planner**, I require the system to provide visibility of potential candidate vessels for the TIA service based on configurable parameters from the N- 07 notice to shipping, and to suggest which customer should receive the offer based on a defined ranking or criteria.
3. **As a System Requirement**, the system shall allow Full Container (FC) customers to submit a TIA request within a configurable daily time window, while for other segments, the service is offered by a Planner.
4. **As a Planner**, I need a screen to view and manage incoming TIA requests from container vessels.
5. **As a System Requirement**, upon approval of a TIA request, the system shall notify the customer and apply a fee based on the vessel's category, with LoTSA vessels being exempt from the fee.
6. **As a System Requirement**, if a customer cancels a TIA service, a 100% cancellation fee shall be applied.
7. **As a System Requirement**, the system shall allow customers to request additional sub-products, such as Just-In-Time (JIT) and Same Date Transit, in conjunction with the TIA service, subject to their own rules.

8.3.13. Void Transaction

Summary: The Void status is an administrative process for voiding a previously granted reservation. This typically occurs when a customer secures a more desirable transit slot through another means, such as a competition or auction, making their original booking redundant.

1. **As a Booking Coordinator**, I want, after a customer wins a new transit slot through a competition or auction, to evaluate their transaction history to determine if they have a pre-existing reservation that now qualifies to be voided.
2. **As a Booking Coordinator**, if a customer's old reservation qualifies, I want to change its status from "BOOKED" to "VOID Request" to initiate the voiding process.
3. **As a System Requirement**, "VOID Request" transactions shall be sent to an approval queue for a Supervisor or Planner.
4. **As a System Requirement**, the system shall notify the designated approver (Supervisor or Planner) that a new "VOID Request" is pending their review and approval.
5. **As a supervisor or planner**, I need to be able to approve a "VOID Request" to finalize the voiding of the reservation, ensuring that all required evidence is provided in accordance with N-07 notice to shipping rules.

8.3.14. Just In Time Transit Request

Summary: The Just-In-Time (JIT) service enables maritime customers to request transit slots closer to their vessel's arrival, optimizing schedules and reducing anchorage time.

1. **As a Customer**, I want to request a Just-In-Time transit slot for my vessel to minimize waiting time and improve operational efficiency.

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- 2. **As a System Requirement**, the system shall validate incoming JIT requests against a configurable rules engine (N-07 notice to shipping) to ensure they meet all prerequisites, such as vessel category, arrival window, and existing slot limitations.
- 3. **As a System Requirement**, the system shall analyze operational capacity, and the current reservation mix to determine the real-time availability of JIT transit slots.
- 4. **As a Planner**, I require a clear, consolidated view of available JIT slots and a list of eligible vessels so that I can make informed decisions about which requests need to be approved.
- 5. **As a System Requirement**, the system shall present candidate vessels to the Planner with a clear indicator of their eligibility based on the N-07 notice to shipping rules engine.
- 6. **As a Planner**, I require the ability to review system-suggested candidates and approve or deny JIT requests based on my assessment of the operational situation.
- 7. **As a System Requirement**, the system shall automatically notify the customer as soon as a decision is made on their JIT request to ensure timely communication.
- 8. **As a Planner**, I want the option to manually publish the availability of JIT transit slots to specific customers or coordinators to proactively manage vessel traffic.

8.4. Future proofing requirements

ACP anticipates that its new booking system software will provide decades of service. This will require periodic maintenance and enhancement over time. In particular, the system design should accommodate modular and adaptable state-of-the-art design. It also should anticipate likely associated needs such as new or enhanced revenue management systems, financial/accounting systems, management-information/business-intelligence systems, and artificial intelligence capabilities.

8.5. Performance requirements

The Panama Canal booking system operates with a high level of dynamism, managing multiple types of transactions every day that reflect the complexity of the services offered to customers. Each transaction is not limited to a single action but is part of an integrated process that includes several booking services such as booking requests, swaps, substitutions, changes date, cancellations, and transit in advance, among others. This means that a single transaction can involve several validations and internal workflows, requiring coordination across different areas to ensure accuracy and efficiency. The diversity and volume of these operations demonstrate that the system should not only be designed to manage reservations but also to support strategic decisions and operational adjustments in real time, ensuring flexibility and responsiveness to global market demands.

The tables below highlight an estimation of the workflow of transactions based on historical data of fiscal year 2025, presented as an aggregated total and classified by type of booking service. Also, maximums and minimums are included to show the variance among transactions, both annual and daily averages, keeping in mind that the dynamics of this process always change year on year.

Booking services transactions aggregated – FY2025			
Average Daily Transactions	106	Average Annual Transactions	38,433

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Minimum Daily Transactions	40	Minimum Annual Transactions	14,600
Maximum Daily Transactions	187	Maximum Annual Transactions	68,255

Booking services transactions by type FY2025	
CHANGE DATE	1,252
CANCELLATIONS	1,850
BOOKING REQUESTS (ALL)	27,235
SUSTITUTION	3,347
SWAP	1,555
TIA (Transit in Advance)	2,495
SAME DAY TRANSIT	413
JIT (Just in Time)	177
DAYLIGHT TRANSIT	109
Total Transactions	38,433

This section outlines the essential system-wide performance requirements for the software solution to be developed. In addition to these baseline standards, the offeror shall actively engage and collaborate with end-users during the functional requirements analysis to gather specific performance expectations. This collaborative approach ensures that the development process is guided by clear, actionable insights, enabling the solution to meet both general and user-defined performance criteria effectively. As a requirement, we need a multi-simultaneous-user standard.

8.5.1. Average Response Time

Standard Load Performance: The software shall consistently deliver an average response time of no more than one (1) second under standard operational load conditions. Additionally, 99% of all response times must remain below two (2) seconds during these conditions, ensuring a fast, responsive, and efficient user experience across all environments.

8.5.2. Scalability

Transaction Rate and Resource Management: The system shall demonstrate robust load scalability, with the capability to distribute processing loads efficiently and leveraging parallel processing techniques to manage high transaction volumes. It must also include mechanisms for effective memory and storage resource management to prevent depletion and ensure sustained performance under varying operational conditions.

Dynamic Scaling: The software must scale out gracefully in response to increased load or fluctuating workloads and similarly scale back to its normal operational size once the load decreases, without any service disruption or degradation in response times. Memory scalability is

also crucial; the system shall maintain optimal memory usage levels as load increases and uptime extends, ensuring sustained throughput and diligent management of in-memory elements.

8.5.3. Stability

Consistent Performance Under Standard Load: Under standard load conditions, the system is required to maintain an average sub-second response time for all user-initiated transactions. It should also exhibit consistent levels of resource utilization, including memory and processing capacity, to ensure stable and uninterrupted operation.

Load Increase Tolerance: The system shall be capable of sustaining up to a 20% increase in operational load without requiring immediate scaling measures, provided that the increased load begins to affect response times. This tolerance is essential to maintain consistent service quality and responsiveness during periods of peak usage or unexpected demand surges.

8.5.4. Standard Load Definition

User Base and Operational Context: The standard load is defined by the activity generated by a specified number of users, all logged in and performing their duties in a 24/7 operation across various shifts and locations. These locations include, but are not limited to functional teams that are part of Finance (revenue management, agents), Strategy, Operations (planners, coordinators, supervisor) and Digital Transformation (support and management)

Load Specification and Analysis: The offeror is tasked with determining the appropriate specifications to sustain the standard load effectively. This includes a comprehensive analysis of operational schedules, shift patterns, and distribution of users across locations to ensure the system is equipped to handle the defined standard load seamlessly.

The offeror shall work closely with ACP's users and stakeholders to refine these performance requirements, ensuring the final software solution is robust, scalable, reliable, and stable, capable of supporting ACP's critical maritime operations. This collaborative approach will facilitate the development of a solution that not only meets but exceeds the performance expectations set forth in this RFI.

8.6. Non-functional requirements (NFR)

This section outlines the critical non-functional requirements (NFRs) that will guide the architectural design decisions for the software solution. These NFRs are essential for ensuring system reliability, business continuity, and optimal performance, reflecting ACP's commitment to maintaining high standards of service delivery.

Non-functional items		Description	Objective
1	Integration with EVTMS	Schedule reading, restrictions, operational availability.	Synchronize actual traffic with reservation inventory.
2	AIS Integration	Localization, ETA, speed, course.	Make operational decisions in real-time.
3	Integration with Finance/VUMPA	Application of fees, surcharges, penalties	Ensure accurate billing for every transaction.
4	Audit and Bulletproofing	Reviews all system actions, human decisions, errors, parameter changes.	Comply with regulatory requirements and full traceability.

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5	Notifications	Email, SMS, internal alerts, auction notices, expirations, LoTSA windows.	Keep internal/external customers and agents informed.
6	Search and Smart Documentation	Semantic search, retrieving notices, rules, processes, and documentation.	Faster responses to customers and agents.
7	Digital Assistant / AI Chat	Chatbot with knowledge of operational rules, document search, and FAQs.	Reduce operational burden and improve customer experience.
8	Customer & Agent Web Portal	Unified interface for customers, agents, planners, and supervisors.	Facilitate all system operations.
9	API Gateway / Integration Layer	Exposes services, manages security, rate limits, API keys.	Encapsulate microservices and control access.
10	Event Bus / Streaming	Asynchronous processes for auctions, expirations, Last-Minute, notifications.	Decouple time-sensitive operations.
11	Data Warehouse / Analytics	Consolidate KPIs, slot trends, auction performance, historical analysis.	Strategic and operational reporting.

The system must meet the following non-functional requirements:

- Availability: 99.9% (24/7/365)
- Average response time: < 2 seconds
- Scalability: Support for at least 500 concurrent users
- RTO (Recovery Time Objective): < 4 hours
- RPO (Recovery Point Objective): < 1 hour

8.7. .3 Security Requirements (new section)

The provider must demonstrate compliance with:

- SOC 2 Type II compliance
- ISO 27001 or equivalent
- Security audit requirements
- Sensitive data classification
- Encryption in transit (TLS 1.3) and at rest (AES-256)
- Data retention policy

Critical requirement: The system MUST encrypt all auction bid data using AES-256 until the auction closing time.

8.8. Performance Requirements

Required performance metrics:

- Standard load: 200 transactions per minute
- Peak load: 500 transactions per minute during auctions
- Concurrent users: Minimum 500, scalable to 1,000

8.8.1. Hours of Availability

24/7 Operation: The system shall remain fully operational and accessible 24 hours a day, 7 days a week, 365 days a year. This level of continuous availability is fundamental to ensure uninterrupted support for ACP's mission-critical operations.

8.8.2. High Availability and Disaster Recovery Planning (HA & DRP)

System Availability SLA: The architecture must support high availability (HA) to achieve a system availability Service Level Agreement (SLA) of 99.7% per month. This requires a robust design that minimizes downtime and ensures the system remains accessible to users nearly all the time. The design should incorporate fault tolerance, redundancy, and automated recovery. The offeror shall provide a discount on the total monthly subscription cost, intellectual and support services subscriptions estimated monthly, according to the following table whenever the SLA was not met due to causes attributed to the offeror, for example architecture, support services, or software errors:

Less than 99.7% but greater than or equal to 99.0%; the discount is 10% of the monthly payment.
Less than 99.0% but greater than or equal to 95.0%; the discount is 25% of the monthly payment.
Less than 95.0%, the discount is 100% of the monthly payment.

Disaster Recovery Planning: Incorporation of a comprehensive Disaster Recovery Plan (DRP) is mandatory to detail how the system will recover from catastrophic events. This plan should outline the procedures and technologies in place to quickly restore service in the event of a system failure.

8.8.3. Recovery Objectives

Recovery Point Objective (RPO): The system must be designed to ensure that the acceptable data loss time is near zero seconds, minimizing the risk of significant data loss in the event of failure.

Recovery Time Objective (RTO): The acceptable recovery time from an outage or system failure is 15 minutes. This objective underscores the need for rapid restoration capabilities to minimize operational disruptions.

8.8.4. Data Backup and Restoration

Off-site Backup Strategy: An off-site backup strategy must be implemented, featuring automated procedures for data backup and restoration. This strategy is vital for data protection and ensures business continuity by enabling the recovery of critical data from a remote location in the event of a local system failure.

Nonproduction Environment Refresh: Standard procedures must be established for regularly refreshing nonproduction environments with production data and configuration. This practice is essential for testing, development, and training purposes, ensuring that these environments accurately reflect the production setup for realistic simulations and evaluations.

8.8.5. Product Quality Automation

The software solution shall incorporate a robust and comprehensive product quality automation framework designed to uphold high standards of software quality throughout all phases of the development lifecycle. This framework must automate the evaluation and enhancement of

product quality through a structured series of systematic, repeatable testing and analysis procedures, ensuring reliability, consistency, and continuous improvement across the solution.

8.8.5.1. Components:

Automated Testing Coverage: The solution shall implement a comprehensive automated testing framework that includes unit testing to achieve at least 80% code coverage, ensuring individual components function correctly. It must also incorporate integration testing to validate interactions between software modules and external systems. Additionally, end-to-end testing should simulate real-user scenarios to verify the complete application flow and its integration with external interfaces.

Code Quality Analysis: Integrate automated tools for static code analysis to identify potential quality issues, adherence to coding standards, and security vulnerabilities within the codebase. The solution shall be a policy where mergers with the main branch require the passing of the code quality checks.

Performance Testing: Automated performance tests shall be conducted to assess the responsiveness, throughput, and stability of the application under various load conditions. Performance benchmarks shall be established based on the anticipated production environment and user load.

Security Testing: Implement automated security testing tools to scan vulnerabilities and security flaws as part of the continuous integration pipeline. The solution must comply with the guidelines established by the Canal Cybersecurity Information Security Officer.

Continuous Integration/Continuous Delivery (CI/CD): The solution must utilize a CI/CD pipeline that integrates all automated testing and analysis tools. This pipeline shall ensure that new code commits triggering automated builds, tests, and deployments to designated environments, enabling rapid feedback and correction cycles.

Monitoring and Feedback: Post-deployment; the solution shall include automated monitoring tools to continuously track application performance, user experience, and system health in the production environment. These tools shall provide actionable insights and alerts to address potential quality issues.

8.8.5.2. Acceptance Criteria:

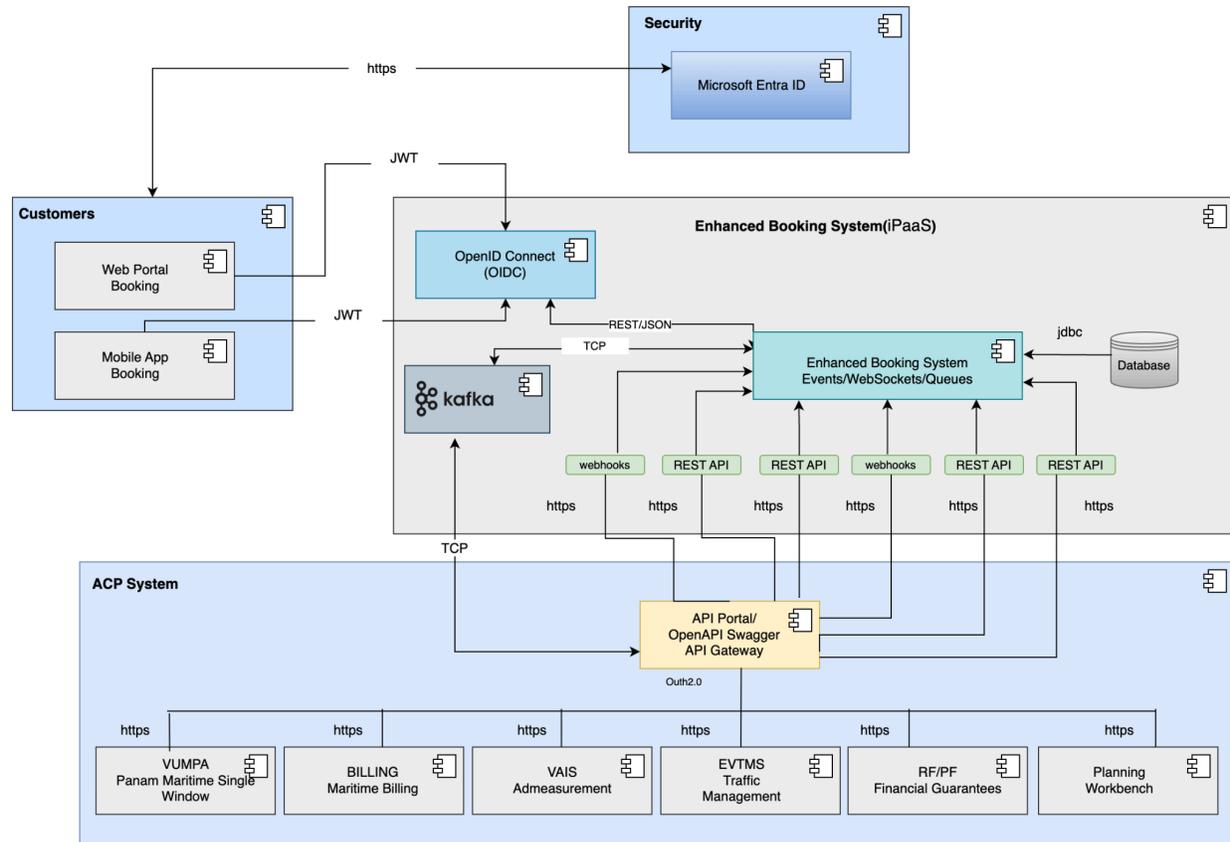
- Demonstrable integration of automated testing frameworks covering unit, integration, and end-to-end tests with a minimum of 80% code coverage.
- Successful implementation of static code analysis tools with enforced coding standards and security checks.
- Implementation of a CI/CD pipeline demonstrating automated build, test, and deployment processes with integrated quality checks.
- Evidence of automated security testing embedded within the CI/CD pipeline.
- Provision of monitoring tools in the production environment, with documented examples of feedback loops contributing to product improvements.

9. Data Sources

The Panama Canal relies on a comprehensive set of integrated systems that serve as essential data sources for maritime traffic operations. The new solution must support seamless integration

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with these ACP systems, ensuring reliable data exchange and operational alignment. The following systems provide critical information for planning, scheduling, financial transactions, vessel tracking, and operational coordination. Their integration is fundamental to maintaining the continuity, accuracy, and efficiency required for Canal's complex operational environment:



System Integration Diagram

- **Financial Guarantee and Proforma System (RF/PF):** Manages and monitors financial guarantees and deposits required for maritime services, including cash deposits and bank guarantees for tolls, duties, and fees. The new reservation system must integrate data information such as the amount to be invoiced and reservations dates in VUMPA Proforma.
- **Maritime Services Billing System (BILLING):** It is the specialized application used to audit maritime charges. Manages and monitors cost estimates, charge collection, and invoice generation for vessels, integrating with financial systems to ensure accurate and timely payment processing. This system centralizes all tolls and related service charges recorded by various providers in their respective platforms.
- **Vessel Admeasurement and Inspection System (VAIS):** Maintains vessel information, performs admeasurement calculations, generates certificates, and produces charges for toll collection. It integrates with the maritime billing system.

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- **Panama Maritime Single Window System (VUMPA):** Registers visit requests for vessels operating in Panamanian waters, facilitating coordination between Canal personnel and other authorities for safety and compliance. VUMPA facilitates international maritime transport through the simplification and harmonization of procedures, reducing paper forms and improving efficiency, transparency, and productivity for shipping companies and authorities.
- **Enhanced Vessel Traffic Management System (EVTMS):** Consolidates real-time vessels, visits, and transit data, integrating information from VUMPA and providing GPS-based location tracking and operational management.
- **Upcoming Planning Workbench (Wartsila):** Supports scheduling, planning, and management of maritime operations, providing tools for resource allocation and operational coordination. This application must be integrated with the new Booking System to enable seamless workflow and data exchange.
- **Short/Medium Term: Pricing and Revenue Management – Optimizing system enhancement:** Some additional requirements were included in section 10 of this RFI with the purpose of guidance and clarity to all proponents of ACP’s aspiration for future improvements, enhancements and advanced functionalities that will complement proposed operational procedures. The requirements presented in section 10 are not mandatory for this phase but not limited to be considered in case a proponent considers them to be required as part of the initial solution.

10. Integration requirements

The purpose of this section is to outline the technical requirements for system integration, ensuring seamless and reliable communication between the proposed solution and ACP’s existing ecosystem of applications and specialized platforms. To achieve this, the solution must implement multiple integration mechanisms that guarantee compatibility, performance, and security across all interfaces.

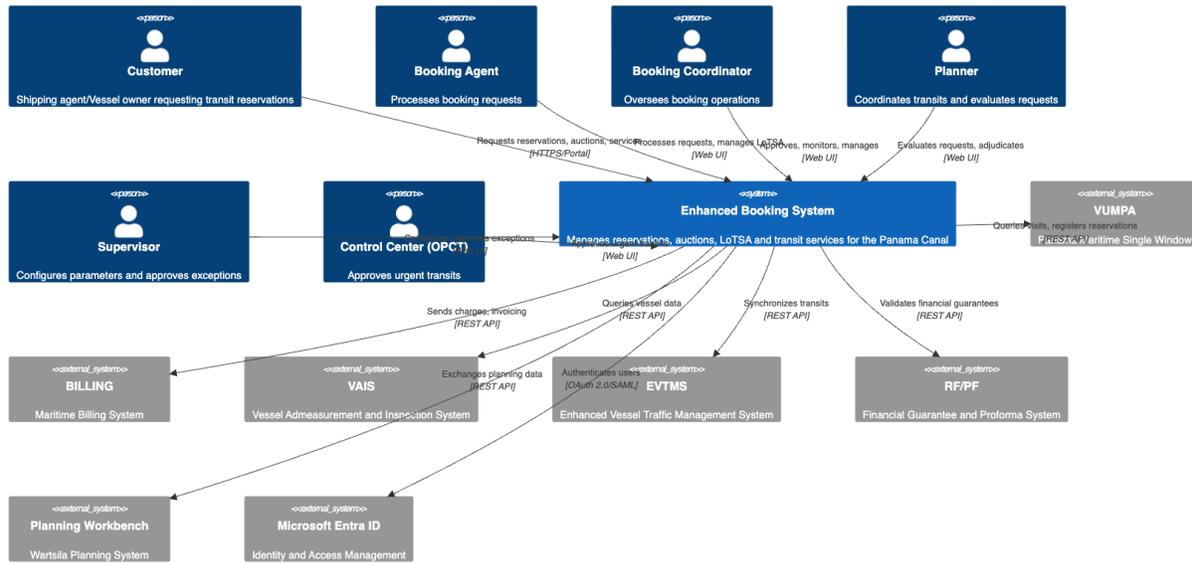
The integration should support a variety of protocols and technologies, including REST and SOAP web services, direct access to database resources such as stored procedures, and authentication through Microsoft Entra ID. Additionally, the solution must handle multiple data exchange formats (XML and JSON) and interface with Oracle Integration Bus services currently deployed within ACP’s infrastructure.

These capabilities are critical to enable real-time data exchange, operational synchronization, and full interoperability with ACP’s mission-critical systems.

Most tools and systems were developed in-house, and all of them share the following integration mechanisms that the offeror must comply with:

Integration Context Diagram

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Context Diagram

10.1. Integration Using REST or SOAP protocols:

The proposed system must support data exchange through REST APIs, enabling efficient and standardized communication. All data transfers must occur over HTTPS to ensure confidentiality and integrity. Authentication at the API level shall be managed using API keys or delegation tokens, ensuring secure access control to the integration endpoints.

REST is the preferred protocol for new developments. SOAP is accepted only for integration with legacy systems that do not support REST

10.2. Integration Using Database Resources:

The proposed solution must enable integration with existing systems through direct access to database resources, including the execution of stored procedures, functions, and other relevant components. This capability is essential to ensure seamless interoperability, efficient data exchange, and consistent transactional behavior between the new software and the current infrastructure.

10.3. Integration with Microsoft Entra ID:

The proposed solution must support integration with the existing Microsoft Entra ID implementation currently in use by the Panama Canal Authority (ACP). This integration is required to leverage established identity and access management protocols, ensuring secure authentication, centralized authorization, and compliance with ACP's enterprise security standards.

10.4. Information exchange format:

The predefined format for information exchange between systems is JSON, selected for its high interoperability, lightweight structure, and ease of processing. In scenarios where JSON is not viable, an alternative format must be agreed upon with the Panama Canal, ensuring full compatibility with the systems involved. Acceptable alternatives may include XML for structured data representation, plain text with encryption for secure lightweight communication, or other standardized formats that align with existing integration protocols and security requirements.

10.5. Integration with Client Applications for BI and Analytics:

The proposed solution must include robust integration capabilities with client-facing applications for Business Intelligence (BI) and Data Analytics. This includes compatibility with leading platforms such as Power BI, Tableau, Looker, and Amazon QuickSight, among others. The application should enable seamless data connectivity and exchange, allowing ACP to leverage its existing analytics ecosystem for reporting, visualization, and decision-making. Ensuring this integration is essential for maintaining operational efficiency and supporting advanced insights across the organization.

For integration with Business Intelligence tools (Power BI, Tableau, Looker, QuickSight), specify:

- DirectQuery
- ODBC/JDBC access
- Dedicated APIs for reporting

10.6. Data Migration:

The provider must provide a data migration plan that includes:

- Estimated volume of historical data to migrate
- Data period to migrate (minimum 5 years of history)
- Data integrity requirements
- Coexistence plan during transition
- Rollback strategy

11. Optimization phase: Items or concepts of interest for ACP.

Following the objectives presented in this RFI, including relevant functionalities required, there are some desirable or aspirational concepts to be considered for an optimization phase to be performed in the medium term.

These users' stories are included in this section of the RFI as a reference for the proponents and to aid in the development of any conceptual idea or recommendation.

ACP prefers that the conceptual design of the solution focuses on user stories presented in previous section, and to consider the following user's stories to build in ideal escalation or evolution of the new system in an organized manner.

Maritime Reservation Solution AI-Enhanced Capabilities

As a Booking Coordinator and Planner, I need an AI model to assist in deciding which booking products to offer and how to allocate available slots, so I can optimize canal usage and meet demand efficiently.

As a Supervisor, I need data-driven recommendations for auction parameters based on historical and current trends, so I can maximize auction success and revenue.

As a Planner, I need an AI model to suggest which booked vessel represents the best option to move to a different transit date so I can evaluate and take advantage of better opportunities to provide booking options or products.

As a Planner, I need predictive insights based on vessel or customer history or behavior, so I can anticipate potential cancellations and mitigate operational disruptions.

As a System Requirement, the system shall be supported by an AI model to simulate the impact of changes in system parameters (e.g., slot allocation, demand shifts), incorporating business intelligence variables such as lake levels, seasonal trends, and geopolitical events, to proactively adapt to market conditions.

As a System Requirement, the system shall recommend optimal tie-breaking criteria, mechanisms or procedures for competitions (e.g., ranking, mini-auctions, environmental score), to ensure fairness, efficiency in high-demand scenarios and, ensuring that allocation decisions reflect business priorities.

As a System Requirement, the system shall be capable of extracting frequently asked questions (FAQs) from customer emails to generate automated response suggestions and reduce manual workload.

As a Booking coordinator / Planner, I want the system to use artificial intelligence (AI) to analyze approved bookings versus available transit slots and recommend suitable alternatives based on

customer preferences and operational restrictions, so that I can optimize scheduling and minimize conflicts.

As a System Requirement, the system shall include functionality that allows us to dynamically update the tie-breaker procedure desired for a competition (vessel criteria or other type of auction).

12. Glossary

1. **Advisory to Shipping:** Informative notices issued by the ACP with instructions, operational changes, or special navigation conditions.
2. **Booking (reservation):** When a booking request is approved and formally assigned to a booking slot.
3. **Booking Request:** Transit reservation request for a specific date through the Maritime Services Portal, that eventually will use a booking slot once it is approved.
4. **Cancellation:** Request to cancel a previously confirmed reservation.
5. **Change in booking date:** Modification of the reserved transit date. A change in booking date will be allowed without charge, if it is requested 60 days or more prior to the reserved arrival date.

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The booking fee applied will be in accordance with the booking rates applicable at the time the change is requested. Vessels with HML=M will not be allowed to request a change in booking date. The tariff to be applied to vessels when requesting changes to the reservation date will be in accordance with the table outlined in Notice to Shipping N-7-2025.

6. **Competition:** It is a key procedure that ensures the orderly and fair allocation of available transit slots for vessels through the Panama Canal, based on customer ranking and other criteria established by the ACP.
7. **Customer Ranking:** A scoring system used by the ACP to prioritize reservation requests during competitive processes. It is based on compliance history, frequency of use, and other established criteria.
8. **Customer:** Client registered with the ACP, responsible for the transit or reservation request.
9. **Daily Auction:** An option in the ACP Reservation System where daily slots are offered through auctions during the third period. The slot is awarded to the vessel whose customer offers the highest bid.
10. **Daylight Transit Request:** Request for daylight transit required for passenger vessels and vessels operated by the armed forces of their respective governments, under 91 feet in beam and without transit restrictions.
11. **Draft Restriction:** The maximum allowable draft for vessels transiting the Canal, determined by water levels in the lakes and other operational conditions. It may affect the eligibility of certain vessels to transit.
12. **ETA Message:** Message provided by a vessel or its shipping agent about its intention to arrive in Canal waters.
13. **Exception:** Interruption or change in the transit schedule of a vessel with a reservation, either due to an ACP fault or the vessel's failure to meet a requirement of the reservation system.
14. **Extraordinary Auction:** An auction option in the third period where a slot becomes available due to cancellations, advancements, date changes, or voided bookings. The slot is awarded to the vessel whose customer offers the highest bid.
15. **First Come – First Serve (FCFS):** Slot allocation method where requests are processed in the order received, without weighting by ranking or priority.
16. **First Day of a Booking Period:** For transit reservation purposes, the first day of each booking period begins between 9:00 and 9:30 a.m., and all requests received during this window are considered received simultaneously.
17. **Forfeit Requested:** Reservation status of a vessel when it fails to meet the requirements of the Reservation System.
18. **Full Daylight Transit Vessel:** Any restricted vessel that must begin and complete its transit during daylight hours.

19. **Granted:** Reservation status of a vessel when no exceptions occurred.
20. **HML (High Mast Lighting):** Refers to an operational high-priority lighting system that allows certain vessels to transit during nighttime hours under special conditions. It is a classification that influences transit scheduling, especially restricted vessels that would normally only be allowed to transit during daylight hours.
21. **IMO (International Maritime Organization Number):** Unique international number assigned to each vessel for global identification.
22. **ITT (In Transit Time):** The time elapsed from when the vessel enters the first lock until it exits the last lock.
23. **Just in Time (JIT):** Service requested by the vessel to arrive in Canal waters to maintain its transit reservation on the day of its reservation.
24. **Large or “Super” Vessel:** Vessels with a LOA of 294.44 m (966 feet) or less and a beam of 27.74 m (91 feet) until 32.61 m (107 feet)
25. **Last Minute Transit:** Option for vessels arriving without a reservation and unable to obtain a slot through regular means.
26. **LoTSA (Long-Term Slot Allocation):** an exclusive long-term slot allocation system for Neopanamax vessels, designed by the Panama Canal Authority (ACP) to provide operational certainty, flexibility, and efficiency to its customers. It allows clients to reserve slot packages through sealed-bid auctions, securing transit spaces over an extended period (originally 12 months, now adjusted to 6 months in LoTSA 2.0) and adapting to their logistical needs.
27. **Market Segment:** A specific group of customers or users who share similar characteristics within a broader market. In the context of the Panama Canal, market segments may be defined by vessel type, transit frequency, cargo type, origin/destination, or commercial behavior. This segmentation allows the ACP to apply differentiated policies, rates, and services to optimize operations and better serve each group’s needs.
28. **Neopanamax Vessel:** Vessels with beam greater than 32.61 m (107 feet), or vessels with LOA greater than 294.44 m (966 feet)
29. **Northbound / Southbound:** Transit directions in the Canal.
30. **Northbound:** vessels traveling from the Pacific Ocean to the Atlantic Ocean
31. **Not Granted Requested:** Reservation status of a vessel when the ACP fails to meet the requirements of the Reservation System.
32. **Notice to Shipping (NTS):** Official document establishing rules, procedures, conditions or permanent changes in the transit or reservation system. For example, N-07 is the usual annual notification issued for the reservation system.

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33. **Operational Condition:** A state or circumstance that affects Canal's ability to operate normally, such as maintenance, adverse weather conditions, or draft restrictions. These conditions may influence scheduling and slot allocation.
34. **Panamax Plus Vessel:** For this instruction, any Panamax vessel with a draft greater than 39.5 feet TFW.
35. **Parameters:** Technical and operational conditions that define whether a vessel can transit (e.g., beam, draft, cargo type, restrictions).
36. **Passenger Vessel:** One whose main activity is the transportation of passengers, subject to fixed and publicly known itineraries.
37. **Penalty:** Additional fee a vessel must pay to remain on the schedule if you arrive after the required time.
38. **Port Arrival:** The moment a vessel arrives in Canal waters and is detected by ACP signal stations (radio or radar).
39. **Required Time of Arrival:** Time frame established by the ACP in which a vessel with a transit reservation must arrive in Canal waters to maintain its reservation on the scheduled day.
40. **Restricted Vessel:** Any large or small vessel that, due to its cargo, draft, configuration, or deficiencies, can only transit during daylight hours through the cut or locks; or cannot meet other vessels during its transit through the cut.
41. **Same Day Transit or Late Arrival:** Request to transit on the same day of arrival, subject to availability.
42. **Service Order No.:** Service order number generated by the system for each request or transaction.
43. **Shipping Agency:** is a company domiciled in the Republic of Panama authorized by the vessel's owner, operator, or charterer through the form prescribed by the Authority, granting them the power to represent the vessel.
44. **SIN (Ship Identification Number):** A unique number assigned by the ACP to each vessel for identification within the system.
45. **Slot:** A space assigned to a vessel within the transit scheduling system, allowing it to transit on a specific date and time. Slots may be assigned through competition, on a first-come, first-served (FCFS) basis, an auction or via products such as LoTSA. The availability and number of slots depend on the daily operational capacity of the Canal.
46. **Small or Regular Vessel:** vessels with less than 27.74 m (91 feet) in beam.
47. **Southbound:** vessels traveling from the Atlantic Ocean to the Pacific Ocean.

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48. **Special Auction:** An option in the ACP Reservation System where a conditional slot is offered through auction (if not sold during the opening competition of Period 2). The slot is awarded to the vessel whose customer offers the highest bid.
49. **Substitution:** Replacement of a reserved vessel with another vessel that does not have a reservation.
50. **Swap (Slot Exchange):** Allows the exchange of transit dates between two previously reserved vessels.
51. **Transit Booking List:** The official list of vessels with confirmed reservations to transit on a specific date.
52. **Transit Booking Periods:** There are three transit booking periods. The first period ranges from 90 to 15 days before the requested transit date; the second period ranges from 14 to 8 days before the requested date; and the third period ranges from 7 to 2 days before the requested date and is exclusively for auctions. There is also a special period exclusively for passenger vessels, from 730 to 366 days before the requested date. From 365 to 91 days, slots are not available, and this is considered a closed period. Any vessel granted a reservation before the period closes cannot request a substitution, swap, or date change until the first period opens.
53. **Transit in Advance (TIA):** Request to advance a vessel's transit date from its original reservation.
54. **Transit Reservation Management Portal:** The portal where transit reservation requests are received and processed.
55. **Transit Reservation:** A slot assigned by the ACP to a vessel for transit on a specific date.
56. **Unrestricted Vessel:** Any small vessel that can transit at any time of day and can meet other similar vessels during its transit through the cut.
57. **Vessel Name:** The official name of the vessel registered with the ACP.
58. **Vessel Scheduling Fee:** allows to accommodate vessels that cannot be booked through the ordinary reservation system but require coordination with the Canal to be scheduled for transit. This service is not available to passenger vessels, vessels from the Intra-maritime cluster, and vessels of war and auxiliary vessels from the United States and the Republic of Panama
59. **Vessel Type:** A classification assigned to a vessel based on its physical, operational, and functional characteristics. This classification is used by the Panama Canal Authority (ACP) to determine transit parameters, technical requirements, applicable fees, and special conditions.
60. **Visit Number:** Number assigned by the ACP to each vessel visit to the Canal, used to track its transit and associated services.
61. **Void Booked Request:** Request to cancel a confirmed reservation before it is fully processed.
62. **Void Booked:** Status of a reservation that has been officially canceled in the system.

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63. **VUMPA:** Panama's Maritime Single Window, where services are offered to all interested customers by the Panama Canal Authority and the Panama Maritime Authority.
64. **Waiting List:** List of vessels that did not obtain a slot in the reservation system and are waiting for availability due to cancellations or auctions.
65. **ACP:** Panama Canal Authority (Autoridad del Canal de Panamá)
66. **Booking Slot:** Reservation space assigned for vessel transit
67. **LoTSA:** Long Term Slot Allocation
68. **MVP:** Minimum Viable Product
69. **MoSCoW:** Must have, Should have, Could have, Won't have - Prioritization methodology
70. **Neopanamax:** Vessels that can transit through the expanded locks
71. **Panamax:** Vessels that can transit through the original locks
72. **RFI:** Request for Information
73. **RFP:** Request for Proposal
74. **SLA:** Service Level Agreement
75. **TIA:** Transit In Advance
76. **VUMPA:** Panama Maritime Single Window (Ventanilla Unica Maritima de Panama)