



Request for proposal – Annex 3. Technical requirements

Table of contents

1	Global configuration requirements.....	5
1.1	DO's organization	5
	<i>Administrative regions configuration.....</i>	<i>6</i>
	<i>Location configuration.....</i>	<i>6</i>
	<i>Postal Control Point configuration.....</i>	<i>6</i>
1.2	Devices configuration	7
	<i>Link RFID readers with Postal Control Point.....</i>	<i>7</i>
	<i>Link of a mobile RFID device to a Postal Control Point.....</i>	<i>8</i>
1.3	Business rules configuration	8
1.4	Postal services parameters	8
	<i>Expected period of the permanence of the postal item in the same location.....</i>	<i>9</i>
	<i>Service standards.....</i>	<i>9</i>
	<i>Manual configuration of service standards.....</i>	<i>9</i>
1.5	Parameters of routes	10
1.6	Initiation of passive transponders	10
2	Operations management requirements.....	10
2.1.	Configuration of operations management requirements	10
	<i>Non- functional requirements of aggregated items (nesting).....</i>	<i>11</i>
	<i>RFID movement parameters for aggregated items.....</i>	<i>11</i>
	<i>Movement validation of aggregated items.....</i>	<i>12</i>
	<i>Separate controls for monitoring postal items and monitoring aggregated items.....</i>	<i>12</i>
	<i>Control parameters of movement of items within the same location.....</i>	<i>13</i>
2.2.	Examples of scenarios	13
	<i>Scenario D - WITHOUT aggregated items and WITHOUT shipping control.....</i>	<i>13</i>
	<i>Scenario C - WITH aggregated items but WITHOUT shipping control.....</i>	<i>13</i>
	<i>Scenario B - WITHOUT aggregated items but WITH shipping control.....</i>	<i>13</i>
	<i>Scenario A - WITH aggregated items and WITH shipping control.....</i>	<i>13</i>
2.3.	Requirements identified to monitor postal operations through all the postal pipeline	13
	<i>Complete pipeline of the postal item.....</i>	<i>14</i>
	<i>Posting items (handover point).....</i>	<i>14</i>
	<i>Operation: Handover from business customer.....</i>	<i>15</i>
	<i>Operation: Posting items.....</i>	<i>15</i>
	<i>Posting Item at Post Office overview.....</i>	<i>15</i>
	<i>Sorting items.....</i>	<i>16</i>
	<i>Sorting isolated items.....</i>	<i>16</i>
	<i>Creating aggregated items.....</i>	<i>16</i>

<i>Managing aggregation of items with another system</i>	17
<i>Managing aggregation of items with QMS</i>	18
<i>Dismantling aggregated items</i>	18
<i>Managing the dismantling of the aggregation of items with another system</i>	18
<i>Managing the dismantling of the aggregation of items with QMS</i>	19
<i>Forwarding items</i>	19
<i>Truck loading</i>	19
<i>Loading alerts</i>	20
<i>Receiving items</i>	21
<i>Operation: Unloading</i>	21
<i>Unloading alerts</i>	22
2.4. Other alerts.....	22
<i>General rules for controlling alerts</i>	22
<i>Postal operations exception alerts</i>	23
<i>Automatic postal operation exception adjustments</i>	23
<i>Manual postal operation exception adjustments</i>	24
2.5. Summary of alerts (exception events).....	24
2.6. Postal operations process flow.....	24
<i>Business processes of the current situation (AS-IS)</i>	24
<i>Business processes after designing the proposed solution (TO-BE)</i>	30
3 Quality reporting requirements	35
3.1. Introduction.....	35
3.2. Configuration of the quality reporting parameters.....	35
<i>Free process reporting</i>	36
<i>Transport time between facilities</i>	36
3.3. Reports.....	36
<i>On-time Delivery Index</i>	36
<i>Distribution of times</i>	37
<i>Quantity of items pending treatment at the end of the day</i>	37
<i>Quantity of items pending treatment after the unit's treatment cut-off time</i>	38
<i>Processing time per location</i>	39
<i>Percentage of items processed in compliance with the service standard of the postal facility</i>	39
<i>Inbound and outbound flux of the logistics unit</i>	40
<i>Efficiency of RFID readings (read rate)</i>	41
3.4. KPI summary.....	42
4 Postal security management requirements	42
4.1 Introduction.....	42
4.2 Security alerts in sorting process.....	42
4.3 Security alerts in receiving process.....	43
5 Asset management requirements	43
5.1 Introduction.....	44
<i>Initial definitions of the proposed solution</i>	44
5.2 Configuration of asset management parameters.....	44
<i>Type of transport asset</i>	44
<i>List of transport asset scrap reasons</i>	44
5.3 Asset control process.....	45

	<i>Assets registration</i>	45
	<i>Attach photo of new asset</i>	45
	<i>Link RFID tag to transport asset by computer</i>	45
	<i>Link RFID tag to transport asset by RFID handheld</i>	45
	<i>Asset registration using existing fixed asset system</i>	46
	<i>Link RFID tag to fixed asset by computer</i>	46
	<i>Link RFID tag to fixed asset by handheld</i>	46
	<i>RFID tag replacement</i>	46
	<i>RFID tag replacement by computer</i>	46
	<i>RFID tag replacement by RFID handheld</i>	47
	<i>Asset scrapping</i>	47
	<i>Asset scrapping by computer</i>	47
	<i>Asset scrapping by RFID handheld</i>	47
	<i>Attach photo of scrapped asset</i>	47
	<i>Maintenance of asset data</i>	47
	<i>Updating asset data by computer</i>	47
	<i>Updating asset data by RFID handheld</i>	48
5.4	Asset control reports.....	49
	<i>List of assets by logistical unit</i>	49
	<i>Assets not moved in the logistics unit for more than "X" days</i>	49
	<i>Calculation of the useful life of asset types</i>	49
	<i>Quantity of assets scrapped by reason</i>	49
	<i>Assets detected and not registered in QMS</i>	49
	<i>Traceability of assets by postal control points</i>	49
	<i>Inbound and outbound flux of assets per location</i>	49
5.5	Mapping of asset control process.....	50
	<i>TO BE - Transport asset control processes</i>	50
6	Sales and customer service management requirements	52
6.1	Introduction.....	52
6.2	Reports to support sales operations.....	52
	<i>Customer's mail volume</i>	52
	<i>Quantity of customer RFID tag without corresponding post</i>	52
	<i>Revenue protection monitoring</i>	53
6.3	Reports to support customer services.....	53
	<i>Traceability of postal items by location in real time</i>	53
	<i>Traceability of postal items by location</i>	54
	<i>Traceability of postal items by location by existing systems in real time</i>	54
7	Architecture and non-functional requirements	54
7.1	QMS architecture.....	54
	<i>Programming languages</i>	54
	<i>Data repository</i>	55
	<i>BI Solution</i>	55
	<i>Diagram of the architecture main elements</i>	55
7.2	Non-functional requirements.....	55

	<i>"Responsive" user interface technique</i>	55
	<i>"Mobile First" development approach</i>	56
	<i>Data export to Microsoft Excel</i>	56
	<i>Online queries printing</i>	56
	<i>Security and access control</i>	56
	<i>Access audit trail</i>	56
	<i>Data editing audit trail</i>	56
	<i>Multi-language user interface</i>	56
	<i>Screens online help</i>	56
	<i>Online help for data field</i>	56
	<i>Multiple time zones</i>	56
	<i>Special accessibility</i>	57
	<i>User interface browser</i>	57
	<i>Performance for high volumes of data and access</i>	57
	<i>Estimated volume for the QMS of Correios Brasil</i>	57
8	Interface inventory	57
8.1	Introduction	57
9	Lexicon	59

1 Global configuration requirements

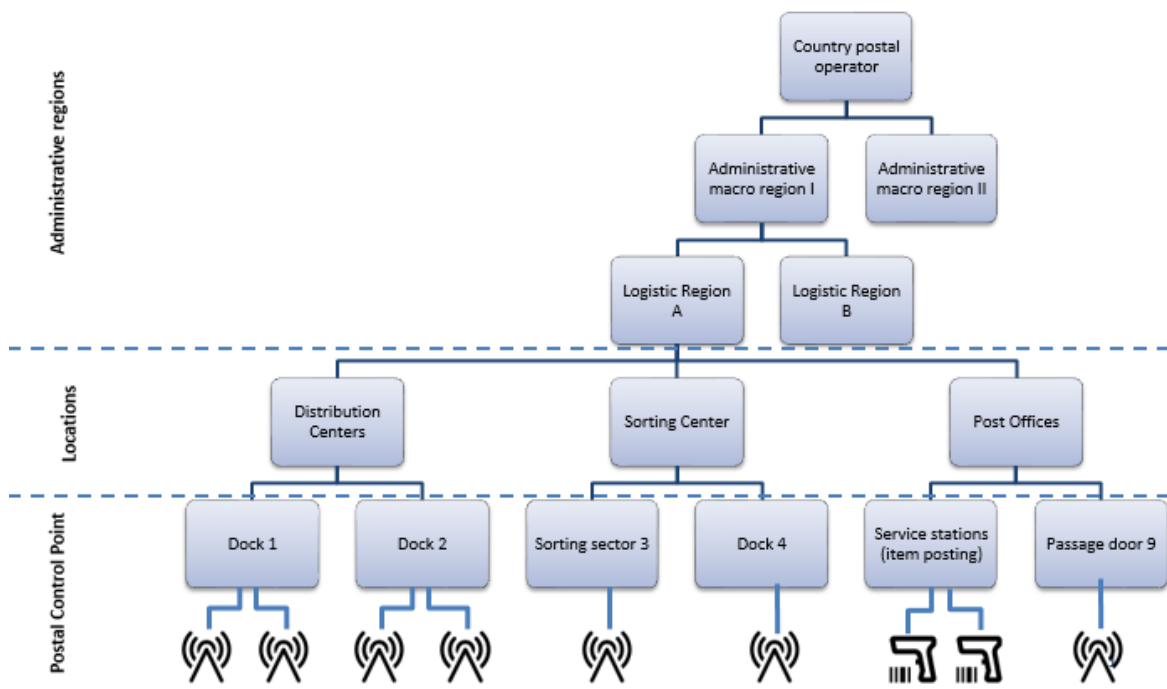
In order to enhance scalability through global postal environments, it is required to build the system in line with different scenarios of postal operations. Therefore, the system needs to be configurable according to each postal operator structure.

Objective: This group of functions aims to set up the system in the post environment providing it with the capacity to define all the parameters that will drive the calculation and logic rules of the software.

1.1 DO's organization

The postal operator needs to configure its enterprise parameters as a first step to build on top the required functionalities to monitor its operations. The QMS defines the postal operator structure according to three levels:

- **Administrative regions:** aggregation of postal facilities. It allows to create reports consolidating data from different postal facilities. Example: number of postal items that are captured in a specific region.
- **Location:** postal physical logistic units or any location where the postal operations take place.
- **Postal control points:** lowest level within the organization. It defines a stretch between operations inside of a postal facility. Examples of postal control point may be, entry gate, exit gate, sorting point, customs entry gate, etc...



FU-001	<p><u>DO's organization configuration</u></p> <p>This functionality should guarantee the correct configuration of the postal organization. It must have at least the following rules:</p> <ul style="list-style-type: none"> – Ensure the hierarchical relationship from one parent to several children; – Each location must have at least one postal control point; – Locations can only be linked to administrative regions, hence, they can not be linked between them; – Administrative regions can have multiple hierarchical levels.
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Administrative regions configuration

Administrative regions are aggregations of locations to consolidate information handled by the QMS system to meet the business model of the postal operator.

FU-002	<p><u>Manual configuration of administrative regions</u> Interface to fill in with the parameters to set-up the region, with data such as:</p> <ul style="list-style-type: none"> - Name of the Administrative region; - Internal code of the Administrative region in the postal operator; - Batch configuration; - Delivery zones; - Links between cities.
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Location configuration

Location is any physical location that participates in the postal pipeline. For example; post office, sorting centers, distribution centers, air mail unit, etc.

FU-003	<p><u>Manual configuration of the location</u> Interface to fill in with the parameters to identify a location, with data such as:</p> <ul style="list-style-type: none"> - Name of the postal facility; - Geo-localization; - Address; - ZIP code; - Purpose of the facility (posting point, delivery point, sorting center, AMU, OE, etc.); - Internal code of the facility in the postal operator; - Internal code of the region to link with the postal facility.
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FU-004	<p><u>Automatic configuration of the location</u> Interface to pull the parameters to identify a location from other systems. The pulled information can't be manually modified and must be synchronized.</p> <ul style="list-style-type: none"> - Name of the postal facility; - Geo-localization; - Address; - ZIP code; - Purpose of the facility (sorting center, AMU, OE, etc.); - Internal code of the facility in the postal operator; - Internal code of the region to link with the postal facility; - Daily synchronization.
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Postal Control Point configuration

The postal control point is defined by a localization inside a postal facility. Its configuration consists of defining the purpose of the postal control point.

The RFID readers can be linked to the Postal Control Point.

FU-005	<p><u>Manual configuration of the postal control point</u> Interface to fill in with the parameters to identify a Postal Control Point, with data such as:</p> <ul style="list-style-type: none"> – Name of the postal control point; – Geo-localization; – Internal code of the facility to link with the postal control point; – Purpose of the control point (capture entries, capture dispatches, capture posting, etc.); – Internal code of the Postal Control Point in the postal operator.
FU-006	<p><u>Automatic configuration of the postal control point</u> Interface to pull the parameters to identify a Postal Control Point from other systems. The pulled information can't be manually modified and must be synchronized.</p> <ul style="list-style-type: none"> – Name of the postal control point; – Geo-localization; – Internal code of the facility to link with the postal control point; – Purpose of the control point (capture entries, capture dispatches, capture posting, etc.); – Internal code of the Postal Control Point in the postal operator; – Daily synchronization.

1.2 Devices configuration

This group of requirements aims to define the use of the RFID readers used during the postal operations.

Link RFID readers with Postal Control Point

FU-007	<p>The link between an RFID reader and a logistical structure must comply with the following rules:</p> <ul style="list-style-type: none"> – A reader is defined by its license plate. License plates are imported either from the GMS NMS or for other RFID providers (i.e.: Lyngsoe systems). The QMS does not issue license plates; – QMS will pull all the information concerning the RFID readers (license plates, active status, LAN network, etc.) from the GMS NMS when the RFID readers belong to the UPU network; – For third parties RFID readers, the information will be batched in the QMS; – A reader can be linked <u>only</u> to a postal control point; – It <u>cannot</u> be linked directly to a postal facility or an administrative region; – It is only possible to link active readers; – a postal control point can have several readers; – Real-time synchronization to validate the readers status.
FU-008	<p><u>RFID readers inventory synchronization (interface)</u> To guarantee the correct link between readers and the postal control point, a replication of the readers inventory will be necessary, from the RFID middleware</p>

	<p>system to the QMS system. The control system for this inventory can be the GMS NMS or another. This requirement refers only to the input interface.</p> <p>The readers inventory in QMS <u>cannot</u> be modified manually. Its update will only be through this interface.</p>
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Link of a mobile RFID device to a Postal Control Point

This type of link will be used in operations in which it is not feasible to have an RFID reader installed, such as the sorting process of postal items or shipping containers to a particular route. Mobile RFID devices are considered small RFID handhelds or duo barcode and RFID reader that do not require physical installation or fixation. It does not include mobile RFID readers.

FU-009	<ul style="list-style-type: none"> – The connection of a mobile RFID device to a postal control point will be done on the device itself; – It is only possible to link mobile RFID device that are operating on the same LAN network as the postal facility in which the postal control point is configured; – There must be a validation process to link a mobile RFID device with the postal control point; – A middleware or web service is required to integrate with the QMS.
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FU-010	<p><u>Manual configuration of mobile RFID devices</u> at least the following fields need to be controlled in QMS in order to Interact with mobile RFID devices:</p> <ul style="list-style-type: none"> – MAC address; – License plate; – Model; – Manufacturer.
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1.3 Business rules configuration

Group of parameters to be configured in order to run calculations and elaborate reports

Processing times between postal control points

FU-011	<p><u>Objective</u>: It defines the business rules to calculate processing times within a postal facility. Processing times are the elapsed time between different postal control points within the postal pipeline.</p> <p>Parameters:</p> <ul style="list-style-type: none"> – Holidays; – Cut-offs times; – Non-working days.
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1.4 Postal services parameters

Concept: Postal services are postal services offered to the consumer, for example:

- Sedex 12 = Express shipping service. Express delivery service for goods and documents with delivery until 12 am the following day.
- Sedex today = Same day express delivery service.

- PAC = Exclusive non-express shipping service for goods.

FU-012	<p>Register the list of postal services to the consumer/client, with information such as:</p> <ul style="list-style-type: none"> - Business name of the service; - Service code in the postal operator's legacy system; - Service status (active, inactive, ...) - The start date for offering the service; - The final date for offering the service; - Maximum customer service term (SLA). This period can be set by day or a specific time of day.
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Expected period of the permanence of the postal item in the same location

Concept: Expected period of time for a postal item to be in the same location

FU-013	<p>For each Post Service, the maximum period for the postal item to remain in the aforementioned logistical unit. This period can be set by running hours or specific time on a given day. Example: until 4 pm the day after you enter the logistics unit.</p>
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Service standards

FU-014	<p><u>Objective:</u> is the time defined to deliver the mail. It depends on the type of postal service, the region, zip code and postage. Information is pulled from existing system of consultation of terms and prices - SCTP. In Correios Brasil this system is SCPP.</p> <p>[Interface] This interface should ask the SCTP system for the delivery deadline for each item post. This request should preferably occur after the posting interface with the CPS system.</p>
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Manual configuration of service standards

FU-015	<p><u>Objective:</u> Services standards are a mandatory requirement for almost any calculation and quality report. In cases where it does not exist SCTP system or similar, QMS is required to provide a functionality to define the service standards.</p> <p>Parameters:</p> <ul style="list-style-type: none"> - Type of postal service; - Locations; - Regions; - Zip codes; - Postage times; - Processing times.
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1.5 Parameters of routes

FU-016	<p><u>Setting routes between logistical units (LTN, LTR, and LTU)</u></p> <p>The QMS must provide a record of transport routes (transport lines) between logistical units. The setting of a route must contain a single place of origin and one or more places of destinations, sequenced by the expected order of arrival in each of these. Ex.:</p> <p>Origin = Brasília - CTE Destination 1 = Goiana - Distribution Center Destination 2 = Cuiabá - Distribution Center [interface with posting plan]</p>
FU-017	<p><u>Setting postman routes</u></p> <p>These are the routes between neighborhoods or addresses in the same city. It's the postman's route.</p> <p>The registration of a postman route will consist of a place of origin (a logistics unit) and one or more ranges of zip codes. There is no need for a pre-defined sequence of ZIP codes.</p> <p>Ex.:</p> <p>Origin = Brasília - CTE Range 1 = ZIP code 70.800 to 70.999 Range 2 = ZIP code 70.050 to 70.200</p>

1.6 Initiation of passive transponders

Concept: In order to identify and process the transponders attached to items declared in the system, it is required to initiate them. Initiate a transponder, is to declare it as active in the QMS system. Hence, QMS will be able to track the transponder and feed the data base to build analysis and reports concerning that transponder.

FU-097	<p><u>RFID passive transponder initiation in QMS</u></p> <p>Develop a functionality to initiate RFID passive transponders that will be handled by QMS. This function should be configurable at two levels:</p> <ul style="list-style-type: none"> - Pattern of transponders (i.e.: S10; SSCC; GRAI; etc.) - Serial of numbers (grouped by ranges or introduced individually) per each pattern.
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2 Operations management requirements

Objective: Support DOs equipped with RFID, to carry out postal operational processes as planned. Operations management functionalities are those that concern live operations to support the posts to meet the quality targets. This proposed solution assumes implementation of RFID readers in the relevant operations.

End-users: postal employees engaged in live operations.

Note: for a better understanding of the proposed solution, the terms or acronyms used in this document are defined in the lexicon.

2.1. Configuration of operations management requirements

Objective: This group of functions aims to build a panel to configure those parameters that are only used in the operations management module. It will provide the QMS system with the capacity to define all the parameters that will drive the calculation logics in the operations management monitoring module.

Non- functional requirements of aggregated items (nesting)

Concept: Some operations concerning processing mail are easier to handle with items aggregated, particularly when items are consolidated in closed mailboxes, containers, CDLs, etc. Accordingly, the system needs to be adapted to this situation enabling or disabling this option once required.

An aggregation of items is a single item or some items packaged, packed, or arranged in a specified manner and capable of being handled and controlled as a unit.

Body carrying the aggregation of items is the structure on which the aggregated items are moved; it is the packaging that ties postal items together. It can be a CDL; pouch; crates; box; etc. These structures are reusable and sometimes controlled as assets. Some structures may be comprised of more than one component, as in the case of the CDL which is composed of three parts.

Premises: The following assumptions are considered:

- The body or structure where the aggregated items are located, is tagged with RFID and managed within the QMS in the module “Assets management”. When postal items are collected in the body, they are nested in an aggregation of items to facilitate the capture of RFID data in a specific step of the postal operations pipeline.
- When working with aggregated items, it is assumed that posts operate to keep the aggregation inviolable throughout the entire process.
- This solution considered that the identification of the aggregated items will not have an RFID tag, since the identification of the aggregation of items is temporary.

FU-018	<p><u>Identification of an aggregation of items</u> The aggregation of items is the sum of the body (packaging) and the postal items that it includes. This set (aggregation of items) will <u>have unique identification in the QMS</u>. However, it will NOT have an RFID tag.</p> <p>Note: The generation of the aggregation of items ID record is described in another requirement.</p>
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RFID movement parameters for aggregated items

Nesting items, implies facing risks concerning integrity of the aggregation. For example, operators may make mistakes during the sorting process by inserting items in the wrong container or bag, an RFID reader may not capture all the items at the same time or if the body is metallic, the RFID efficiency will be affected. In a nutshell, failures when processing aggregated items will depend on three different variables:

- Performance of the RFID technology;
- Material of the body;
- Manual operations of nesting.

To minimize the impact of those risks, the following parameters need to be configured to validate the registration of movements of aggregated items. These parameters are configured by each operator based on the postal process in the postal facility, the efficiency of the RFID readers in place and the assets in use. It may be changed according to the needs of each location, and adjusted to the reality of each DO.

FU-019	MIWB = Minimum number of items read per aggregation WITH NO NEED to read the body tag.
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	<p>This parameter is used only when the RFID tag of the body is not read, but some items that make up the aggregation of items registered in QMS have been identified.</p> <p>It represents the minimum quantity of postal items of the aggregation, that needs to be captured by an RFID reader, to consider that the aggregation has been moved or detected.</p> <p>This parameter is configured as a percentage of the aggregation of items per type of body. Example:</p> <ul style="list-style-type: none"> - % of items for CDL; - % of items for bags; - % of items for boxes.
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FU-020	<p>MIBR = Minimum number of items read per aggregation including the READ OF the body tag.</p> <p>This parameter is used when the RFID tag of the body containing the aggregation of items registered in QMS is read.</p> <p>It represents the minimum quantity of postal items of the aggregation, that needs to be captured by an RFID reader, to consider that a aggregated items has been moved.</p> <p>This parameter is configured as a percentage of the aggregation of items per type of body. Example:</p> <ul style="list-style-type: none"> - % of items for CLD; - % of items in pouch; - % of items for boxes. <p>It is assumed that this parameter can be smaller than the reading without the body tag (MIWB), to facilitate the identification of an aggregation of items by a less powerful device, such as a PDA handheld.</p>
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Movement validation of aggregated items

FU-021	<p>The movement of aggregated items, must be also recorded as a movement for every item contained in that aggregation.</p> <p>To validate the movement of aggregated items detected by an RFID reader, at least one of the conditions below is required:</p> <ol style="list-style-type: none"> 1) reading of the RFID tagged to the body carrying the aggregated items and plus "MIWB" quantity of postal items that compose this aggregation. This rule aims to prevent the reading of a fixed packaging or container tag from being considered aggregated items when it is empty. 2) reading at least "MIBR" quantities of postal items from the aggregation, even if the fixed tag to the structure is not read. <p><u>Note:</u> The quantities "MIWB" and "MIBR" must be defined in the configuration of the module.</p>
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Separate controls for monitoring postal items and monitoring aggregated items

FU-022	<p>The QMS must maintain separate control boards to monitor isolated items and to monitor aggregated items. These control boards (internal tables) are interrelated, and must be synchronized. To do so, movements of aggregated items must generate records in both control boards (in the table collecting registrations of postal items movements and in the table collecting registrations of aggregated items movements).</p>
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Control parameters of movement of items within the same location

FU-023	Record whether the location makes use of control by: a) Aggregated items (or isolated postal item); b) Control of forwarding route;
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2.2. Examples of scenarios

This proposal seeks for solutions to add value to postal operations with the use of RFID technology.

Postal operations monitoring will use the proposed solution to monitor mainly two main variables, but not limited to:

- a) Monitoring of the movements of postal items (aggregated or isolated);
- b) Control of misrouted items and monitoring of transportation, according to the forwarding plan.

The combination of these variables results in four different monitoring scenarios:

Scenario D - WITHOUT aggregated items and WITHOUT shipping control.

Postal facilities without control of the movement of aggregated items and without control of the destinations of their shipments. For this scenario, the postal operators only track the movements of individual postal items on its premises. In this scenario, the degree of assuredness to know if an item entered or left the unit is low. We can only know the first and last reading of the item in the facility, and it is required to wait for a read in another facility to conclude that this item was delivered.

Scenario C - WITH aggregated items but WITHOUT shipping control.

In this scenario, the degree of assuredness to know an item entered or left the unit is also low; since we only know the first and last reading of the item in this unit. However, due to the movement control by aggregated items, confidence in the traceability of postal items is increased.

Scenario B - WITHOUT aggregated items but WITH shipping control.

In this scenario, there is more control of shipments, with prior alerts if any item is being sent to the wrong destination. However, there is no good assuredness in the information about unloading or loading items, due to the possible shadow of the RFID reading and to some situations.

Scenario A - WITH aggregated items and WITH shipping control

This scenario is more reliable, since the information created to monitor items' location is bigger while relying on nesting. This way, even if an item is not detected by the RFID antenna, the aggregated items are detected and consequently, this item is considered in this transport automatically.

Since this scenario also controls the destination of your shipment, the possibility of an aggregation of items going to the wrong destination is smaller.

2.3. Requirements identified to monitor postal operations through all the postal pipeline

Objective: This group of functions aims to monitor whether operations are being carried out as planned and, when applicable, to issue alerts so that any deviations are fixed as soon as possible (preferably during the operation).

Concept:

Postal Operation: are activities like transportation, cargo handling or sorting of postal items, which comprises the logistical processes from posting to the final delivery.

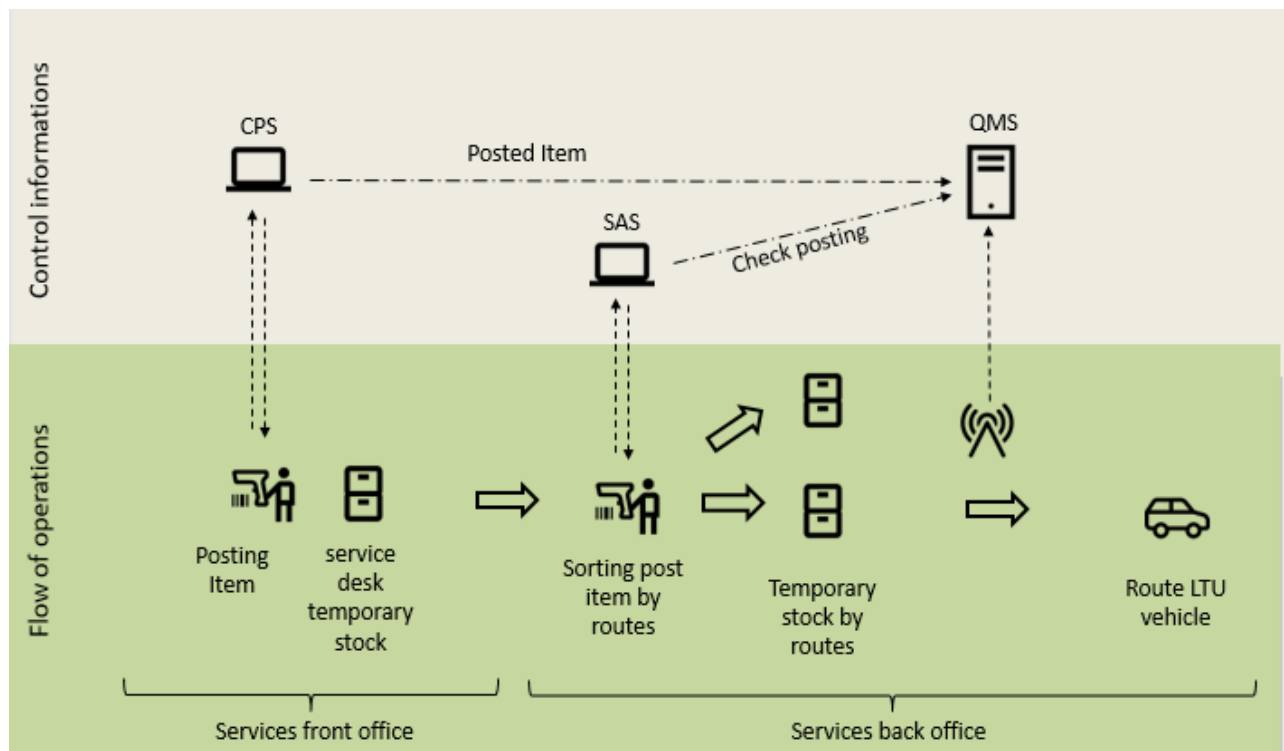
Postal pipeline: sequence of operations needed to succeed with the mail delivery, from its posting until its final delivery.

Items may be identified by:

- Carrying a barcode;
- Carrying an RFID tag;
- Carrying both barcode and RFID tag.

The system should be capable to allow the possibility to process aggregated items in some of the steps in the postal pipeline.

Complete pipeline of the postal item



CPS: is acronym of Customer Posting System

SAS: represent a sorting and aggregation system for postal items.

Posting items (handover point)

Context: The operation of posting items is the physical handover from the customer to the postal operator. It may be done in a postal office or, in case of large business customers, mail may be collected in the customer's location.

Posting operations are NOT within the scope of the QMS and will be carried out following each postal operator' structure.

Most of postal structures, are based on barcode to post items. Therefore, to make the most of the use of QMS, it is recommended to:

- 1) Link an RFID postal tag to the S10 barcode;

2) Link S10 to the customer's RFID tag, if he has one.

After the posting operation is completed, items are registered in a local system, from which QMS will pull the information.

Operation: Handover from business customer

The process of posting business customer mail, is a process that needs to be agreed between the customer and the post, addressing issues such as the use of the client's RFID tag.

Currently, this solution design considers only the following adjustments in the current process:

- 1) Baptize RFID tags for those items created in SCCE;
- 2) Link S10 to SSCC or RFID tags based in SCCE information. This link will be done in the local system.
- 3) Posting items from business customers will be recorded in the local system dedicated to posting that interfaces with QMS. Accordingly, QMS will recognize those items only after the interface with the local system have been processed, regardless the posting location or moment of registration.

Even if both parties agreed that the mail is going to be collected by the postal operator directly from customer's premises, the information concerning the handover needs to be forwarded to the QMS using the interface with the local system.

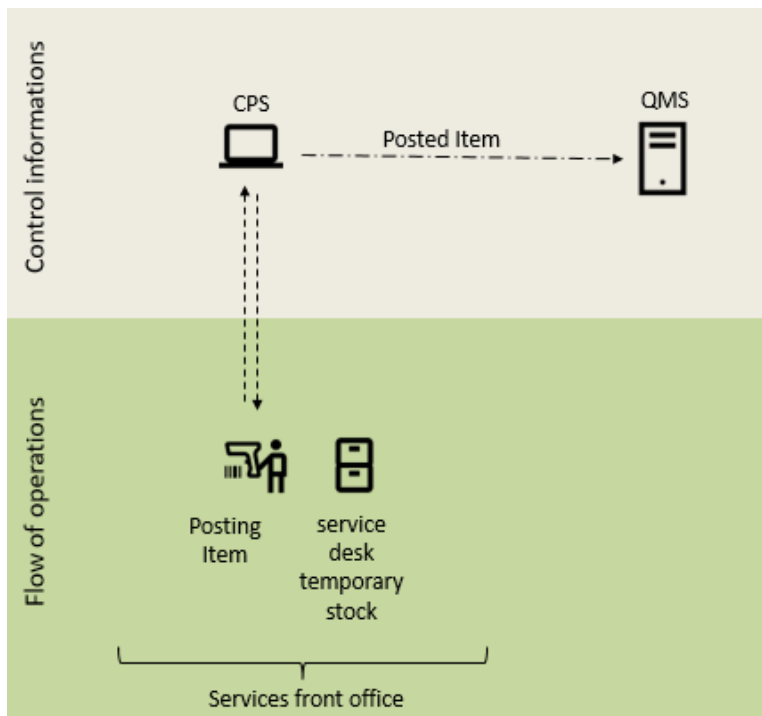
Operation: Posting items

After the posting operation is completed, the local system should forward the information to the QMS.

FU-024	<p><u>Posting check</u></p> <p>The posting information is logged into the local system, and it is not possible to modify the information in QMS.</p> <p>The QMS must have an input interface for the main data of the posted items, such as:</p> <ul style="list-style-type: none"> – RFID tag of the item or customer's RFID tag, if he has one; – S10 code; – ZIP code of the destination; – Postal service; – Posting time-stamp; – Postal control point ID. <p>This interface, must keep QMS synchronized with local systems concerning new posted items and any update of the items already posted.</p>
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Note: additional information on the performance of the interface can be found in the Table: Inventory of Interfaces.

Posting Item at Post Office overview



CPS: is acronym of Consumer Posting System

FU-025	<p><u>Locations routed in the forwarding plan</u></p> <p>Once posted, the QMS should record the list of locations where the item should be send prior its destination (Interface with SGIP), in order to control misrouted items during the postal pipeline. Therefore, QMS should record:</p> <ul style="list-style-type: none"> - Item ID; - Type of service; - Final destination; - Intermediate Location(s) ID(s).
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Sorting items

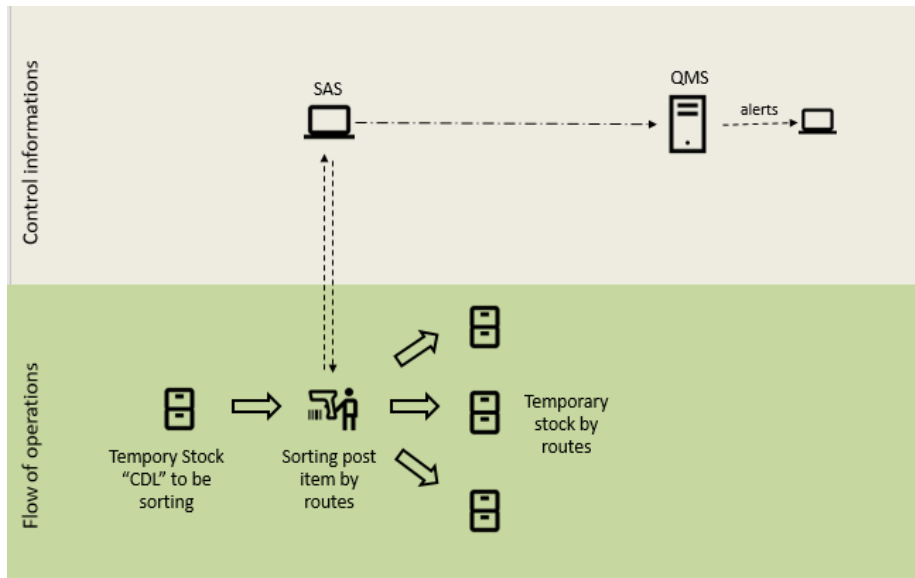
Sorting operations are NOT within the scope of the QMS and will be carried out following each postal operator' structure (in case of Correios do Brasil, the workflow concerning sorting items is detailed in appendix. However, it is required an interface after the "Posting check activity", to provide traceability in this system. Two scenarios are considered depending on whether the items are aggregated or not.

Sorting isolated items

FU-026	<p><u>Sorting check</u></p> <p>The QMS may have an input interface for the main data of the posted items checked, such as:</p> <ul style="list-style-type: none"> - Optional (if there are not RFID gates installed, the functionality may be disabled); - Postal Control Point ID; - RFID number of the item or customer's RFID tag, if he has one; - S10 code, in case of items not identified with RFID tag; - Time-stamp.
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Creating aggregated items

While sorting items, it may be useful to create an aggregation in order to optimize future sorting operations or dispatches. The creation of aggregated items should be optional at each postal control point. The aggregated level ID can be created by another system already in use in the post or by the QMS.



SAS: represent a sorting and aggregation system for postal items.

Whether created in local systems or in QMS, the process of creating aggregation of items is as follows:

- Each sorting sector prepares a list with all items that shares the same transportation route;
- A body (CDL, Roll Cage, etc.) where items will be aggregated is prepared for each route, and associated to the list;
- An ID is created for the aggregation of the items listed and the body;
- The operator, reads the S10 tagged in the items indicated in the list one by one, and puts them inside the body;
- Once all items are located in the body, the operator closes the body and confirms that the aggregation is concluded;
- A label is printed with the aggregation ID and fixed to the body, to facilitate their visual identification.

Managing aggregation of items with another system

FU-027	<p><u>Interface: Assembly of aggregated items by another system</u> [Interface] Once the assembly of the aggregation of items has started, the postal operator's system must inform the QMS, at least the following data:</p> <ul style="list-style-type: none"> – Optional operation; – Aggregated items ID; – RFID tag of the body; – RFID tag of other parts of the structure, if applicable; – Postal items that conform the aggregation; – Postal control point where the items have been aggregated; – Time-stamp; – Location ID.
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Managing aggregation of items with QMS

FU-028	<p><u>Assembly of aggregated items by QMS</u> To register a new assembly of items aggregated by QMS, it must at least:</p> <ul style="list-style-type: none"> - Optional operation; - The QMS should request confirmation from the user of assembly operation; - RFID tag of the body; - Validation that the body is released for use; - RFID tag of other parts of the body, if applicable; - Individually read all postal items that conforms the aggregation; - Postal control point where this activity is being carried out. <p>This functionality must be performed on a PDA</p>
FU-029	<p><u>End of assembling aggregated items on QMS</u> After the assembly of a aggregated items is confirmed, by interface or in the QMS itself, the QMS must:</p> <ul style="list-style-type: none"> - Follows FU-028 requirement; - Time-stamp; - Type of postal service; - Location ID of the destination; - Create aggregated items ID; - Print the label following FU-028; - Link the postal items reported to this unitization ID.
FU-030	<p><u>Identification label for aggregated items</u> The QMS should provide the identification tag printing functionality (label), with information such as:</p> <ul style="list-style-type: none"> - Follows FU-028 requirement; - Aggregated items ID; - Type of postal service; - Postal control point ID; - Transport route planned; - Time-stamp; - Label design.

Dismantling aggregated items

Once the aggregation of items is created, it passes through the postal pipeline until reaching a postal control point in which it is required to dismantle and break the aggregation. The following functionalities are required, to monitor this activity:

Managing the dismantling of the aggregation of items with another system

FU-031	<p><u>Interface: Disassembly of aggregated items by another system</u> [Interface] Once the disassembly of an aggregation of items has started, the postal operator's system must inform the QMS, at least the following data:</p>
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	<ul style="list-style-type: none"> – Optional operation; – Aggregated items ID; – Postal control point ID; – Time-stamp.
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Managing the dismantling of the aggregation of items with QMS

FU-032	<p><u>Disassembly of aggregated items by QMS</u></p> <p>To register a disassembly of aggregated items by QMS, it is required to capture at least the body tag and inform the postal control point, where this activity is being carried out.</p> <p>The QMS must:</p> <ul style="list-style-type: none"> – Capture RFID tag of the body; – Capture RFID tag of other parts of the structure, if applicable; – To confirm that this tag, corresponds to a body and linked to an active aggregation of items; – Register all postal items that conforms the aggregation in the control board with: <ul style="list-style-type: none"> ○ Postal control point; ○ Time-stamp; – Request confirmation from the user, as a guarantee that this operation is a disassembly. <p>This functionality can be performed on a PDA (handheld) to capture RFID tag or barcodes, or with the automatic capture from an RFID reader.</p>
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FU-033	<p><u>Release of components that conform the aggregation of items</u></p> <p>Once the disassembly of the aggregation of items has been informed, either by interface or in the QMS itself, the system should:</p> <ul style="list-style-type: none"> – Update the ID status of the aggregated items. This ID is cannot be used again; – Switch the body to a status “released for use”; – Release the other components of the aggregated items so that it can be used in a new unitization; – Update the status of postal items informing that, from that moment, they will be controlled individually.
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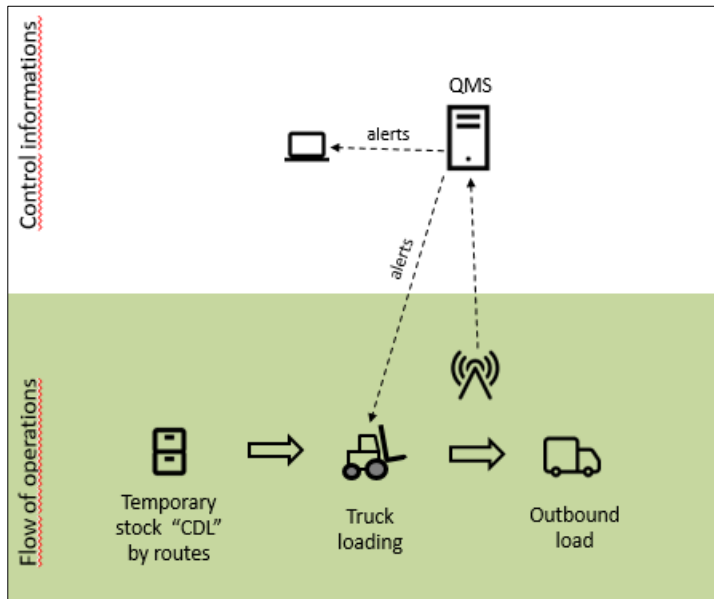
Forwarding items

As already mentioned, RFID readers may not be installed in all Postal control points. However, if an exit door is equipped with RFID, the exit registration should be considered and monitored in QMS.

Truck loading

Context: The shipping operation with control of correct routes, starts with the creation of the truckload record, informing the route allocated to the truck. This allocation is done through the dock, namely, the route is linked to a dock and, if technology is available, the truck can be linked to the dock as well.

Then, it informs the start of the truck loading operation, informing the dock that this operation will take place. From that moment on, every aggregation of items read at this dock will be considered embarked. Finally, at the end of the operation, it informs the close of loading.



FU-034	<p><u>Creation of the truckload record and start loading</u></p> <p>The QMS should provide a function to create the truckload record and start loading, with at least the following information:</p> <ul style="list-style-type: none"> – Truck identification, if available; – Route (transport line) of destination of this load; – Postal control point (Dock where this loading will be carried out). <p>From that moment on, all aggregated items read at that dock, will be considered loaded on that cargo.</p> <p>This feature should preferably operated on a handheld RFID or smartphone.</p>
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FU-035	<p><u>Handover to transportation</u></p> <p>The handover to transports starts once the truck is loaded. A function to close loading should be developed, informing:</p> <ul style="list-style-type: none"> – Truck identification, if available; – Postal control point (loading dock). <p>From that moment, it is not accepted to load any other item or aggregation of items on this truck.</p>
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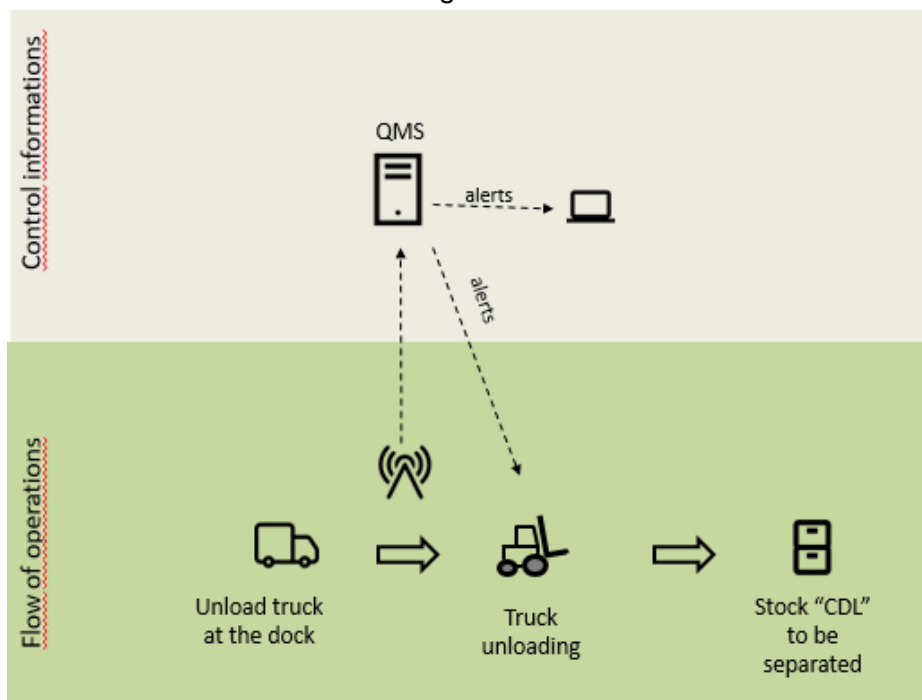
Loading alerts

FU-036	<p><u>Misrouted items: loaded items that don't belong to the truck route</u> Once the truck has finished loading, the system should check whether any postal item shipped does not belong to the destination of that route. This check will be done by the postal item destination Zip code versus the truckload route.</p> <p>If an item is detected as misrouted, QMS should send an alert to destination for informative purpose.</p>
FU-037	<p><u>Misrouted aggregated items: loaded aggregated items that don't belong to the truck route</u> Once the truck has finished loading, the system should check whether any aggregation of items have been loaded into the truck but does not belong to the destination of that route. This check will be done by the destination (route) registered in the aggregation.</p> <p>If an aggregation of items is detected as misrouted, the container must be taken out</p>

Receiving items

Context: QMS will monitor the receiving items operations according to the following process:

- 1) The registration of the beginning of unloading is a manual operation registered in the system, as described in the requirement FU-038;
- 2) After that, the unloading activities take place while the RFID readers capture the items as they are unloaded;
- 3) Once the unloading activity is closed (FU-039), the system runs a function to verify that all items forwarded from the unit of origin have been received.



Operation: Unloading

Context: When starting an unloading, the operator must inform the QMS system that at a specified dock it will start the unloading of a specified load (previously registered in the system). Usually, this process will process aggregated items.

After the unloading is completed, the operator must inform the system that this operation has been completed.

FU-038	<p><u>Start unloading</u></p> <p>The QMS should provide a function to register the beginning of an inbound, requesting information such as:</p> <ul style="list-style-type: none"> – Truck identification, if applicable; – Aggregated items ID (body RFID tag, S9), if applicable; – Items ID (RFID tag, customer RFID tag, S10); – Postal control point (dock where the unloading takes place). <p>This function must be able to operate in:</p> <ul style="list-style-type: none"> – Laptop; – Smartphone; – RFID handheld.
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FU-039	<p><u>End unloading</u></p> <p>The QMS should provide a function to record the end of the unloading operation, requesting only:</p> <ul style="list-style-type: none"> – Truck identification, if applicable; – Postal control point (dock where the unloading took place). <p>This function must be able to operate in:</p> <ul style="list-style-type: none"> – Laptop; – Smartphone; – RFID handheld.
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Unloading alerts

This alerts should be readable on a laptop, smartphone or handheld.

FU-040	<p><u>Unloading misrouted items</u></p> <p>After the end of the unloading, check if any postal item was unloaded but was not foreseen to be so. Accordingly, generate a record of this alert.</p>
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FU-041	<p><u>Unloading misrouted aggregated items</u></p> <p>Once the unloading is finished, the system should verify if aggregated items that were not foreseen to be unloaded, have been unloaded. Such a case, the system generates an alert.</p> <p>This alert should be readable on a laptop, smartphone or handheld.</p>
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2.4. Other alerts

Alerts are equivalent to exception events. Events that are not complying with normal or scheduled conditions. An alert is always recorded in the system. This record is later updated (manually or automatically), as resolved or canceled.

Each type of alert may be treated differently by the system. To avoid message congestion, it is not recommended that an exception raise a message. Usually alerts are consulted via reports.

General rules for controlling alerts

FU-042	<p><u>Internal control of exception alerts</u> The QMS should keep track of all exception alerts for postal operations and their updates, with information such as:</p> <ul style="list-style-type: none"> – Origin location ID; – Origin Postal control point ID; – Source system (if interface); – Time-stamp of the generation (or update) of the alert; – Item ID; – Aggregation ID, if applicable; – Type of postal service; – Type of alert; – Alert status (active; canceled; automatically adjusted; manually adjusted; expired; etc...).
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Postal operations exception alerts

FU-043	<p><u>Movement of postal item isolated from its aggregation</u> When a postal item is detected by an RFID antenna isolated from its aggregation, QMS should generate an alert record. It is considered an isolated postal item, if:</p> <ul style="list-style-type: none"> – The postal item is detected by an antenna without detecting the tagged body carrying the aggregation of items and other postal items. AND – The postal item is detected at a different postal control point from the last registration of the aggregation, but in the same location.
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FU-044	<p><u>Customer service deadline alert</u> Generate an alert when a postal item exceeds its customer service (SLA) term, according to the Post Service, as defined in the QMS global configurations.</p>
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FU-045	<p><u>Alert of the time the postal item exceeds the targeted processing time</u> Generate an alert if a postal item exceeds the expected period to stay in a particular location, according to the QMS global configurations.</p>
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Automatic postal operation exception adjustments

FU-046	<p><u>Aggregated items movement not detected by RFID</u> When an aggregation of items has been considered moved by the QMS rules, all postal items that make up this aggregation of items will be <u>automatically</u> considered moved, even if they have not been detected by reading the RFID.</p>
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FU-047	<p><u>Automatic adjustments by changing the location</u> When a postal item is detected in a new location (via RFID or interfaces), all exception alerts from the previous unit are automatically canceled.</p>
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FU-048	<p><u>Automatic adjustment of isolated postal item</u> If a postal item is detected separately in a postal facility other than the unit of its aggregation, then: 1) It will be <u>automatically</u> disconnected from its aggregation and will be controlled as an isolated postal item.</p>
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	2) A movement exception alert will still be generated, but already informing the automatic adjustment made.
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FU-049	<u>Automatic adjustment by the expiration time</u> Any postal operation exception that exceeds the expiration time, configured in the location parameter, must be automatically canceled.
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Manual postal operation exception adjustments

FU-050	<u>Manual adjustment of isolated postal item</u> If a separate item alert within the same logistical unit is confirmed manually, the QMS must disconnect this item from its aggregation and will control it as an isolated postal item.
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FU-051	<u>Manual alert cancellation</u> The system should provide a function for manually canceling alerts, requesting the reason for this decision. This cancellation can be performed in batch, for this the function must provide a filter by the aggregated items; kind of service; truckload, origin route, destination route, among others.
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2.5. Summary of alerts (exception events)

The table below presents a summary of the alerts (exception events) projected in this solution and their main characteristics. The adjustments (or updates) planned for these alerts are not listed in this table.

ID Req.	Title	Generation criteria		Resulting action				
		Reference standard	check data	Record	Report	email	sound alarm	light alarm
FU-036	[Alert] Misrouted items: loaded items that don't belong to the truck route	Planned route	Boarded route	✓	✓			
FU-037	[Alert] Misrouted aggregated items: loaded aggregated items that don't belong to the truck route	Planned route	Boarded route	✓	✓			
FU-040	[Alert] Unloading misrouted items	Planned route	Boarded route	✓	✓			
FU-041	[Alert] Unloading misrouted aggregated items	Planned route	Boarded route	✓	✓			
FU-043	[Alert] Movement of postal item isolated from its aggregation	Aggregated items	Isolated reading of the postal item	✓	✓			
FU-044	[Alert] Customer service deadline alert	Standard service lead time	Item delivery time	✓	✓			
FU-045	[Alert] of the time the postal item exceeds the targeted processing time	Standard processing time	Processing time spent	✓	✓			

2.6. Postal operations process flow

Business processes of the current situation (AS-IS)

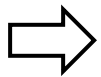
The design of this process monitoring solution is based on the main postal operations of Correios Brasil. This section details the current postal operations carried out in Correios Brasil as listed:

- AS-IS Posting Item at Post Office
- AS-IS Sorting Item at Post Office
- AS-IS Shipping at Post Office
- AS-IS Inbound on Distribution Center
- AS-IS Large customer posting
- AS-IS Sorting on Distribution Center

- AS-IS Shipping at Distribution Center (LTN and LTR)
- AS-IS Sorting for postman route
- AS-IS Shipping postman vehicle

To represent the business processes of the current postal operations of Correios Brasil, the techniques and notations of BPMN 2.0 (Business Process Model and Notation) were used.

However, to highlight the physical movements of postal items (which is relevant to the scope of this QMS project), two new symbols have been added:



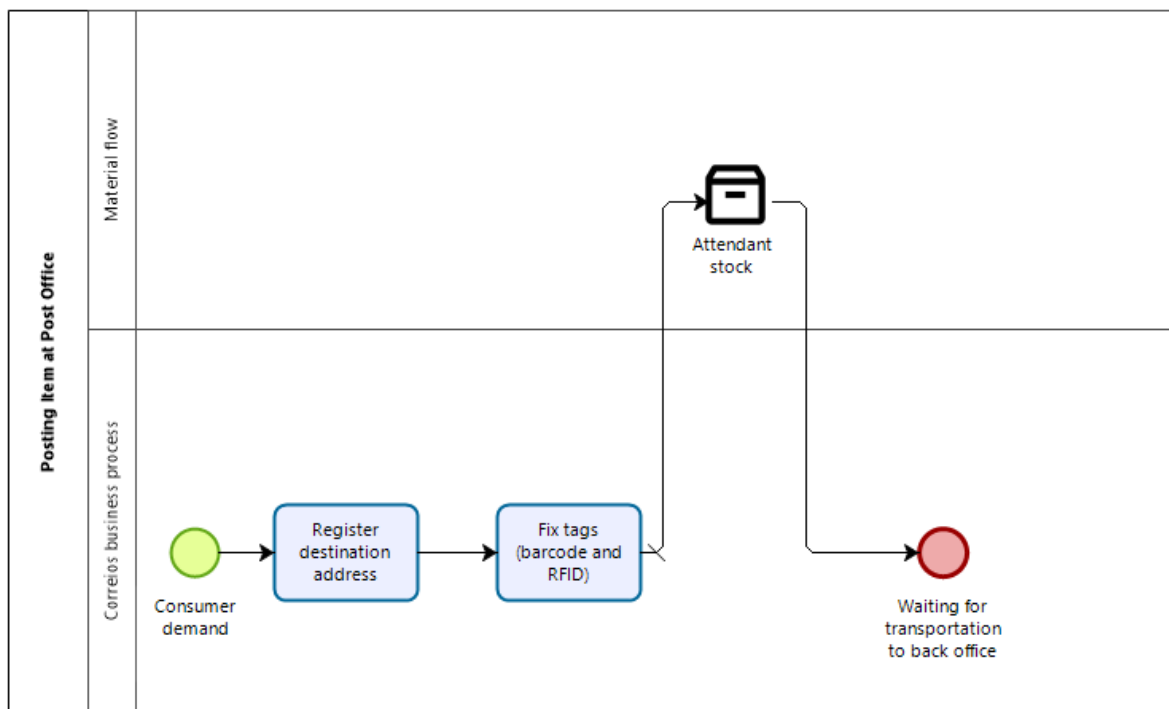
Represents a physical movement of postal items, regardless of the number of items and the means of transport.



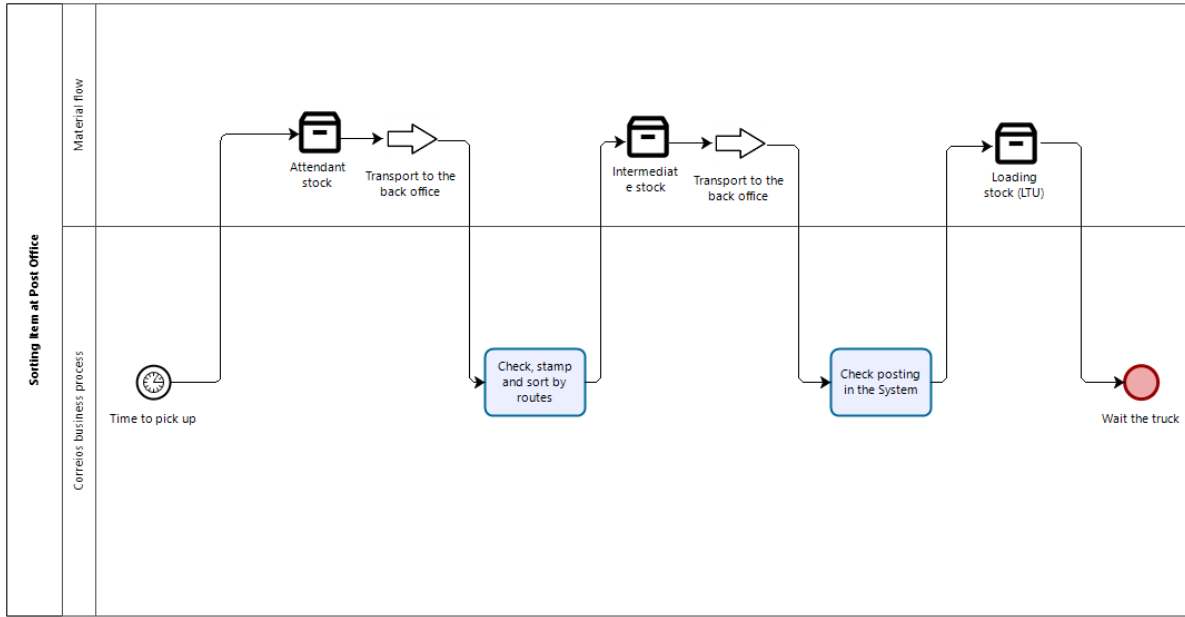
Represents temporary stock, regardless of its size or type of container.

The business processes presented below were mapped at CTE (Parcel Treatment Center) and the central post office, both in Brasília.

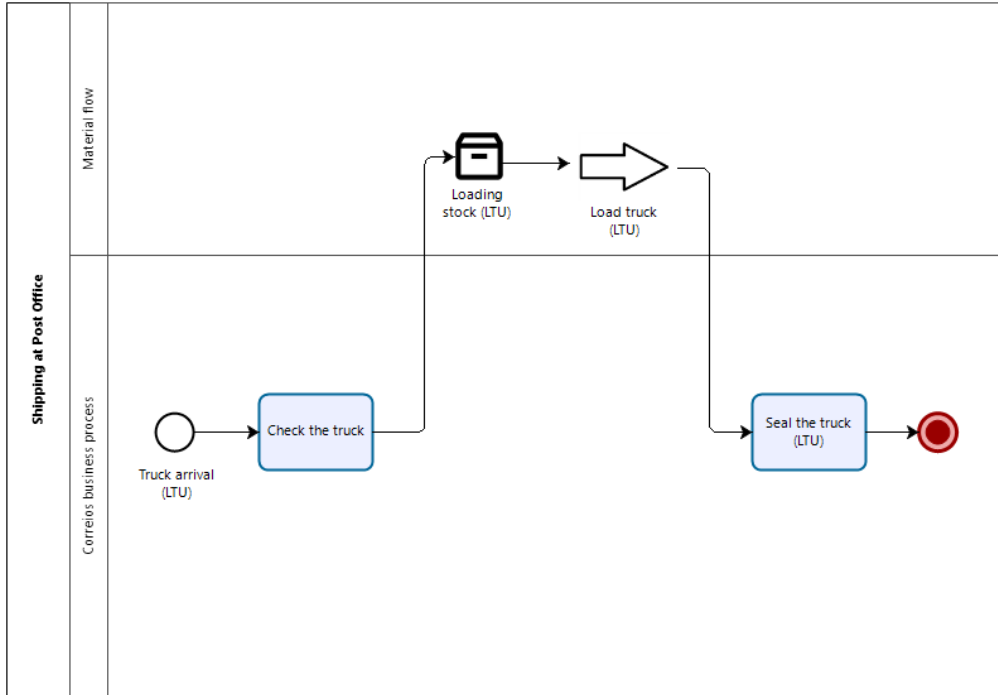
AS-IS Posting Item at Post Office



AS-IS Sorting Item at Post Office

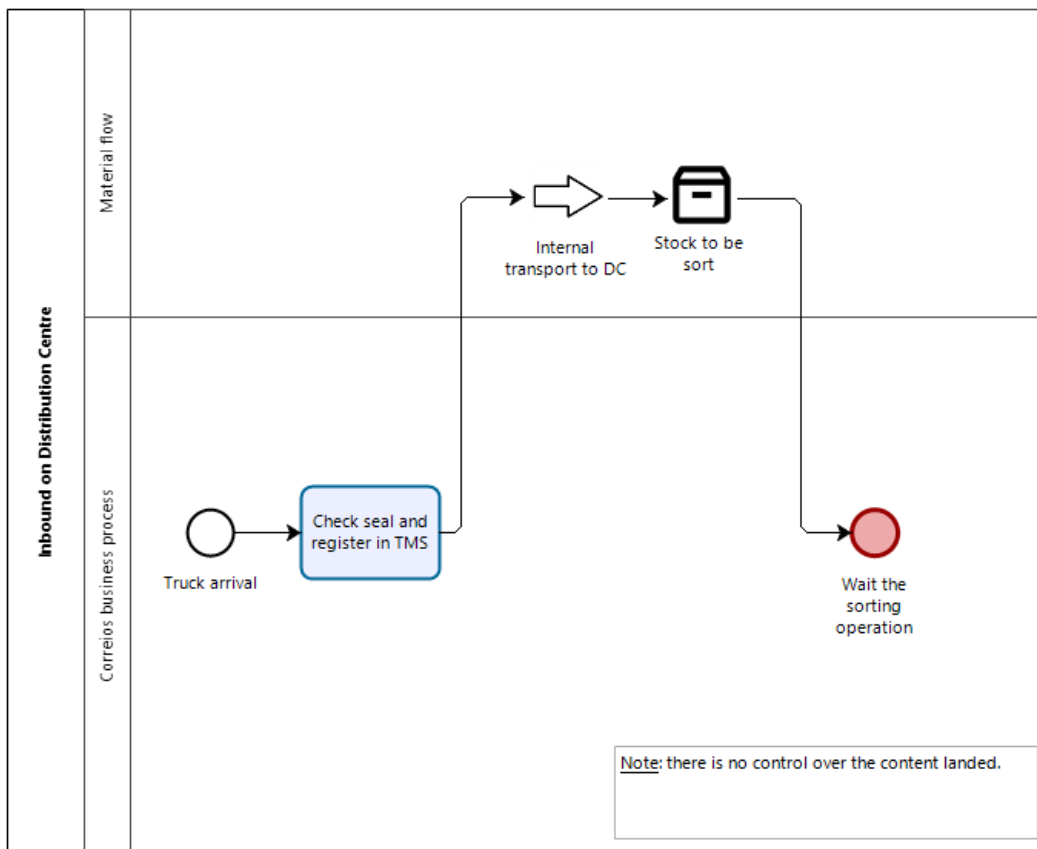


AS-IS Shipping at Post Office



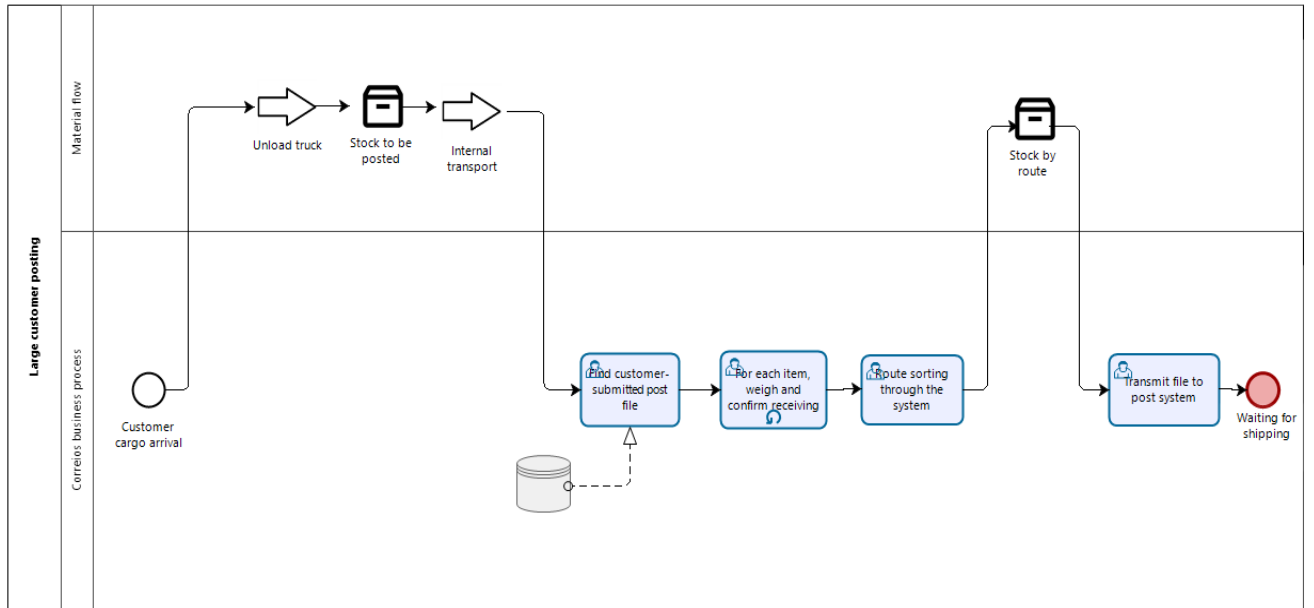
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AS-IS Inbound on Distribution Centre

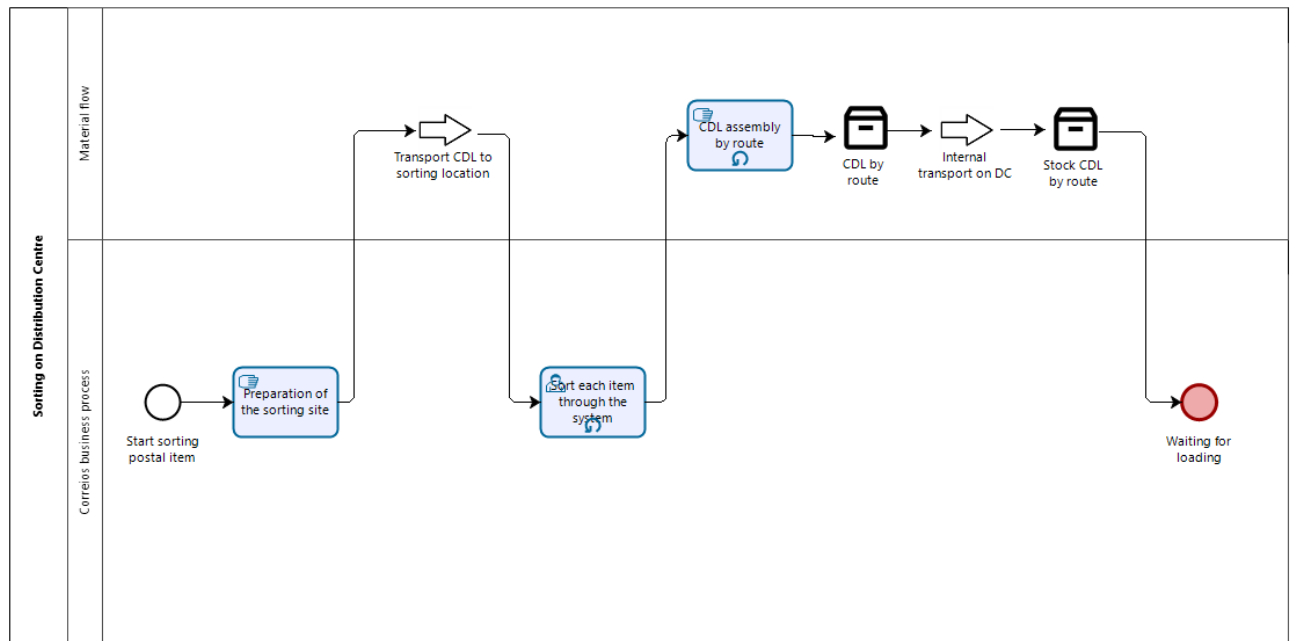


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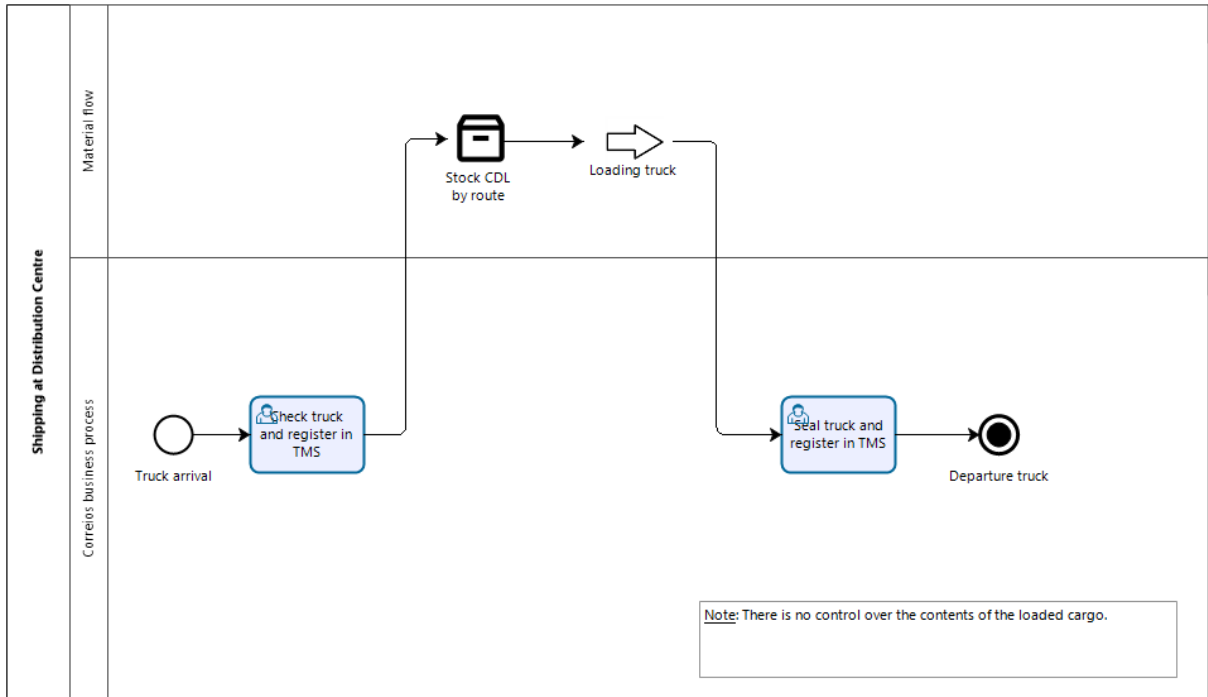
AS-IS Large customer posting



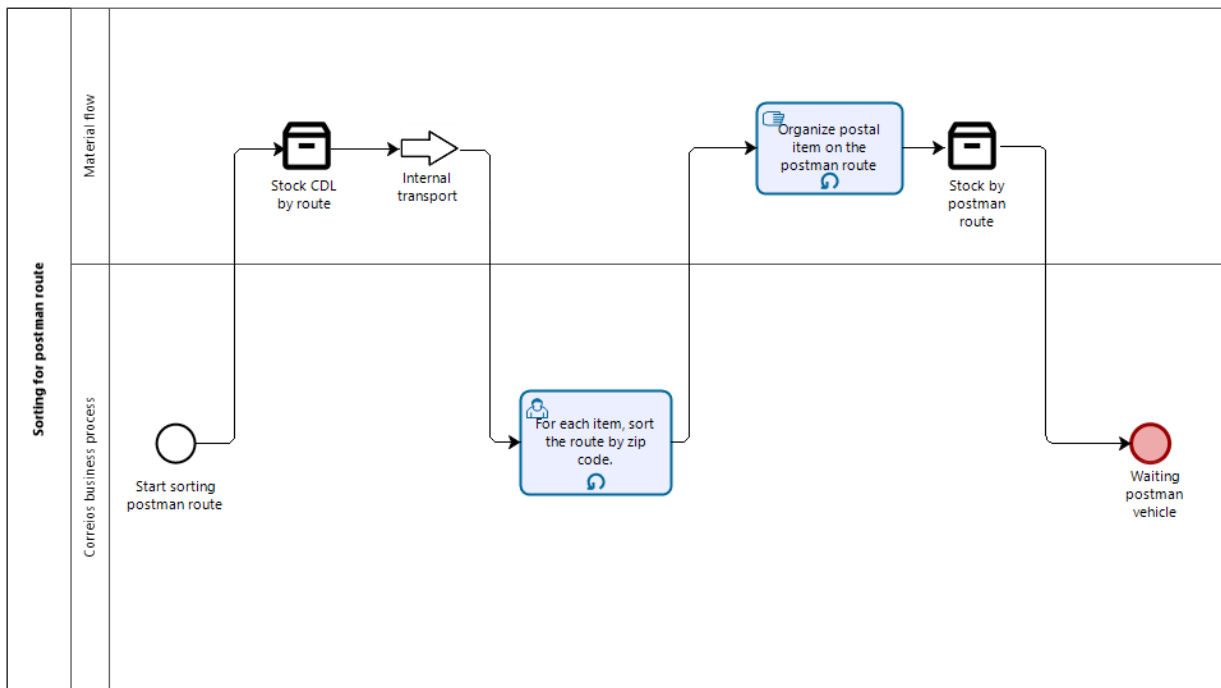
AS-IS Sorting on Distribution Centre



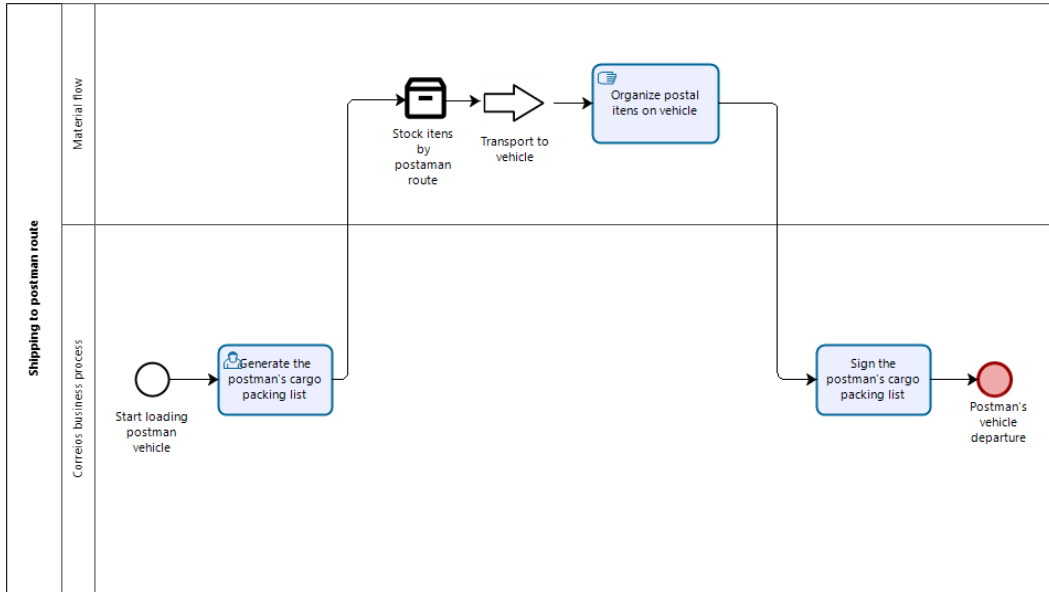
AS-IS Shipping at Distribution Centre (LTN and LTR)



AS-IS Sorting for postman route



AS-IS Shipping postman vehicle

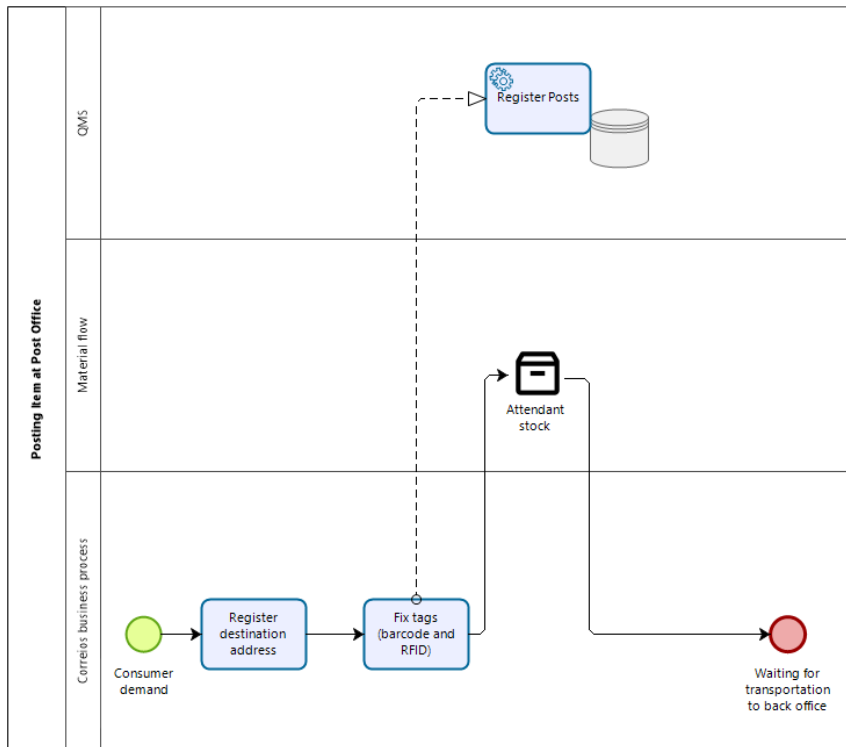


Business processes after designing the proposed solution (TO-BE)

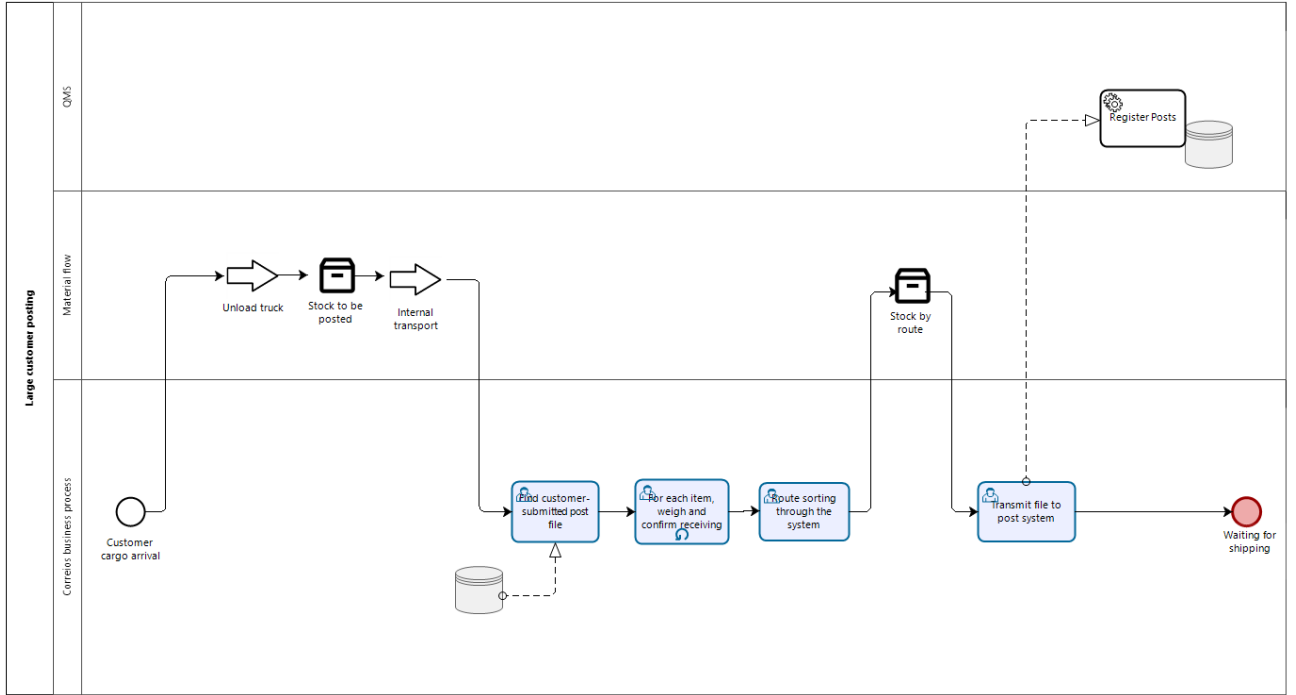
Business processes have undergone little change with the new design of the solution since it relied more on interfaces and automatic data capture.

The new activities included in these processes are represented with a green background.

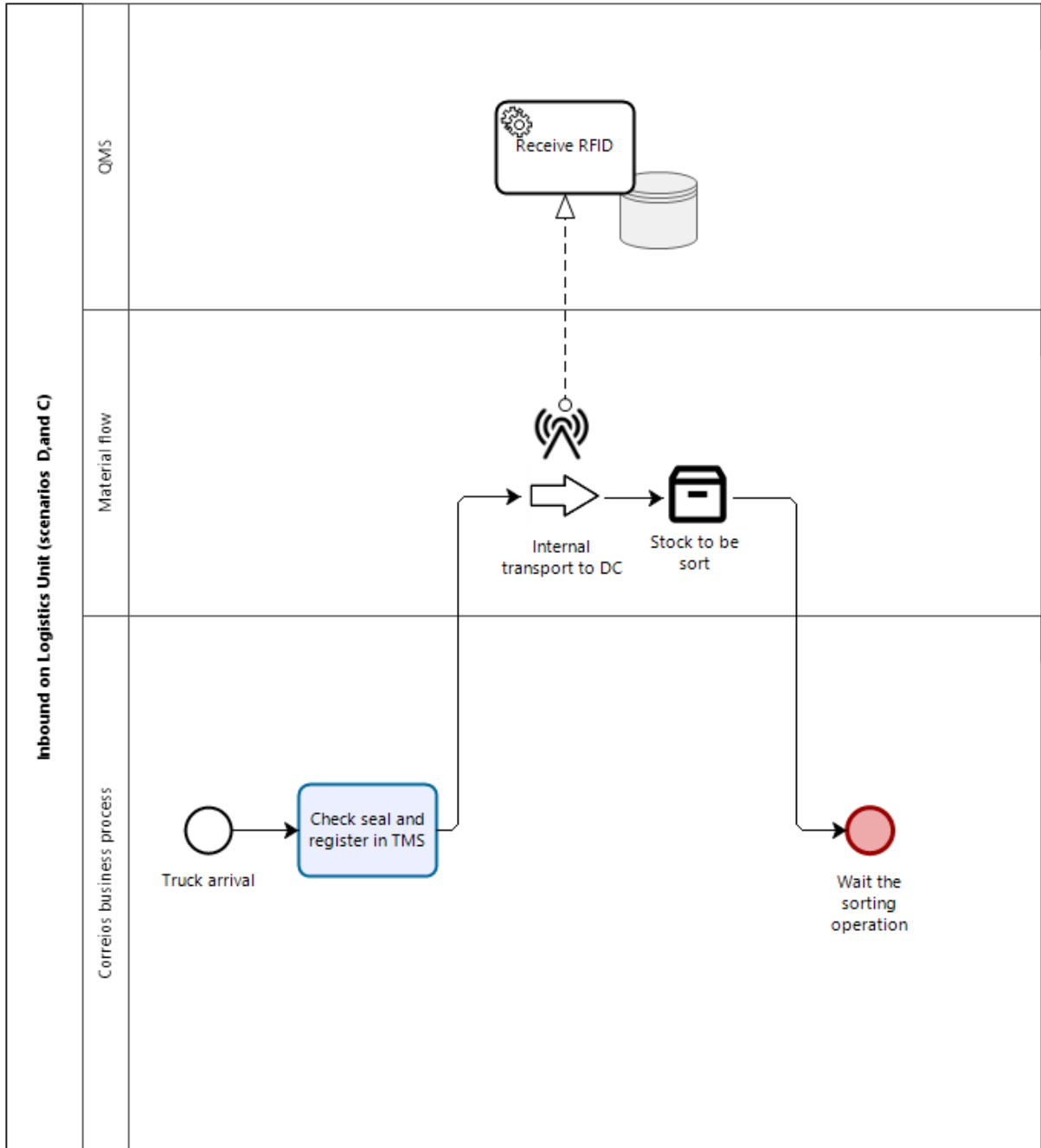
TO-BE Posting Item at Post Office



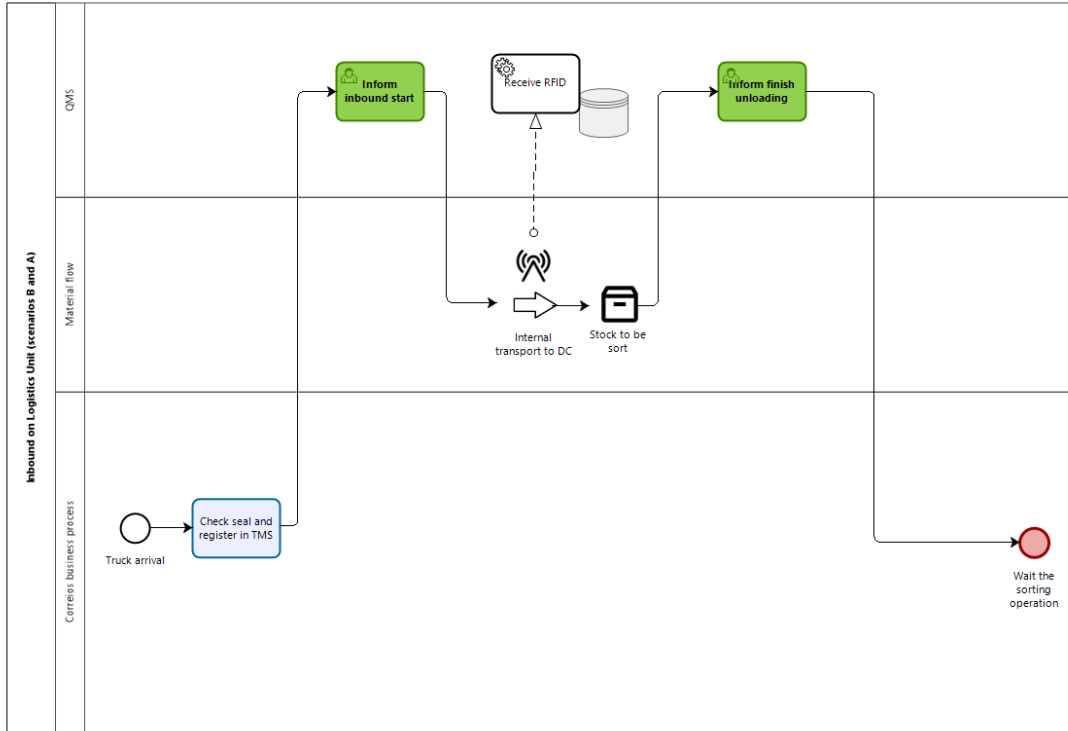
TO-BE Large customer posting v01



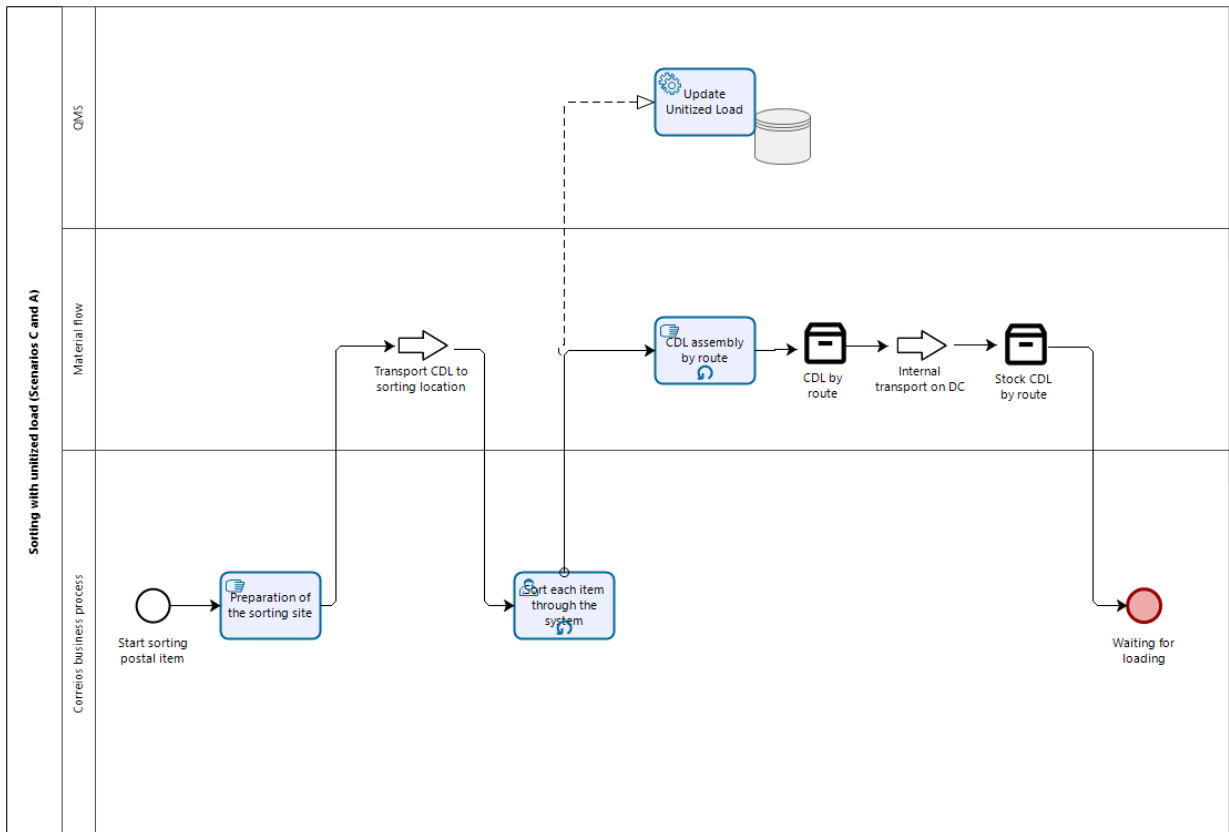
TO-BE Inbound on Location (scenarios D and C)



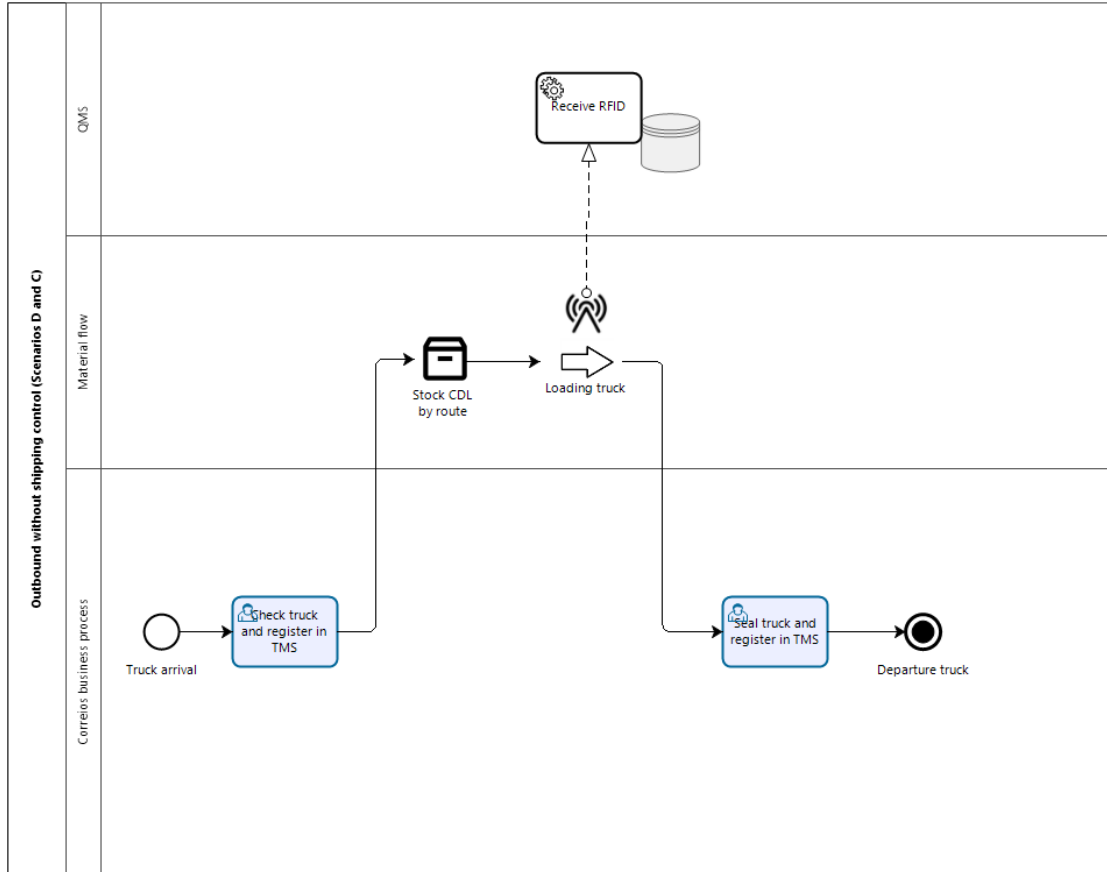
TO-BE Inbound on Location (scenarios B and A)



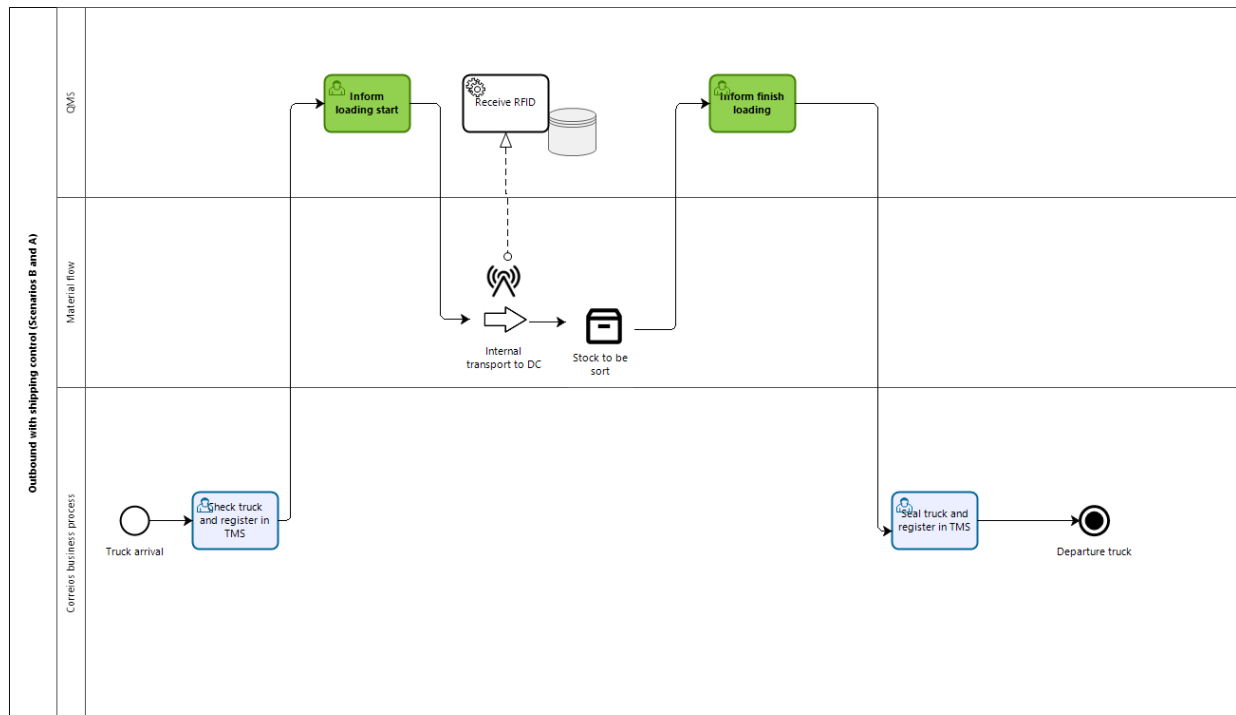
TO-BE Sorting with Aggregated items (Scenarios C and A)



TO-BE Outbound without shipping control (Scenarios D and C)



TO-BE Outbound with shipping control (Scenarios B and A)



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3 Quality reporting requirements

3.1. Introduction

Objective: The quality reporting module aims to provide useful information to assess the performance of operations to targets and quality standards; providing comparisons between periods and objects of analysis; and trend assessments. Its great benefit is to equip executives with the identification of improvement focus to achieve quality goals.

Preliminary technical aspects: The requirements presented in this document are strictly functional (business need). It is noted that these requirements will be supported by a Business Intelligent tool, which infrastructure requirements are specified in a set of non-functional requirements.

3.2. Configuration of the quality reporting parameters

This section defines the business rules that are used to calculate the reports. It include the functionalities needed to configure those parameters.

Premises:

- Reports may be requested on demand but the data will be validated on a daily basis (not in real-time), so only the data captured until the previous day is used to calculate the reports;
- First reading of an item in a particular facility, is the one that corresponds to the first time-stamp registered in the QMS control board in a particular facility. The source of the registration in the control board may be RFID, barcode, or manual. In case of registrations done using RFID, the first capture is considered as the first reading;
- Last reading of an item in a particular facility, is the one that corresponds to the last time-stamp registered in the QMS control board in a particular facility, and followed by a time-stamp registered in a different facility. The source of the registration in the control board may be RFID, barcode,

or manual. In case of registrations done using RFID, the last capture is considered as the last reading.

Free process reporting

Other reports rather than the high level described in this document may be created on demand. This requirement defines how those reports are customized.

FU-052	<p><u>Filters:</u></p> <ul style="list-style-type: none"> - Reports between specific postal control points in the same location; - Reports of aggregated data from city to city (includes several locations); - Reports of aggregated data between regions.
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Transport time between facilities

FU-053	<p><u>Parameters:</u></p> <ul style="list-style-type: none"> - Location ID; - Processing times; - Working schedule; - Non-working days.
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3.3. Reports

On-time Delivery Index

This index is currently used in Correios Brasil, under the name IEP (Índice de Entrega no Prazo).

FU-054	<p><u>Objective:</u> Assess the main commitment to customers: on-time delivery. This index is an evaluation tool for all sectors participate, even partially, to logistics delivery chain.</p> <p><u>KPI:</u> This index is a percentage that is based on a weighted average of all items that were delivered within the agreed term. Therefore, the KPI is calculated as the sum of the items delivered within the terms multiplied their weight, divided by the sum of all items multiplied their weight.</p> <p><u>Main data sources:</u> The main sources of data are QMS transactional tables:</p> <ul style="list-style-type: none"> - Postal Item: including the deadline scheduled for delivery of the postal item; - Postal Item traceability: (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table, including the final delivery to the customer; - Service type parameters: (to provide weight for this indicator). <p><u>Filters:</u></p> <ul style="list-style-type: none"> - Type of Services; - Customer Type / Market; - Adm. Region (Logistics); - Logistics Unit; - Month;
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	<ul style="list-style-type: none"> - Day; - Origin City; - Destination city. - Include other parameters included in global configuration (ZIP code, geo-loc., etc). <p><u>Graphics:</u></p> <ul style="list-style-type: none"> - Day by day with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> - Day by day of the same data filtered with the period of the current and previous year; - Day by day of the same filtered data compared to other similar logistical units.
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Distribution of times

FU-055	<p><u>Objective:</u> Identify the elapsed in each process of the segments of the pipeline</p> <p>This report calculates the time between different postal control points, and aggregates them per postal facility.</p> <p>The sum of the elapsed time between the first and last postal control point in the same facility represents the processing time at a particular facility, and it is presented in days.</p> <p>The elapsed time between the last postal control point from the outbound facility and the first postal control point from the inbound facility represents the transporting time, and it is presented in days.</p> <p><u>Parameters:</u></p> <ul style="list-style-type: none"> - Processing times at outbound facility; - Transporting time; - Processing time at inbound facility.
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Quantity of items pending treatment at the end of the day

FU-056	<p><u>Objective:</u> Evaluate the performance of the postal facility and support the planning of the work for the next working day.</p> <p>This indicator considers midnight time as the "end of the day", regardless of the unit's service cutoff time.</p> <p><u>Main data sources:</u> The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> - Postal Item; - Postal Item traceability: Last postal control point where the item was registered (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; - Postal item location control (logistics unit). <p><u>KPI:</u> This indicator is the absolute quantity of items that are at 12pm in the postal facility; regardless of cut-off time of treatment of these items. Example: if a load arrives at the unit at 10pm and the treatment for these items is</p>
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	<p>scheduled for the next day at 9am, these items will be considered pending treatment.</p> <p>Note: It will be considered a treated item, the item that was sorted and shipped to its destination (final destination or another postal facility).</p> <p><u>Filters:</u></p> <ul style="list-style-type: none"> - Type of Services; - Customer Type / Market; - Location; - Route / Transport Line; - Month; - Day. <p><u>Graphics:</u></p> <ul style="list-style-type: none"> - Day by day with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> - Day by day of the same data filtered with the period of the current and previous year; - Day by day of the same filtered data compared to other similar logistical units.
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Quantity of items pending treatment after the unit's treatment cut-off time.

FU-057	<p><u>Objective:</u> Evaluate the performance of the postal facility, against its services standards.</p> <p><u>Main data sources:</u> The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> - Postal Item; - Postal Item traceability: Last postal control point where the item was registered (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; - Postal control point; - Postal facility service standards. <p><u>KPI:</u> This indicator is an absolute quantity of items that were not treated in accordance with the planning of the logistics unit.</p> <p>Although this report is daily, only items that arrived before the window of time allocated to postage (receiving items) and were not processed will be considered as remnant treatment items.</p> <p><u>Filters:</u></p> <ul style="list-style-type: none"> - Type of Services; - Customer Type / Market; - Postal facility; - Route / Transport Line; - Month; - Day.
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	<p><u>Graphics:</u></p> <ul style="list-style-type: none"> – Day by day with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> – Day by day of the same data filtered with the period of the current and previous year; Day by day of the same filtered data compared to other similar logistical units.
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Processing time per location

FU-058	<p><u>Objective:</u> Evaluate the performance of the logistics unit through the average length of stay of postal items on its premises.</p> <p><u>KPI:</u> To calculate the average processing time, all items that left the unit in the specified period will be considered. For these selected postal items, consider the first and last reading of the item in that logistics unit. Note: items that had only one RFID reading in this logistical unit will not be considered for this calculation.</p> <p><u>Main data sources:</u> The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> – Postal Item; – Postal Item traceability: Last postal control point where the item was registered (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; – Postal control point; <p><u>Filters:</u></p> <ul style="list-style-type: none"> – Type of Services; – Customer Type / Market; – Postal facility; – Month; – Day. <p><u>Graphics:</u></p> <ul style="list-style-type: none"> – Day by day with the data resulting from the filters; – Month to month with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> – Day by day of the same data filtered with the period of the current and previous year; – Day by day of the same filtered data compared to other similar logistical units.
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Percentage of items processed in compliance with the service standard of the postal facility

FU-059	<p><u>Objective:</u> This report aims to evaluate the performance in a particular postal facility according to the standard times established for it.</p> <p><u>KPI:</u> It is the relation between the service standard by type of service and the average processing time calculated for this type of service in the KPI "Processing time per location".</p> <p><u>Main data sources:</u> The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> – Postal Item;
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	<ul style="list-style-type: none"> – Postal Item traceability: Last postal control point where the item was registered (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; – Postal control point; – Services standards <p><u>Filters:</u></p> <ul style="list-style-type: none"> – Type of Services; – Postal facility; – Month; – Day. <p><u>Graphics:</u></p> <ul style="list-style-type: none"> – Day by day with the data resulting from the filters; – Month to month with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> – Day by day of the same data filtered with the period of the current and previous year; – Day by day of the same filtered data compared to other similar logistical units.
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Inbound and outbound flux of the logistics unit

FU-060	<p><u>Objective:</u> Evaluate the time of greatest movement of postal items in the logistics unit.</p> <p><u>KPI:</u> Quantity of items entering and leaving each hour. To extract this information, the first and last RFID readings of each item will be considered, excluding items that had only one reading.</p> <p><u>Main data sources:</u> The main sources of data are QMS transactional tables:</p> <ul style="list-style-type: none"> – Postal Item; – Postal Item traceability: Last postal control point where the item was registered (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; – Postal control point; <p><u>Filters:</u></p> <ul style="list-style-type: none"> – Type of Services; – Postal facility; – Day; – Hour. <p><u>Graphics:</u></p> <ul style="list-style-type: none"> – Day by day with the data resulting from the filters; – Month to month with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> – Day by day of the same data filtered with the period of the current and previous year;
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	– Day by day of the same filtered data compared to other similar logistical units.
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Efficiency of RFID readings (read rate)

This report can be generated only for the location with shipping control

FU-061	<p><u>Objective:</u> Evaluate the efficiency of RFID readings in Correios Brasil operations, by location and by postal control points (antenna).</p> <p><u>KPI:</u> For each RFID reading of the unitized load, the QMS should record the amount of tag read and compare it with the number of postal items provided for in this unitized load. The sum of these readings will result in the index by antenna and location.</p> <p><u>Main data sources:</u> The main sources of data are QMS transactional tables:</p> <ul style="list-style-type: none"> – Postal Item: – Postal Item traceability: (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table; – Aggregation of items control. <p><u>Filters:</u></p> <ul style="list-style-type: none"> – Type of Services; – Location / Postal facility; – RFID equipment; – Month; – Day. <p><u>Graphics:</u></p> <ul style="list-style-type: none"> – Month to month with the data resulting from the filters. <p><u>Comparisons:</u></p> <ul style="list-style-type: none"> – Does not apply.
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3.4. KPI summary

Req	Title KPI	Main indicator	Used by			Filters											
			Ag. Post Office Manager	Logistics Unit Manager	Headquarters Executives	Type of Services	Customer Type / Market	Adm. Region (Logistics)	Location	Route / Transport Line	Month	Day	Hour	Origin City	Destination city	ZIP Code	Geo-location
FU-054	On-time Delivery Index	SLA consumer deadline		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
FU-055	Distribution of times	Time between different postal control points		✓	✓	✓		✓									
FU-056	Quantity of items pending treatment at the end of the day	Non treated items	✓	✓	✓	✓	✓		✓	✓	✓	✓					
FU-057	Quantity of items pending treatment after the unit's treatment cut-off time	Non treated items	✓	✓	✓	✓	✓		✓	✓	✓	✓					
FU-058	Processing time per location	Average crossing time	✓	✓	✓	✓	✓		✓		✓	✓					
FU-059	Percentage of items processed in compliance with the service standard of the postal facility	Average crossing time	✓	✓	✓	✓	✓		✓		✓	✓					
FU-060	Inbound and outbound flux of the logistics unit	Items located in the unit		✓	✓	✓			✓			✓	✓				
FU-061	Efficiency of RFID readings (read rate)	Amount of tag read x provided			✓	✓			✓		✓						

Note: This board summarizes only the quality reports. It does not contemplate the requirements of configuration parameters.

4 Postal security management requirements

4.1 Introduction

Objective: This module aims to provide alerts concerning items that need to be identified for security purposes. This module operates closely with operations management module.

Its scope involves activities such as:

- Security alerts in sorting process;
- Security alerts in receiving process.

4.2 Security alerts in sorting process

FU-062	<p><u>Identifying items that are not registered as posted in the system</u></p> <p>The QMS must register an exception if there's an item identified by RFID or manually reading that has not been previously registered in the system, during the posting process. These items should be identified at least with:</p> <ul style="list-style-type: none"> – Postal RFID tag of the item or customer's RFID tag, if he has one; – Tag S10 code; – Time-stamp; – Postal control point ID.
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FU-063	<u>Manual identification of items that need to be inspected.</u>
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	<p>Provide functionality to manually identify items that need to be inspected. This identification can be done in batch, through filters such as:</p> <ul style="list-style-type: none"> – Type of product being dispatched; – Customer (sender); – Recipient; – Destination country; – Weight; – Etc. <p>These items should be identified at least with:</p> <ul style="list-style-type: none"> – Postal RFID tag of the item or customer's RFID tag, if he has one; – Tag S10 code; – Time-stamp; – Postal control point ID.
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FU-064	<p><u>Interface for identifying items that need to be inspected</u> [Interface] The QMS can interface with existing systems that list the items subject to security inspection.</p> <p>These items should be identified at least with:</p> <ul style="list-style-type: none"> – Postal RFID tag of the item or customer's RFID tag, if he has one; – Tag S10 code; – Time-stamp; – Postal control point ID.
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FU-065	<p><u>Alert for item that needs to be inspected</u> Regarding the items identified for inspection, the QMS should generate an alert when it is detected by the RFID readers. If the same item is detected in another location, the alert is transferred to the new location, automatically ending the alert from the previous location.</p> <p>The registration of this type of alert will only be definitively closed when the inspection is carried out.</p>
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4.3 Security alerts in receiving process

FU-066	<p><u>Missing items</u> After the end of the unloading, check if any postal item foreseen in this cargo was not detected by RFID in the unloading and generate a record of this alert.</p>
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FU-067	<p><u>Missing aggregated items</u> Once the unloading is finished, the system should verify that all aggregated items have been unloaded and, otherwise, generate an exception alert (missing or additional unitized loads).</p>
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5 Asset management requirements

Objective: This module aims at the physical control of the equipment to transport postal items; more precisely the control of the location and condition of these equipment.

Its scope involves assets used for transportation purposes; such as:

- Trolley;
- Pallet;
- Roll cage;
- Mail bag;
- Crates;
- Box;
- As well as the parts of the "CDL" like the base, lid and cardboard sleeve.

Note: the economic or accounting control of this equipment is not part of this scope.

Note: metallic assets must be tested with the RFID equipment installed as metal may affect the efficiency of the readers

5.1 Introduction

Concept: Assets: in this document we will use the term "assets" to refer to transport assets, namely all equipment controlled by this module, regardless of whether it is an item of the accounting asset or not.

Initial definitions of the proposed solution

The solution designed for this module is based on the following definitions:

- This module uses the same systematic solution as defined in the global configuration:
 - The same logistical unit hierarchy;
 - The same item movement tables
 - The same RFID tag reading engine.
- The system can use GS1's standards (GRAI (Global Returnable Asset Identifier) and GIAI (Global Individual Asset Identifier)) but should be flexible to use other standards (such defined by ISO or UPU standards) to identify a Transport Assets item.
- The RFID tags will be previously printed in one of the patterns expected by this solution
- The code of a transport asset in QMS is unique and, consequently, the RFID tag cannot be reused in another asset.
- The functionalities proposed here can be performed by microcomputer, but the use of handheld RFID (or barcode) would facilitate in some activities of the control of transport assets.

5.2 Configuration of asset management parameters

The parameters proposed here refer exclusively to the parameters necessary for the operation of the Resource Management Module.

Type of transport asset

FU-068	<p>Create transport asset type table, with at least the following fields:</p> <ul style="list-style-type: none"> – Acronym of the type of asset (free choice up to 5 characters); – Short name of the type of asset; – Expected useful life.
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List of transport asset scrap reasons

FU-069	Previous creation of a list of reasons for scrapping transport assets; by postal operator. This list will allow statistical reports on the use of transport assets.
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5.3 Asset control process

Assets registration

FU-070	<p>Create an assets registration with at least the following data:</p> <ul style="list-style-type: none"> – Type of asset (related to the type table created in the parameter); – Date of acquisition; – Expected start date for use; – Asset manufacturer; – Main manufacturing material; – Predominant color; – Dimensions (W x H x D); – Manufacturer code (if any); – Fixed asset system code (for accounting controlled items) – RFID tag code; – Status of the asset. For this field, one of the following options must necessarily be assigned: <ul style="list-style-type: none"> ○ Active; ○ Inactive (awaiting maintenance); ○ Scrapped. – Conditions of use. For this field, one of the following options must necessarily be assigned: <ul style="list-style-type: none"> ○ Good; ○ Satisfactory; ○ Precarious; ○ Unusable.
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Attach photo of new asset

FU-071	Allow the upload of a photo (one or more) of the asset, mainly for the reason to support any operation of searching the asset in the future.
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Link RFID tag to transport asset by computer

FU-072	<p>This function can start by typing all the data or replicating the data from the last linked item, in cases of registering in large quantities of the same type of asset. The RFID tag can be linked by typing or reading the tag's bar code. When submitting the tag code, QMS should check:</p> <ul style="list-style-type: none"> – If the tag has already been used in another asset (in this case, refuse the link) – If the tag code is within the expected standards; – If this code belongs to the postal operator.
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Link RFID tag to transport asset by RFID handheld

FU-073	This function must have the same logic and check as the previous (FU-072), but being operated by an RFID handheld.
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Asset registration using existing fixed asset system

This process should be used to record events concerning assets that are accounted by fixed asset systems.

Interface: Loading of assets controlled by the fixed asset system.

FU-074	An asset data entry interface should be developed. In this up-loading, the QMS must prevent duplicate records, with the same fixed asset system code.
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Link RFID tag to fixed asset by computer.

FU-075	<p>This function starts with calling the fixed asset code. The operator must then check and supplement the data.</p> <p>The RFID tag can then be linked by typing or reading the tag's barcode. When submitting the tag code, QMS should also check:</p> <ul style="list-style-type: none"> - If the tag has already been used in another resource (in this case, refuse the link) - If the code of the label is within the expected standards; - If this code belongs to the postal operator. <p>Link other parts of the asset (when the body has several components)</p>
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Link RFID tag to fixed asset by handheld.

FU-076	This function must have the same logic and check as the previous (FU-075), but being operated by an RFID handheld.
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RFID tag replacement

The replacement of the RFID tag is foreseen for situations of loss or damage of the RFID tag. This functionality maintains the logic of tag linking and adds the cancellation of the previous tag.

RFID tag replacement by computer

FU-077	<p>This function starts with the search for the transport asset to be linked, which can be done as follows:</p> <ul style="list-style-type: none"> - Informing the code of the old RFID tag (when known); - Informing the asset number in the fixed asset system; - Or by selecting the transport asset by query (with filters) as assets not moved for more than "X" days. <p>Include maybe other queries such as</p> <ul style="list-style-type: none"> - Type of asset; - Used X day; - Used in the route from X location to X location; - Used to carry X service; - Is a component of X body; - More than 1 filter can be applied.
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	Once the transport asset to be linked is selected, this function must perform the same checks as an initial link, plus the cancellation of the old RFID tag. The old tag cannot be reused in QMS.
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RFID tag replacement by RFID handheld

FU-078	It will have the same logic as the function (FU-077).
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Asset scrapping

The asset scrap function can be used in situations such as:

- Loss of assets;
- Transport asset without conditions of use (unusable).

The scrapping of an asset in QMS may occur before (and independently) of its scrapping in the fixed asset system.

Asset scrapping by computer

FU-079	<p>This function starts with the search for the asset to be scrapped, which can be done as follows:</p> <ul style="list-style-type: none"> – Informing the code of the old RFID tag (when known); – Informing the asset number in the fixed asset system; – Or by selecting the transport asset by query (with filters) as assets not moved for more than "X" days. Use same filters as FU-077 <p>Once the asset is selected, this function must:</p> <ul style="list-style-type: none"> – Asks for the reason for scrapping (according to FU-069); – Cancel the old RFID tag.
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Asset scrapping by RFID handheld

FU-080	It will have the same logic as the function (FU-079).
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Attach photo of scrapped asset

FU-081	Allow the upload of a photo (one or more) of the asset, mainly for the reason of "unusable".
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Maintenance of asset data.

Updating the registration data of assets is not mandatory, mainly due to the operational difficulty of this update. However, update functions should be developed to, whenever possible, inform the QMS of the conditions of use of the asset.

Updating asset data by computer

FU-082	<p>This function starts with the search for the asset, which can be done as follows:</p> <ul style="list-style-type: none"> – Informing the code of the RFID tag (when known); – Informing the asset number in the fixed asset system; – Or by selecting the asset by query (with filters).
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	<p>After selecting the asset, this function will allow updating data such as:</p> <ul style="list-style-type: none"> - Type of asset (related to the type table created in the parameter); - Date of acquisition; - Expected start date for use; - Asset manufacturer; - Main manufacturing material; - Predominant color; - Dimensions (W x H x D); - Manufacturer code (if any); - Status of the asset. For this field, one of the following options must necessarily be assigned: <ul style="list-style-type: none"> o Active; o Inactive (awaiting maintenance). - Conditions of Use. For this field, one of the following options must necessarily be assigned: <ul style="list-style-type: none"> o Good; o Satisfactory; o Precarious; o Unusable. <p><u>Note:</u> This function will not allow changing the following data:</p> <ul style="list-style-type: none"> - Status of the asset to "Scrapped". Scrap status can only be registered by the specific scrap function; - Fixed asset system code (for accounting controlled items); - RFID tag code. <p>For security reasons, these two codes can only be informed by interface or initial registration of the asset, followed by the RFID tag linking function.</p>
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Updating asset data by RFID handheld

FU-083	<p>This function can be used to update the conditions of use, clicking on the box concerning:</p> <ul style="list-style-type: none"> - Good; - Satisfactory; - Precarious; - Unusable.
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5.4 Asset control reports

List of assets by logistical unit

FU-084	Create a query for assets by logistical unit, subclassified by type of asset; previous logistical unit, date / time and postal control point of the last RFID reading.
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Assets not moved in the logistics unit for more than "X" days

FU-085	<p>Create query of assets not moved by period of days to be informed by the user.</p> <p>This query can be subclassified by type of asset, status, conditions of use, date / time and postal control point of last reading.</p> <p>QMS should create an alert (exception) for this register.</p>
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Calculation of the useful life of asset types

FU-086	<p>Calculate the average useful life of the types of assets, subtotaled by manufacturer.</p> <p>This calculation will be based on the estimated starting date of use of each asset and its scrapping date.</p> <p>Also inform the confidence level of the calculation according to the size of the data sample and the total of this type of asset registered in the QMS.</p>
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Quantity of assets scrapped by reason

FU-087	<p>Create query informing the quantity of assets scrapped by reason. This quantity should also be subtotaled by:</p> <ul style="list-style-type: none"> - Reason - Type of asset; - Effective useful life; - Manufacturer; - Selected time period.
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Assets detected and not registered in QMS

FU-088	<p>This function should list the RFID tags that have been detected by the RFID equipment and that are not active in the QMS systems.</p> <p>These tags can be from the postal operator itself or from third parties (customer or suppliers)</p>
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Traceability of assets by postal control points

FU-089	The QMS will provide a report with the traceability of the assets. This report considers only the information from the RFID readings.
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Inbound and outbound flux of assets per location

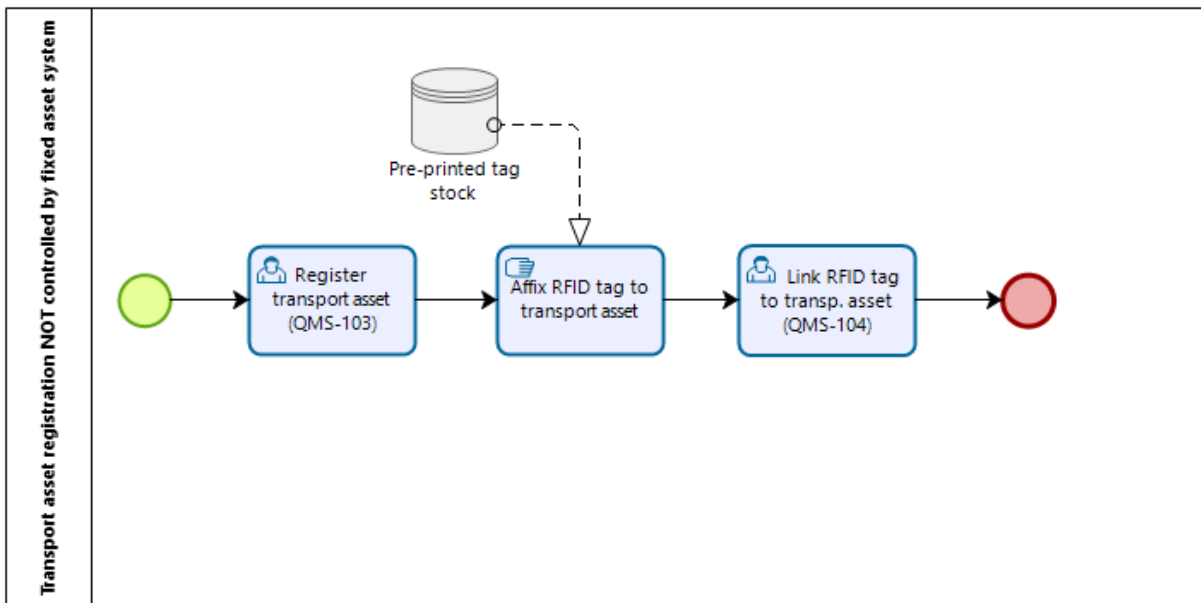
FU-090	<p>Evaluate the time of greatest movement of assets in the logistics unit.</p> <p><u>KPI</u>: Quantity of assets entering and leaving each day. Number of assets in and out at the end of the day.</p>
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5.5 Mapping of asset control process

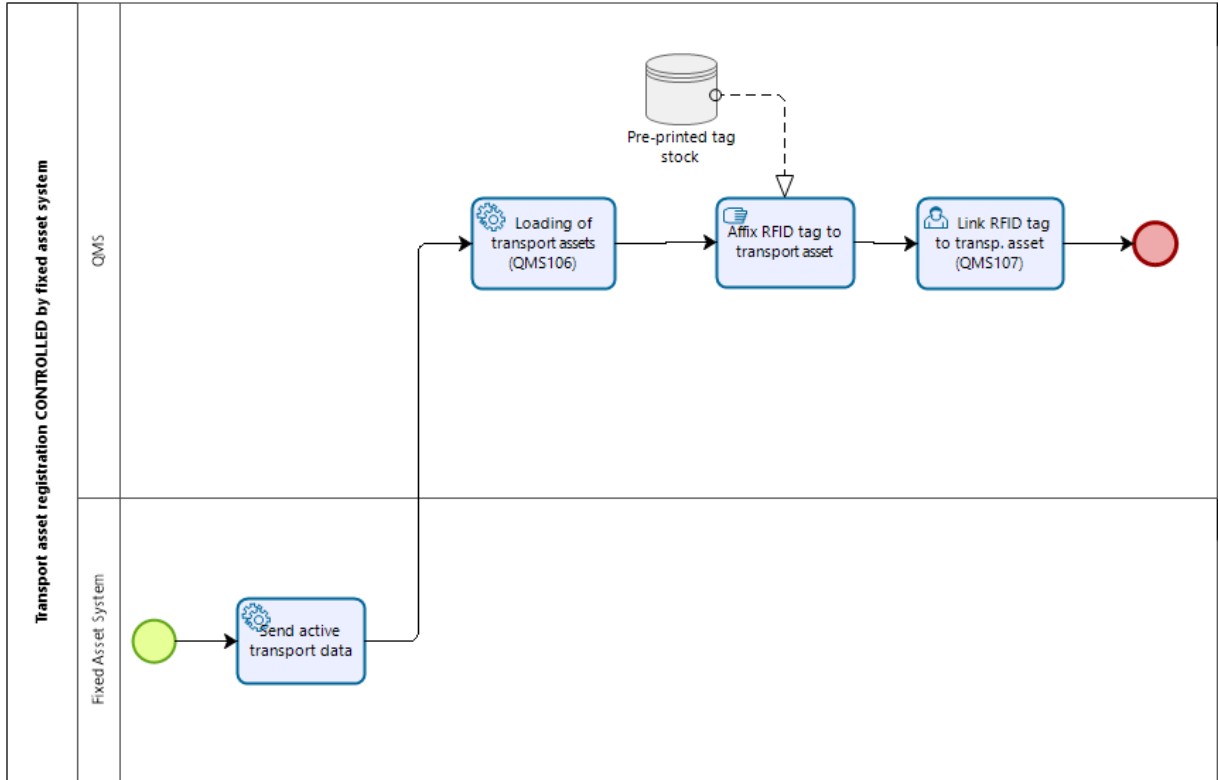
As Correios Brasil has not yet implemented transport asset control processes, we will present below only the process proposals resulting from this solution.

TO BE - Transport asset control processes

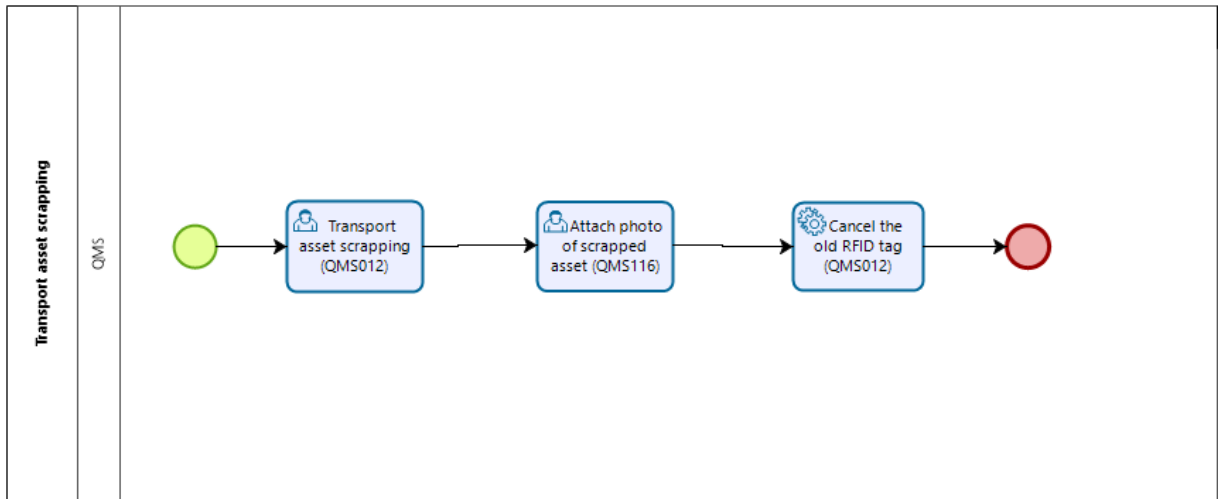
TO-BE Transport asset registration NOT controlled by fixed asset



TO-BE Transport asset registration controlled by Fixed Asset System



TO-BE Transport asset scrapping



6 Sales and customer service management requirements

6.1 Introduction

Objective: This module aims to provide relevant data to sales operations adding value to their activities, enhancing the engagement of the potential customers.

Additionally, this module aims to provide relevant data to customer service operation adding value to their activities, enhancing customer experience to retain existing customers.

Its scope involves activities such as:

- Reports to support sales operations;
 - Monitor customer postal traffic (volume trends per customer);
 - Discovery service of customers using RFID;
 - Contract compliance (to verify compliance with traffic threshold, revenue protection).
- Customer services;
 - Traceability by existing systems.

6.2 Reports to support sales operations

Promotion of the use of RFID may be done through retaining existing customers or identifying potential customers. The data provided in the following reports will support commercial activities.

Customer's mail volume

FU-091	<p>Objective: Create trends and identify up and down peaks to support sales.</p> <p>KPI: Quantity of items posted (with RFID or barcode).</p> <p>Main data sources: The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> – Customer ID; – Postal item control boards; – Existing customer posting system. <p>Filters:</p> <ul style="list-style-type: none"> – Customer; – Type of Services; – Items posted with customer's RFID; – Date (week/month/year). <p>Graphics:</p> <ul style="list-style-type: none"> – Week to week with the data resulting from the filters; – Month to month with the data resulting from the filters; – Year to year with the data resulting from the filters. <p>Comparisons:</p> <ul style="list-style-type: none"> – With previous months or years; – Compare total evolution of posted items versus posted items with the customer's RFID tag.
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Quantity of customer RFID tag without corresponding post

FU-092	<p>Objective: Check opportunities to expand the use of RFID by identifying new potential customers.</p>
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	<p><u>KPI</u>: Quantity RFID tag without corresponding post. The QMS should quantify the RFID tags in the GS1 standard that were identified in DO's premises and that do not have an associated postal code. This amount must be subtotaled by company code registered with the GS1 organization.</p> <p><u>Main data sources</u>: The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> - Postal Item; - Postal Item traceability: (which will be fed by RFID readings and interfaces). It is worth remembering that every event regarding the movement of the postal item will be recorded in this table. <p><u>Filters</u>:</p> <ul style="list-style-type: none"> - Type of Services; - Customer Type / Market; - Month. <p><u>Graphics</u>:</p> <ul style="list-style-type: none"> - Month to month with the data resulting from the filters <p><u>Comparisons</u>:</p> <ul style="list-style-type: none"> - With previous months or years;
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Revenue protection monitoring

FU-093	<p><u>Objective</u>: Monitor that the number of processed items are aligned with the agreements with handling agents and customers.</p> <p><u>KPI</u>: Quantity items posted per type of service (with RFID or barcode).</p> <p><u>Main data sources</u>: The main sources of data are QMS control boards:</p> <ul style="list-style-type: none"> - Customer ID; - SLA defined in global configuration module; - Postal item control boards; - Existing customer posting system. <p><u>Filters</u>:</p> <ul style="list-style-type: none"> - Customer; - Type of Services; - Handling agent; - Date (week/month/year). <p><u>Graphics</u>:</p> <ul style="list-style-type: none"> - Month to month with the data resulting from the filters, including level of SLA; - Year to year with the data resulting from the filters, including level of SLA.
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6.3 Reports to support customer services

QMS can add value to customer services activities by providing information concerning real time location of items. In scenarios where the post already has a tracking system for this purpose, QMS may push its registrations to the existing system. In scenarios where the post doesn't have a tracking system in place, QMS can provide this information to customer service officers.

Traceability of postal items by location in real time

FU-094	<p>The QMS must provide a report, informing the traceability of the postal item by location, without considering the internal movements in the unit. This on-screen report should also consider item location information from interfaces or automatic location adjustments.</p> <p>It should provide at least the following information:</p> <ul style="list-style-type: none"> – RFID tag; – Item code at the postal operator; – Postal service; – Timestamp and information source of the first reading by logistical unit (first registration in the facility); – Timestamp and information source of the last reading by logistical unit (last registration in the facility).
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Traceability of postal items by location

FU-095	<p>This report should consider only the first and last event of the postal item in each logistics unit; maintaining the same fields of complete traceability; that is:</p> <ul style="list-style-type: none"> – RFID tag; – item code at the postal operator (S10); – Postal service; – Postal control point; – Type of postal operation (postage; sorting; internal movement; shipping; manual or automatic movement correction); – Source of information (RFID; SARA; customer system, etc.); – Aggregated items tag (if moved by aggregation of items); – Timestamp of registration of the movement or treatment.
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Traceability of postal items by location by existing systems in real time

FU-096	<p>[Interface] The QMS must push the data reported in FU-094 and FU-095 to the existing system through an API that converts the information to the format requested by the tracking system.</p>
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7 Architecture and non-functional requirements

7.1 QMS architecture

The development of the Quality Management System (QMS) should be carried out on a development platform already built, with the following characteristics:

- It is a multi-layered architecture. Multilayers can be divided into three basic layers of the MVC pattern (Model, View, and Controllers). Three layers are considered, as they are distributed in three different locations: client machine, remote server, and database layer.
- The communication of the vision layer with the controllers occurs through the Application Programming Interface, which must follow the complete REST convention.

Programming languages

Programming languages have been established for two distinct architectural modules:

The first module is the set of APIs (back-end) with development in component and service architecture, following standards and conventions of the REST specification, using the Correios Brasil development platform, in Java with Spring boot.

The second module is the user interface system, also using the Correios Brasil development platform, with PHP development with Tonic.

Data repository

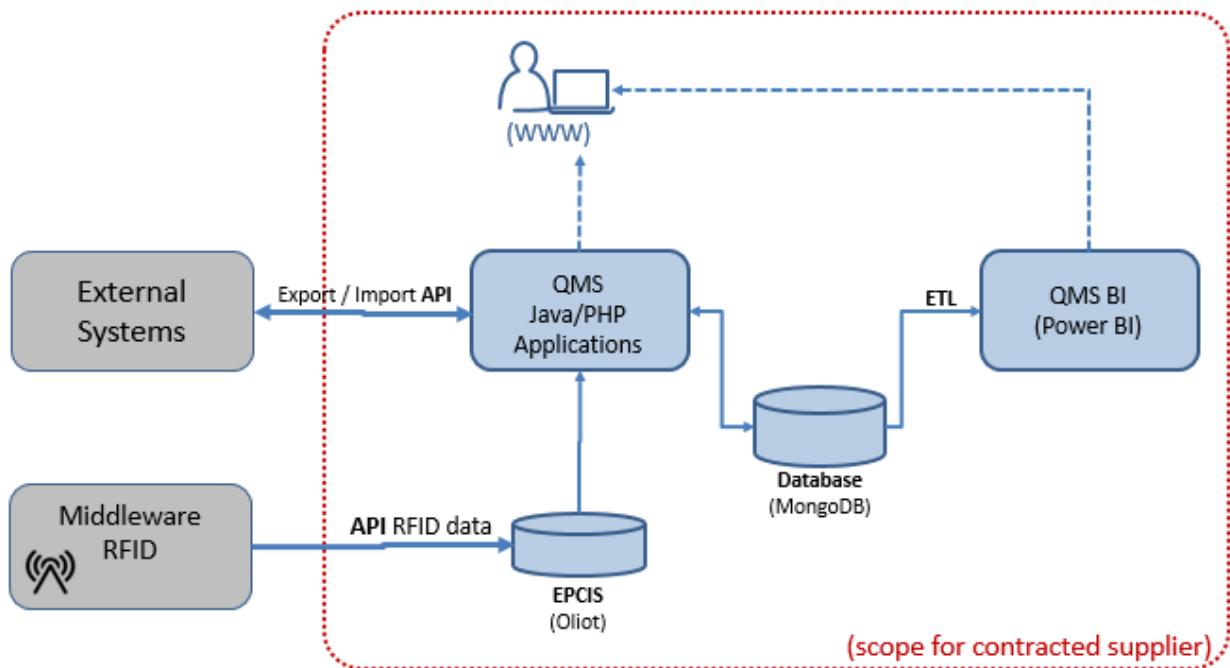
This project uses the data exchange and storage pattern called Electronic Product Code Information Services - EPCIS, for the storage and transmission of data captured by radio frequency antennas. The software that implemented the EPCIS pattern and that was used in this architecture is Oliot EPCIS.

The NoSQL database called MongoDB is used as the data repository.

BI Solution

The analytical and business intelligence reports should be developed in the Power-BI Pro solution.

Diagram of the architecture main elements



7.2 Non-functional requirements

In addition to working on the architecture described above, the development of each functional requirement must also meet the following non-functional requirements, when applicable.

Code convention

NF-001	The practices of Java Code Conventions or PHP pattern recommendation (PSR1 and PSR2) must be followed.
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"Responsive" user interface technique

NF-002	Developments should use the "responsive" user interface technique, to facilitate use on other mobile devices.
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“Mobile First” development approach

NF-003	Developments should use the “Mobile First” development approach, to facilitate use on other mobile devices.
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Data export to Microsoft Excel

NF-004	The QMS should provide data export to Microsoft Excel, in their reports.
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Online queries printing

NF-005	Online queries should also provide the option of printing.
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Security and access control

NF-006	The security and access control of QMS, including authentication and authorization, will be carried out through Active Directory used by Correios Brasil. Authentication will be based on (user + password).
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Access audit trail

NF-007	Audit trails should be generated for all accesses.
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Data editing audit trail

NF-008	For relevant data, an audit trail to edit these data should be generated.
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Multi-language user interface

NF-009	All user interfaces, screens or reports, must be configured to display the language selected by the user. This flexibility should use "terms" or "messages" as variables, which will be filled in according to the selected language.
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NF-009.1	QMS system ready for use in English language, using the features defined in NF-009 requirement.
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NF-009.2	QMS system ready for use in French language, using the features defined in NF-009 requirement.
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NF-009.3	QMS system ready for use in Portuguese language, using the features defined in NF-009 requirement.
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Screens online help

NF-010	The screens should have an online help command, allowing search for help on various QMS functionalities.
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Online help for data field

NF-011	The relevant data registration fields must have an online help command to fill in the correct data.
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Multiple time zones

NF-012	The QMS should be able to handle multiple time zones, and ordering the time display of these events in the user's time zone.
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Special accessibility

NF-013	The QMS should implement web accessibility following the WCAG (Web Content Accessibility Guidelines) pattern, in its latest version.
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User interface browser

NF-014	<p>QMS should be able to perform correctly in the following browsers:</p> <ul style="list-style-type: none"> - Internet Explorer 11 and later versions; - Firefox 48 on the 32bits platform; - Firefox ERS (Extended Support Release) in the latest version; - Microsoft Edge; - Google Chrome;
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Performance for high volumes of data and access

NF-015	<p>The QMS must be developed with appropriate techniques to support, with good performance, high volumes of data and access. As a reference, we present below the volume of Correios Brasil.</p> <p>Although the performance depends on several IT components, the maximum time target for presenting a web query, for the QMS operating on the Correios Brasil IT infrastructure, is 3 seconds.</p>
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Estimated volume for the QMS of Correios Brasil

Parameters	1st year	2nd year	3rd year	4th year	5th year
The estimated quantity of named users	324	1584	1584	1584	1584
The estimated quantity of simultaneous users	162	792	792	792	792
The estimated quantity of Ag Correios	0	0	0	0	0
The estimated quantity of Sorting Centers / Distrib.	54	264	264	264	264
Planned quantity of antennas	1000	2000	2000	2000	2000
The estimated quantity of new postal items per month	50.000.000	200.000.000	330.000.000	360.000.000	400.000.000
Number of events per postal item (QMS and other systems)	10	11	11	11	11
Calculated Qty of Transactions per Month (RFID + Interf)	500.000.000	2.200.000.000	3.630.000.000	3.960.000.000	4.400.000.000
The estimated quantity of stored records (in 1,000,000,000)	6,0E+9	32,4E+9	76,0E+9	123,5E+9	176,3E+9

8 Interface inventory

8.1 Introduction

In order to facilitate the understanding of the solution and consequently the dimensioning of the efforts required for its development, this document presents, in a synthetic way, the interfaces provided for in the QMS project, with its characteristics initially designed. These characteristics can be changed or improved during the project.

The functional details of each interface are described in the functional requirements of each module, in which the interface belongs

ID Req.	Origin Sys.	Destination Sys.	Title	Technology	Interface Type	Frequency	Module
FU-004	Others	QMS	Automatic configuration of the location	File System	Batch	On demand	A. Global configuration
FU-006	Others	QMS	Automatic configuration of the postal control point	File System	Batch	On demand	A. Global configuration
FU-008	NMS	QMS	RFID readers inventory synchronization	File System	Batch	Daily	A. Global configuration
FU-014	PTS	QMS	Service standards interface	Web Service	Batch	Daily	A. Global configuration
FU-024	CPS	QMS	Posting Item Interface	Web Service	Real-time	On demand	B. Operations management
FU-026	SAS	QMS	Sorting check interface	Web Service	Real-time	On demand	B. Operations management
FU-027	SAS	QMS	Assembly of aggregated items	Web Service	Real-time	On demand	B. Operations management
FU-031	SAS	QMS	Disassembly of aggregated items by another system	Web Service	Real-time	On demand	B. Operations management
FU-064	Others	QMS	Interface for identifying items that need to be inspected	Web Service	Real-time	On demand	D. Postal security management
FU-074	FAS	QMS	Loading of transport assets controlled by the fixed asset system.	File System	Batch	On demand	E. Assets management
FU-096	QMS	Others	Traceability of postal items by location by existing systems in real time	Web Service	Real-time	On demand	F. Marketing and sales

9 Lexicon

This document brings together the terms or acronyms that were used in the documents of the RFP of the QMS project and that are specific to this project or to the postal business.

<i>Term</i>	<i>Term Description</i>
Administrative regions	Administrative regions are aggregations of logistical units in order to consolidate information handled by the QMS system to meet the business model of the postal operator.
AG	Acronym of Correios Brasil for post office ("Agência" in portuguese).
Aggregated items	It is a single item or a number of items packaged, packed, or arranged in a specified manner and capable of being handled and controlled as a unit. It can make use of a CDL; pouch; crates; box; etc...
Body of the aggregated items	It is the physical body of the aggregated items It is the packaging that ties postal items together. It can be a CDL; pouch; crates; box; etc.. These bodies are reusable and sometimes controlled as assets
CAF	Acronym in portuguese to "Container Aramado Fixo" (Welded Mesh Metal Wire Cage)
CDD	It is a Distribution Centre. Acronym of Correios Brasil for "Centro de Distribuição de Domiliar" (Home Distribution Center).
CDL	Acronym of Correios Brasil to "Container Desmontável Leve" (Corrugated cardboard and plastic container). It is a type of unitized cargo widely used in Correios operations. It is composed of three parts: base, lid and cardboard sleeve
CEE	It is a Distribution Centre. Acronym of Correios Brasil for "Centro de Entrega de Encomenda" (Parcel Delivery Center).
CEINT	International Sorting Centre
CPS	CPS is acronym of Consumer Posting System. This acronym will represent in the QMS documents, any system with the same purpose.
CTC	It is a Sorting Centre. Acronym of Correios Brasil for "Centro de Tratamento de Cartas" (Letters Sorting Center).
CTCE	It is a Sorting Centre. Acronym of Correios Brasil for "Centro de Tratamento de Cartas e Encomendas" (Letters and Parcels Sorting Center).
CTE	It is a Sorting Centre. Acronym of Correios Brasil for "Centro de Tratamento de Encomenda" (Post Item Sorting Center).
DO	Designated Operator - In accordance with article 1.7 of the Constitution of the UPU, a designated operator is any governmental or non-governmental entity officially designated by the member country to operate postal services and to fulfil the related obligations arising out of the Acts of the Union on its territory.
EPC	Electronic Product Code (Standard GS1)
EPCIS	Electronic Product Code Information Services - EPCIS is a GS1 standard that enables trading partners to share information about the physical movement and status of products as they travel throughout the supply chain – from business to business and ultimately to consumers
FAS	Generic acronym used in the QMS Project documents to represent a fixed asset system.
Fixed Assets	It is considered fixed assets in this document, the transport assets that are controlled economically and accounting by the postal operator's fixed assets system.
GIAI	GIAI (Global Individual Asset Identifier). The Global Individual Asset Identifier is one of the two GS1 Keys for asset identification. Companies can apply a GIAI on any asset to uniquely identify and manage that asset. This could be a computer, desk, vehicle, piece of transport equipment, or spare part, as just a few examples.

GRAI	GRAI (Global Returnable Asset Identifier). The Global Returnable Asset Identifier is one of two GS1 Keys for asset identification. This GS1 Key is especially suitable for the management of reusable transport items, transport equipment, and tools. It can identify these returnable assets by type and if needed also individually for tracking and sorting purposes.
IPS	International Postal system (IPS) is a UPU system for managing international letters and parcels.
Location	Postal physical logistic units or any location where the postal operations take place.
Logistic unit	Term previously used as "local". (synonymous with location)
LTN	It is a type of transport route. It is the acronym of Correios Brasil for "Linha de Transporte Nacional" (National Transport Line).
LTR	It is a type of transport route. It is the acronym of Correios Brasil for "Linha de Transporte Regional" (Regional Transport Line). Transport between nearby cities.
LTU	It is a type of transport route. It is the acronym of Correios Brasil for "Linha de Transporte Urbanos" (Urban Transport Line). They are transport between Correios units in the same city.
NMS	(Network Monitoring System). System that monitors the RFID network under the control of GMS UPU.
OTS	Generic acronym used in the QMS Project documents to represent an object tracking system
PDA	Personal digital assistant, smartphone or handheld device
Postal Control Point	Lowest level within the organization. It defines a stretch between operations inside of a postal facility. Examples of postal control point may be, entry gate, exit gate, sorting point, customs entry gate, etc...
Postal item	Postal item is any object (letters or packages) under the responsibility of the Courier to be delivered to its specified destination. Within the scope of the QMS, only qualified postal item will be treated, that means letters or packages with individual identification.
Postal Operation	Activities like transportation, cargo handling, sortment of a postal item, which comprise the logistical processes from the capture to the final delivery of the postal item.
Postal Operator	Postal operator in the context of QMS is understood as the company, that operate national and international postal services in a given country.
Postal service	They are postal services offered to the consumer. Like for example: - Sedex 12 = Express shipping service. Express delivery service for goods and documents with delivery until 12 am the following day. - Sedex today = Same day express delivery service. - PAC = Exclusive non-express shipping service for goods.
PTS	Generic acronym used in the QMS Project documents to represent a system for calculating the price and term (delivery time) of a post.
QMS	Quality Management System
RFID	Radiofrequency Identification
S10 code	The UPU S10 standard defines a system for assigning 13-character identifiers to postal items for the purpose of tracking and tracing them during shipping
SARA	SARA is acronym of Correios Brasil's postal registration system (Sistema de Automação da Rede de Atendimento). In QMS documents it is represented by "CPS".
SAS	Generic acronym used in QMS Project documents to represent a sorting and aggregation system for postal items.
SGIP	SGIP is the Correios system that contains the dispatching plan for all units.

SISRFID	"Sistema de Gestão de Dados de Radiofrequência" - Correios Brasil system for monitoring and identifying objects using RFID tags.
SLA	Service Level Agreement
SRO	SRO (Sistema de Rastreamento de Objetos) is the Correios Brasil Object Tracking System.
SSCC	Serial Shipping Container Code (Standard GS1)
TEC	It is a Distribution Centre. Acronym of Correios Brasil for "Terminal de Cargas" (Cargo Terminal)
Transport assets	This term refers to equipment and utensils for transporting postal items, such as: Trolley; Pallet; Roll cage; Mail bag; Crates; Box; As well as the parts of the "CDL" like the base, lid and cardboard sleeve.
Unitization	Load unitization is the process of aggregating items into a single cargo unit, kept inviolable throughout the entire route (origin / destination).
Unitized Load	It is a synonym for the term aggregated items.