Análise e Modelação de Sistemas

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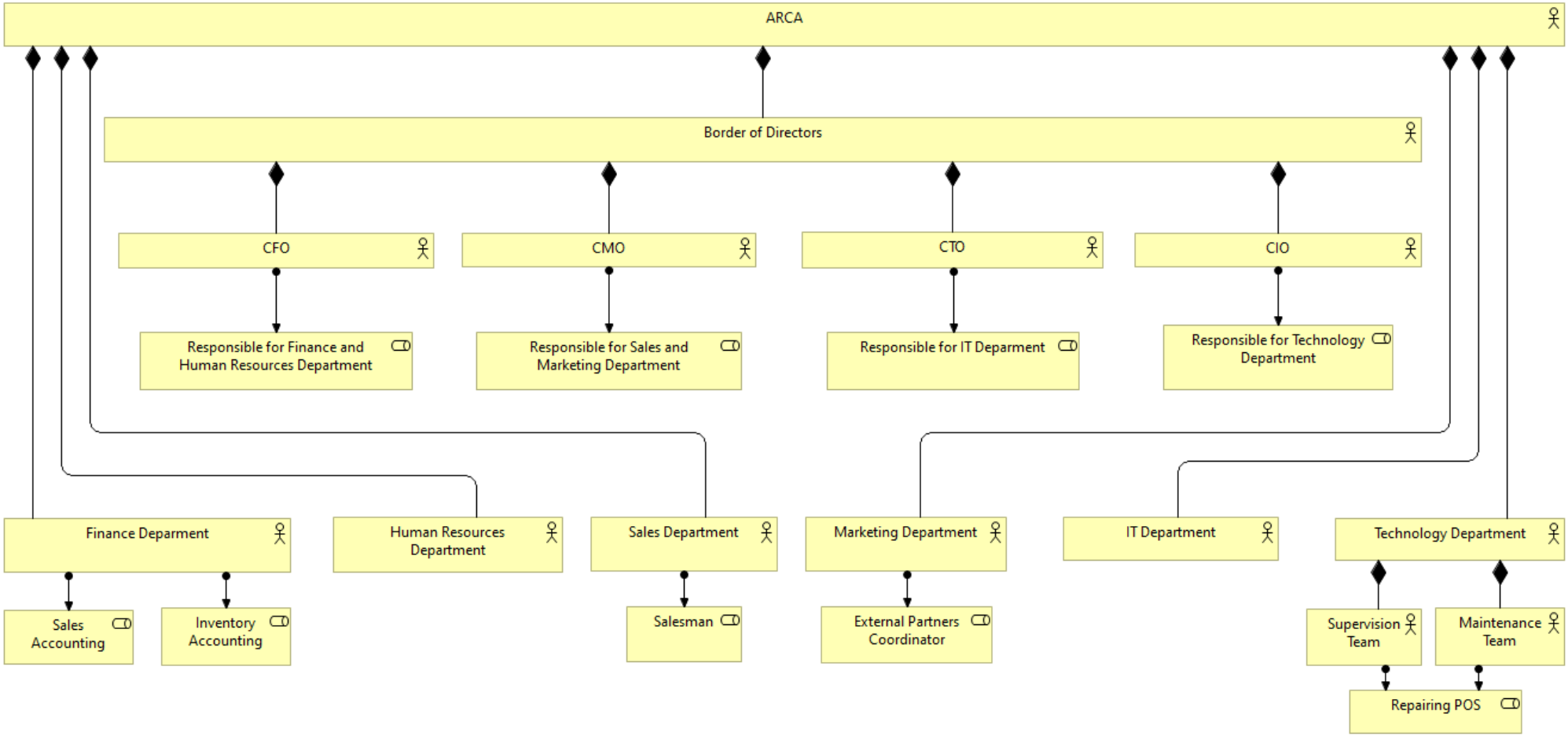
Project - Delivery 2

Group 4 - AMS1113264PB09

Thursday: 8:00 - 9:30

Name	Number	Total (Hours)	Delivery 1 Improvement (Hours)	Task 3 (Hours)	Task 4 (Hours)	Task 5 (Hours)	Task 6 (Hours)
Sara Machado	86923	27	2	5	10	8	2
Gonçalo Freire	90719	27	2	5	10	8	2
Rafael Figueiredo	90770	27	2	5	10	8	2
Ricardo Grade	90774	27	2	5	10	8	2

Task 1: "*Viewpoint*" of Organic Structure:



TASK 1: Description: Structure of the organization "*ARCA*".

- Board of directors that has a "*CFO*", "*CMO*, "*CTO*", "*CIO*".
  - "*CFO*" is responsible for the Finance and Human Resources Department.
  - "*CMO*" is responsible for the Sales and Marketing Department.
  - "*CTO*" is responsible for the IT Department.

- Finance Department is responsible for the roles of "*Sales Accounting*" and "*Inventory Accounting*".
  - "*Sales Accounting*" registers the sales done by the company.
  - "*Inventory Accounting*" manages the inventory of the company.

- Human Resources Department is responsible for or managing the employee life and administering employee benefits.

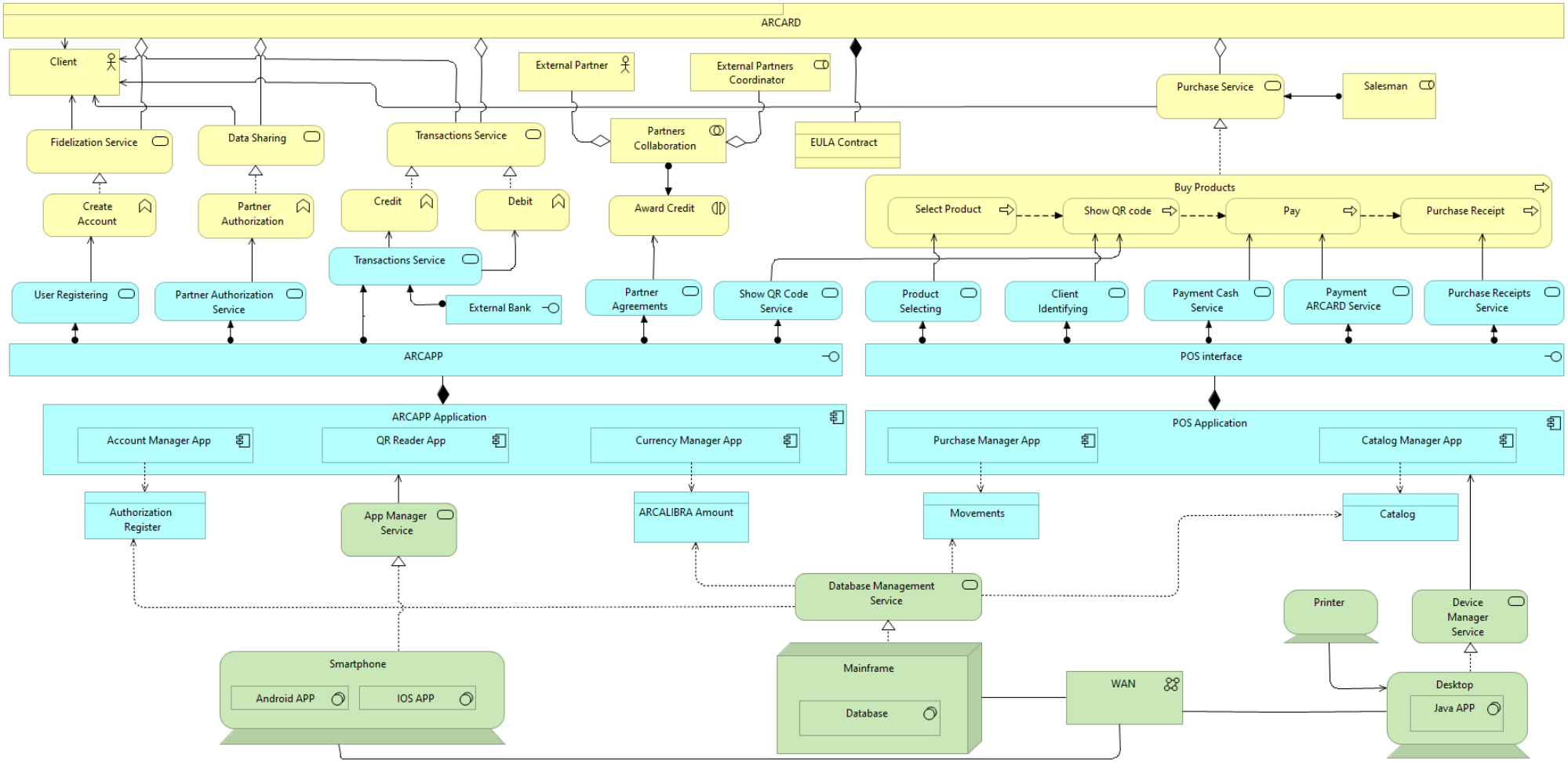
- Sales Department is responsible for the sales operations of the company.

- Marketing Department is responsible for the promotion of the company products.

- IT Department is responsible for providing the infrastructure for automation.

- Technology Department that has a "*Supervision Team*" and "*Maintenance Team*".
  - Both can have the role of "*Repairing POS*" where the supervision team sends a notification to the maintenance team when a POS needs repairing.

Task 2: "*Layered Viewpoint*"



Task 2: Description: ARCA has a product "*ARCARD*" and has an "*EULA Contract*". The client uses 4 services of "*ARCARD*".

- The service "*Fidelization Service*" is realized by a function "*User Registering*" that communicates through ARCAPP with the application service "*User Registering*". This service creates an account for the client using the "*Account Manager App*" that communicates with the technology service "*App Manager Service*". This service is realized by the smartphone with Android or IOS version of the application. After this the data is sent to the Mainframe that has a "Database" through the "*Wide Area Network*" (WAN) and writes on this "*Database*".

- The service "*Data Sharing*", is realized by a function "*Partner Authorization*", that communicates through ARCAPP with the application service "*Partner Authorization Service*". This service enables a partner to see what the client buys in order to receive rewards. The ARCAPP Application then communicates with the technology service "*App Manager Service*" and as explained writes on the "*Database*".

- The service "*Transactions Service*", is realized by the functions "*Credit*" or "*Debit*", that communicates through ARCAPP with the application service "*Transaction Service*". This service communicates with the "*External Bank*" in order to enable a credit transaction or a debit transaction through different clients or to debit to their own account. The ARCAPP Application then communicates with the technology service "*App Manager Service*" and as explained writes on the "*Database*".

- The "*Purchase Service*" is assigned to the client and the salesman, meaning they both participate in it. It has a function "*Buy Products*" that has the following processes "*Show QR Code*", "Select the Product", "Pay" and finally "*Purchase Receipt",* the "*Show QR Code*" code is an optional step, because it's not used when paying in cash.

- "*Show QR Code*" process communicates through ARCAPP with the application service "*Show QR Code Service*" this enables the QR code to be loaded. The ARCAPP Application then communicates with the technology service "*App Manager Service*". This service is realized by the smartphone.

- When the "*QR Code*" is loaded this service allows the communication through POS with the application service "*Client Identifying*", that allows the POS application to get the client's data. The POS Application then communicates with the technology service "*Device Manager Service*". This service is realized by a desktop with a Java version of the application. After this the data is sent to the Mainframe that contains the "*Database*" through the "*WAN*" and realizes the "*Database Management Service*" and gets the clients data.

- "*Select the product*" process communicates through POS with the application service "*Product Selecting*". This service enables the salesman to choose the products that the client wants to buy using the "*Catalog Manager App*". This application then communicates with the technology service "*Device Manager Service*" and as explained for the client gets the product data in the "*Database*".

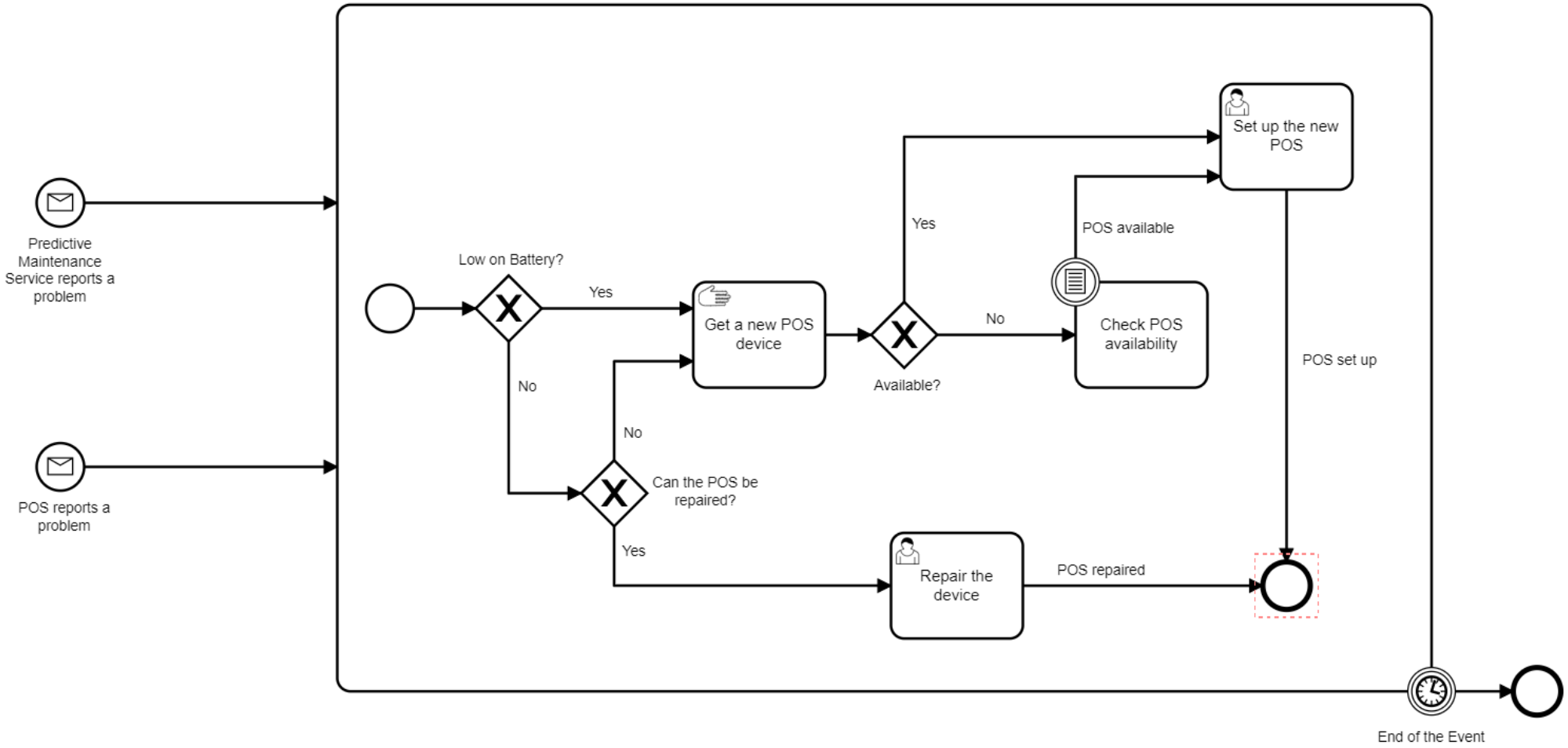
- "Pay" process communicates through POS with the application service "*Payment Cash Service*" or "*Payment ARCARD Service*" through the "*Manager Application App*" in order to make the purchase. This application communicates with the technology service "*Device Manager Service*" and writes in the "*Database*". The "*Movements*" are also updated.

- "*Purchase Receipt*" process also communicates through POS with the application service "*Purchase Receipt Service*", this creates the client receipt. The POS Application then communicates with the technology service "*Device Manager Service*". This service is realized by a desktop and if the purchase was made with cash then prints the receipt using the Printer, else creates an electronic receipt and then writes this information as explained to the "*Database*".

- Periodically the movements of partner products of the clients that authorized it are sent to the partners. This is not explicitly represented in the model but is assumed.

- Finally, the External Partners and the "*External Partners Coordinator*" work together to give users, awards for the partner products. The awards come in the form of refunds to the clients' accounts when buying a product of a partner. The "*Award Credits*" interaction communicates through ARCAPP, with the application service "*Partner Agreements Service*". The ARCAPP application then communicates with "*Currency manager app*", that updates the "*ARCALIBRA amount*" of the account and writes that information on the database as explained before.

Task 3: BPMN Diagram of POS Repair or Substitution Process

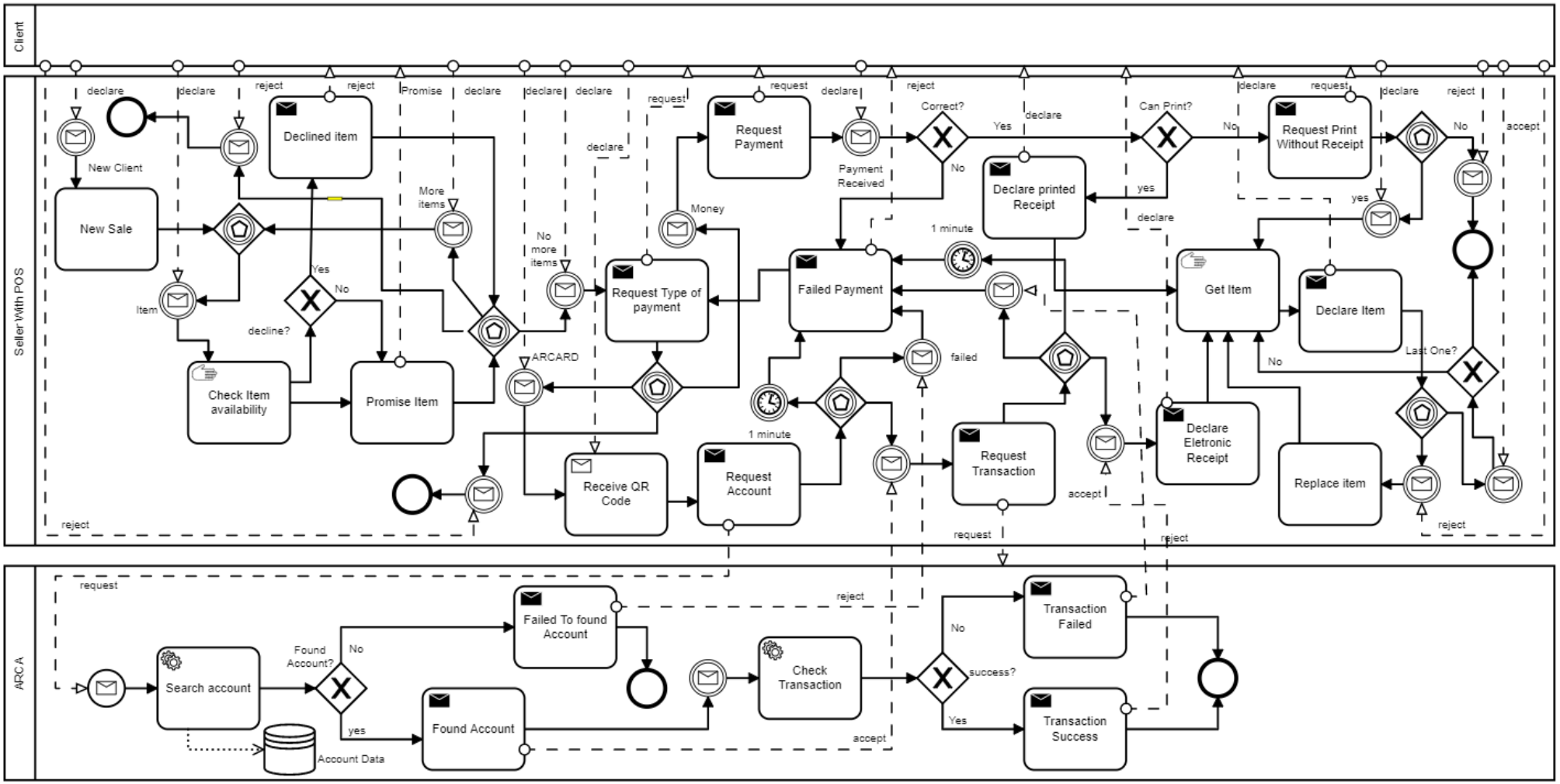


Task 3: Description: BPMN Diagram of POS Repair or Substitution Process

The process can start if the POS reports a problem or if the Predictive Maintenance Service detects a problem.

- In the process, the first thing to do is check if the problem is low battery or if the POS is broken. If the device is low on battery or broken and cannot be repaired, this means that it needs to be replaced. However, there could be no more POS available to replace them, so we will have to wait until they become available. Once they become available or if they were already available in the first place, the last step will be to set up the device to be used and the process ends.
- However, if the POS is broken but can be repaired the process is much simpler, it only needs to be repaired and the process ends.
- Every step of the process can be interrupted if the event ends because it will no longer be necessary a POS.

Task 4: BPMN Diagram of a Collaboration of a Sale in an ongoing Event



Task 4: Description: BPMN Diagram of a Collaboration of a Sale in an ongoing Event

1. A Salesman receives an item request from the client and checks the item availability;

2. Is item available?
   - If yes, then promises item to client. Go to step 3;
   - If no, then declines item request. Go to step 3.

3. If client:
   - Wants to select more items then go to step 2;
   - Wants to Cancel, then end of sale;
   - Don't want to add more items, then go to step 4.

4. Request client a type of payment:
   - If client wants to pay with Money, then go to step 5;
   - If client wants to pay with ARCARD, then go to step 8;
   - If client wants to cancel, then end of sale.

5. Request to client a payment in money.

6. Is the value correct?
   - If yes, then go to step 7;
   - If no, then failed Payment. Go to step 4.

7. Can print the receipt?
   - If yes, then print the receipt and send to client. Go to step 10;
   - If no, then go to step 8.

8. Ask if can made purchase without receipt:
   - If yes, then go to step 9;
   - If no, then go to step 4;

9. Receive QR Code, and request account to ARCA:
   - If founds account in database, then ARCA, sends to POS a success message. Go to step 10;
   - If failed to found account in database, then ARCA sends to POS a failed message. Go to step 4;
   - If ARCA doesn't respond for 1 minute, POS assumes a failed response. Go to step 4;

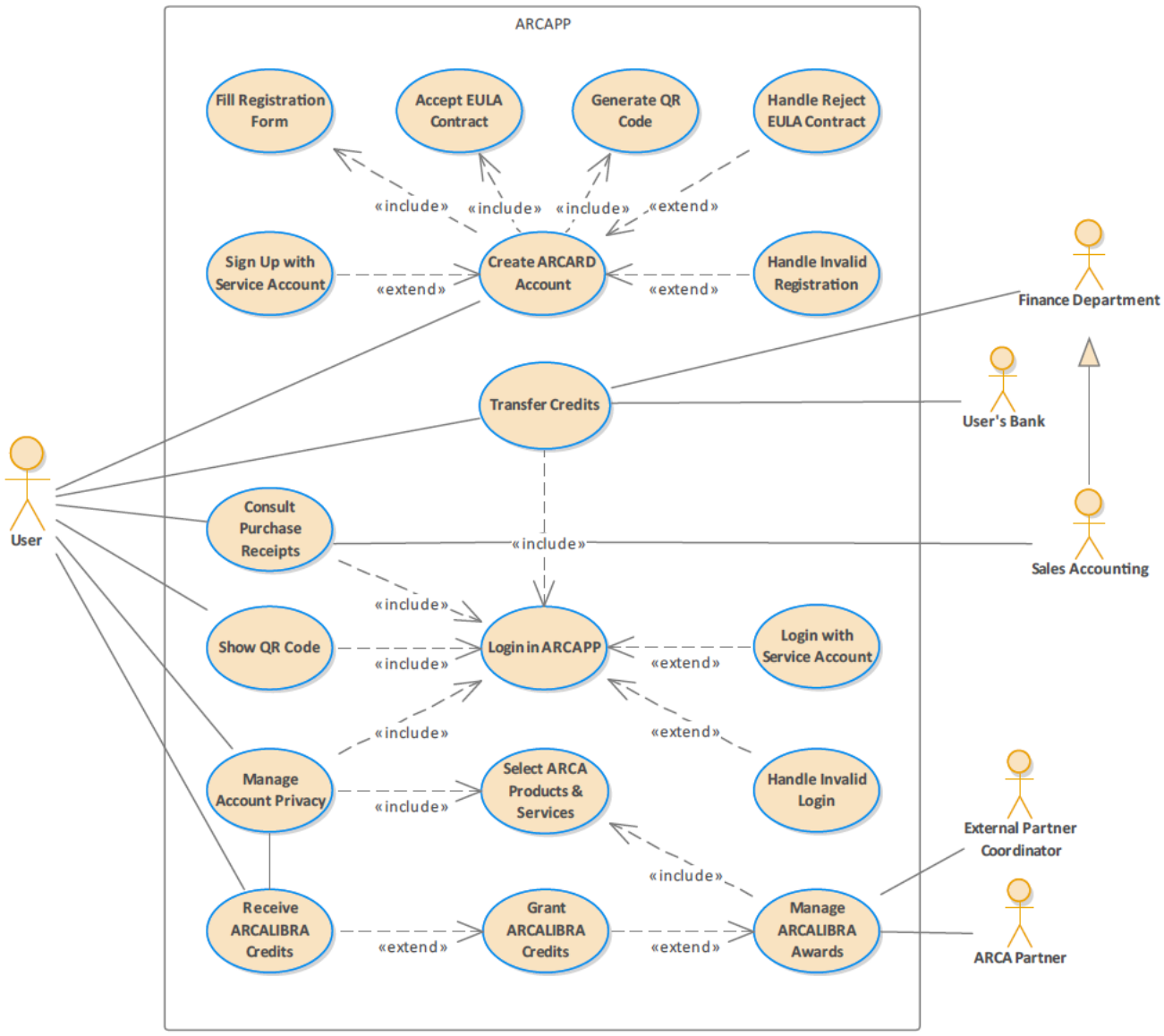
10. Request payment transaction to ARCA:
    - If ARCA made the transaction, then returns a success message and, declares to client an electronic receipt. Go to step 11;
    - If ARCA didn't make the transaction, then ARCA sends to POS a failed message. Go to step 4.
    - If ARCA doesn't respond for 1 minute, POS assumes a failed response. Go to step 4.

11. Get client requested item and declare it to the client. Go to step 12.

12. Is the item defective?
    - If yes, then replace the corresponding item. Go to step 11;
    - If no, then go to step 13.

13. Is last one?
    - If yes, then end of sale;
    - If no, then Go to step 11.

Task 5: UML Diagram of Use Cases for ARCAPP



Task 5: Description: UML Diagram of Use Cases for ARCAPP

- **Fill Registration Form:** The User is presented with a Form, where he needs to fill relevant information for the account creation
- **Accept EULA Contract:** The User is presented with a EULA Contract in a Pop-Up, reads the Contract and accepts it by checking a checkbox.
- **Generate QR Code:** The QR Code is generated through an algorithm that uses the device's unique serial number and the time of the account creation.

Name: Create ARCARD account

Extension Points:
- Sign Up with Service Account
- Handle Reject EULA Contract
- Handle Invalid Registration.

Main Scenario:
1. The User presses the button "*Sign Up*".
2. The User gives the registration information, accomplished in "*Fill Registration Form*".
3. The User accepts the EULA Contract with ARCA, accomplished in "*Accept EULA Contract*".
4. The User presses the button "*Create new account*".
5. The User's unique QR Code is generated automatically, accomplished in "*Generate QR Code*".

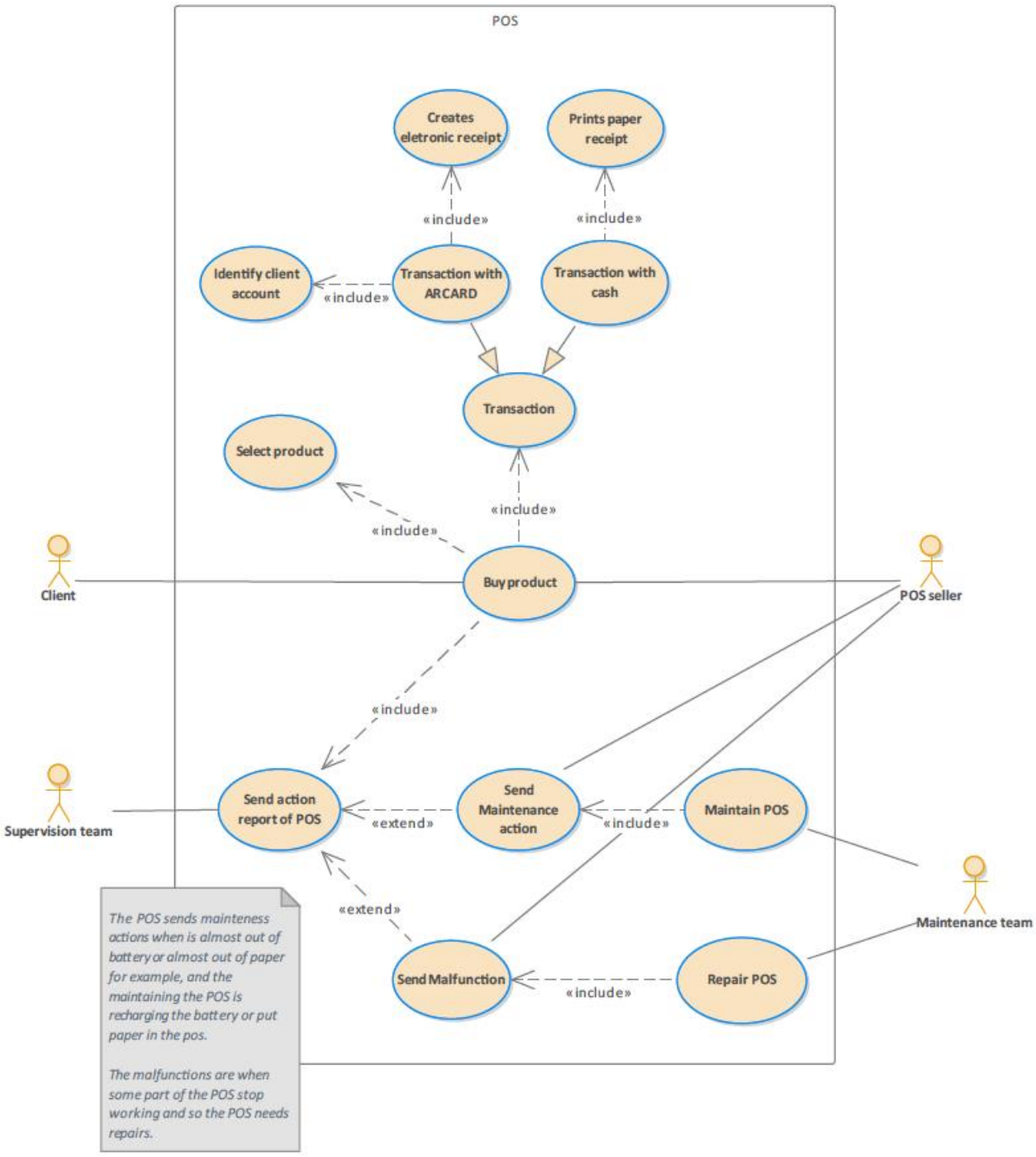
Alternative Scenario:
1. The User presses the button "*Sign Up*", presses the button "*Sign Up with Service Account*" i.e. "*[…] with Google Account*" and the registration information is automatically filled provided by the User's Google Account moving forward to *Main Scenario's* step 3 and so on.

Exception Scenario:
1. The User gives Invalid Registration Information i.e. "*Invalid Username*", "*Weak password*", etc. accomplished in "*Handle Invalid Registration*". The User is informed of the invalid field and is invited to fill it again or cancel the account creation.
2. The User Rejects the EULA Contract with ARCA, accomplished in "*Handle Reject EULA Contract*". An Error Message is given, informing the User that he hasn't accepted it and he must accept or cancel the account creation.

- **Login in ARCAPP:** The User presses the button "*Login*", fills "*Username*" and "*Password*" fields and presses the button "*Confirm*".
- **Login with Service Account:** The User presses the button "*Login*", then presses the button "*Login with Service Account*" i.e. "*[…] with Google Account*" and perform the Login through his Google Account.
- **Handle Invalid Login:** The User tries to Login in ARCAPP with invalid "*Username*" or "*Password*" fields and is presented an Error Message i.e. "*Invalid Username*", "*Invalid Username or Password*", etc. and the User can try to Login again or Cancel the Login.
- **Transfer Credits:** The User Logs in ARCAPP, presses the button "*Credit*" or "*Debit*", connects with his Bank Account, fills the "*Value*" field with the number of ARCALIBRAS he intends to Transfer, presses the button "*Confirm*", and the Transfer is made accordingly with ARCALIBRA's Real Value established by the Financial Department.
- **Consult Purchase Receipts:** The User Logs in ARCAPP, presses the button "*Purchase Receipts*" and the receipts that the Sales Accounting issued are presented.
- **Show QR Code:** The User Logs in ARCAPP, presses the button "*QR Code*" and the QR Code associated with his Account is presented.
- **Manage Account Privacy:** The User Logs in ARCAPP, presses the button "*Account Privacy*" where he can choose to share his purchases with ARCA Partners.
- **Select ARCA Products & Services:** On "*Account Privacy*" in the case that the User chooses to share his purchases with ARCA Partners, the Products & Services are presented with a checkbox for each one, that the User can check accordingly with his will to share its purchases.
- **Receive ARCALIBRA Credits:** The User receives ARCALIBRA Credits on ARCAPP from the ARCA Partners in the case he chose to share his purchases with them, based on Products & Services selected by him.
- **Manage ARCALIBRA Awards:** ARCA Partners Coordinator accordingly with ARCA Sales, can advise the ARCA Partners about which are the Products & Services that should be selected as Special Items (1) in order to increase their sales.
- **Grant ARCALIBRA Credits:** The ARCA Partner grants ARCALIBRA Credits for the Users that have purchase them Special Items (1).

- Special Items (1): ARCA Products & Services selected by the ARCA Partners to reward their purchases.
- User's Bank: A Secondary Actor that helps the User to accomplish Credits Transactions.

Task 6: UML Diagram of Use Cases for POS



Task 6: Description: UML Diagram of Use Cases for POS

- **Identify client account:** The client shows the QR code, associated with his account to the POS, Identifying himself to the POS.
- **Creates electronic receipt:** The POS generates an electronic receipt that is available in the ARCAPP.
- **Prints paper receipt:** The POS prints a receipt of the transaction which is given to the client.
- **Select product:** The client tells the POS salesman what products he wants to purchase, it's not possible to select products that are not available.

Transaction with ARCARD:

- Includes "*Identify client account*".
- The POS checks if the user has enough credits if there are not enough credits the transaction is cancelled. The POS then subtracts the amount of the transaction on the client's account.
- Includes "*Creates electronic receipt*".

Transaction with cash:

- Includes "*Identify client account*".
- The client gives the amount of the transaction in cash to the POS salesman.
- Includes "*Prints paper receipt*".

Transaction:

- There are two types of possible transactions, "*Transaction with ARCARD*" or "*Transaction with cash*".

Send Maintenance action:

- The POS as noticed that it needs maintenance (low on battery, paper, etc) sends a notification with the kind of maintenance necessary to the supervision team and the salesman.

Send Malfunction:

- The POS as noticed that it is not working properly sends a report with the malfunction to the supervision team and the salesman.

Send action report of POS:

- Sends a report of the POS after the realization of an action to the supervision team. If something is wrong with the POS it performs a "*Send Maintenance action*" or a "*Send Malfunction*", depending if the POS needs repairing or maintenance.

Maintain POS:

- Includes "*Send Maintenance action*".
- The maintenance team sends a member to the POS that sent the notification, so it can attend to the needs of the POS.

Repair POS:

- Includes "*Send Malfunction*".
- The maintenance team sends a member to the POS that sent the notification, to try to repair the problem that the POS has reported.

Buy product:

- Includes "*Select product*".
- Includes "*Transaction*".
- Check functionally of POS: The POS runs an automated check-up in its system to see if there is anything wrong with it.
- Includes "*Send action report of POS*".