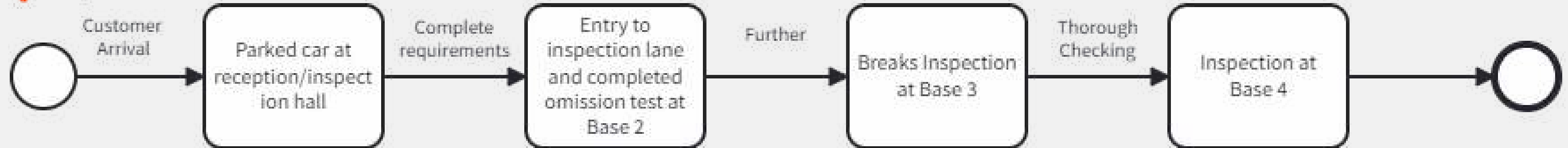# Business Process Management

PRESENTED BY
DEEPIKA
WALEED
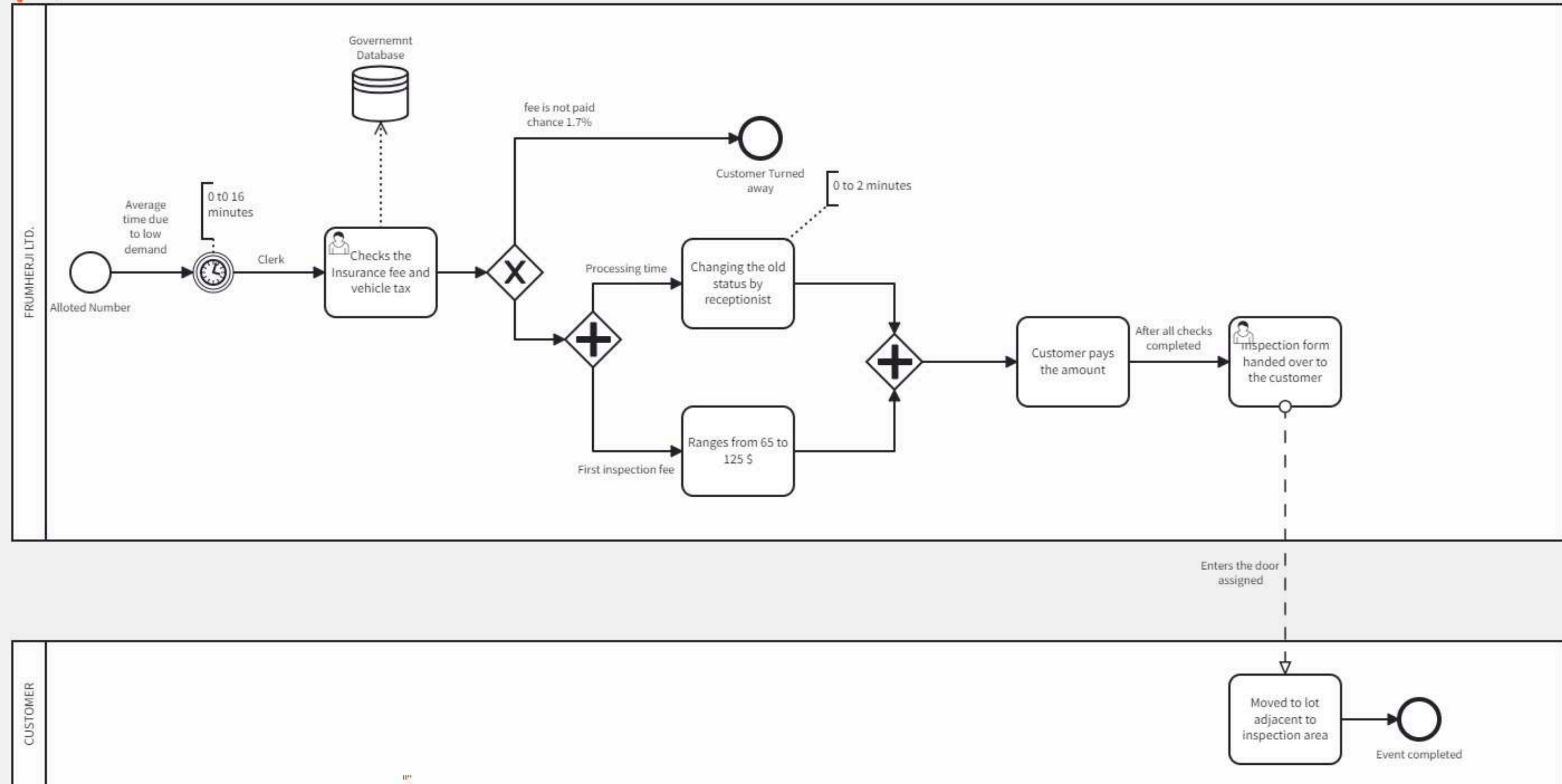DEVAK
MAZHAR

As-Is Model in Nutshell

Description- As-Is Model

- Process starts

- Customer Arrival at the reception area

- Requirements check

- Moved to base 2

- Breaks Inspection at base 3

- Thorough checking at base 4

- Process ends

Process at Base 1

Description of Elements

- Average time after allotment of number 0 to 16 minutes.

- The clerk checks the validity of vehicle insurance from the government database.

- Used Xor gate, if the fee isn't paid then the process ends, if paid then move towards parallel gateway for rest of the process.

- Used parallel gateway to proceed further towards completion of requirements.

- Customer told to moves towards the assigned gate after fulfilment of requirements and process completed on base 1.

Inspection Process at Base 2
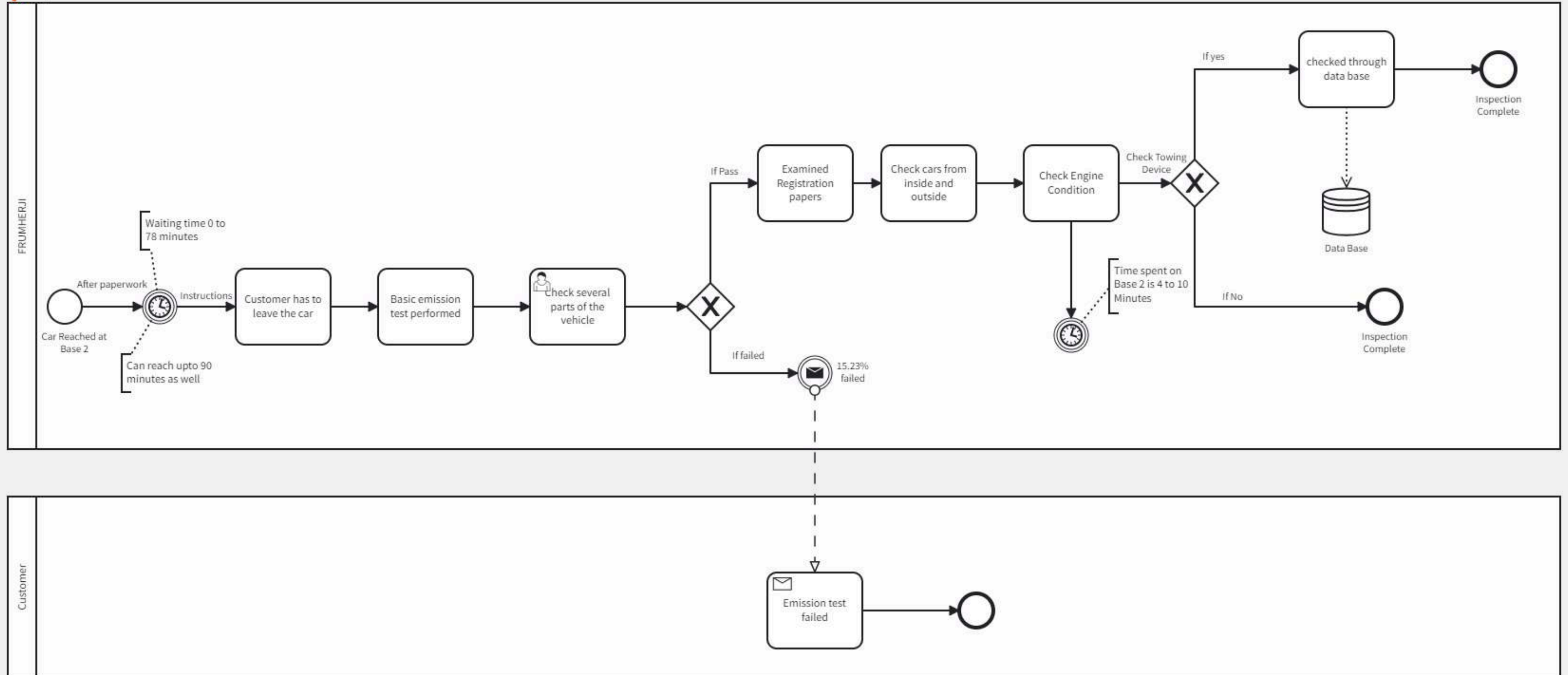
Description of Elements

- Used clock to show time required for the process.

- Emission and vehicle parts inspection by the technicians.

- Used Xor gate, if inspection failed, inform customer about it and process ends.

- If pass, then further documentation will be checked.

- Clock event used again to demonstrate the required time for all these activties.

- Another Xor gate, to check towing status through data base.

- Else the process completes.
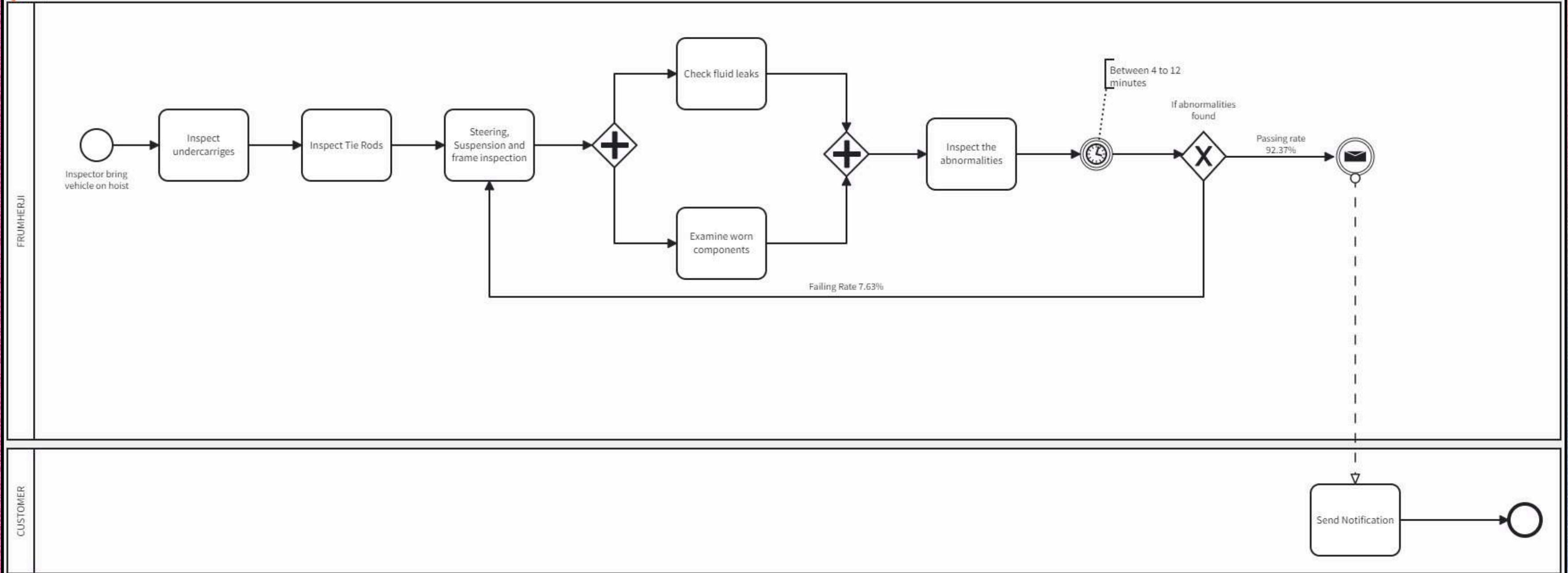
Break checks at Base 3
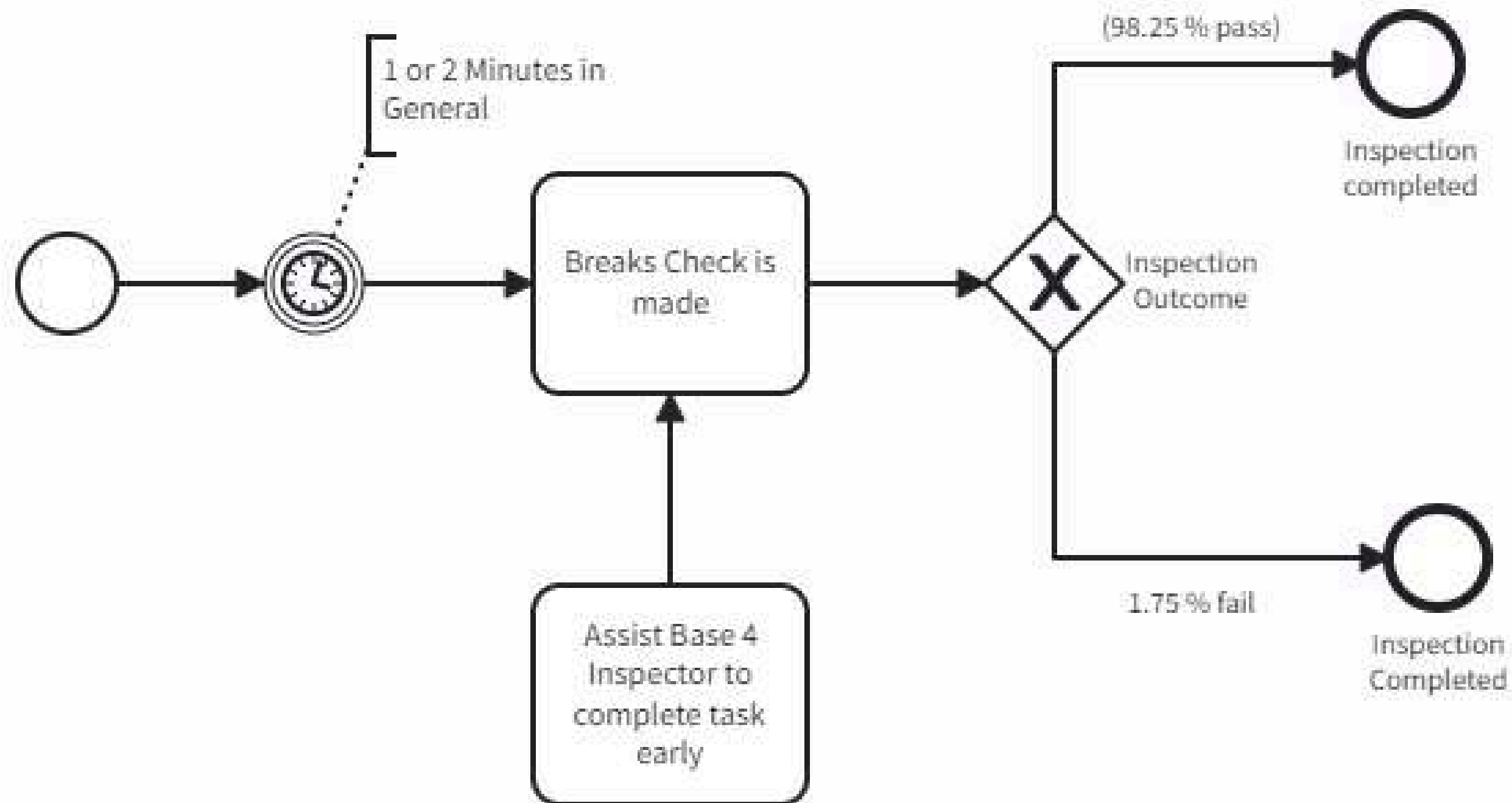
Elements description

- Process begins with a simple break check

- Clock indicating the normal processing time for this.

- Next activity is break check.

- Xor gate to show the completion of the process outcome.

Inspection at Base 4

Description of Elements

- Inspector brings car to base 4.

- Undercarriage, tie rods, and suspension checks are made.

- Parallel gateway used where fluid and component checks are made.

- Abnormality checks take 4 to 12 minutes shown by clock.

- Used Xor gate, if no abnormalities, inform the customer through notification and the process ends.

- 7.63% fail and will go back to the suspension and frame checks activities.

Final Step
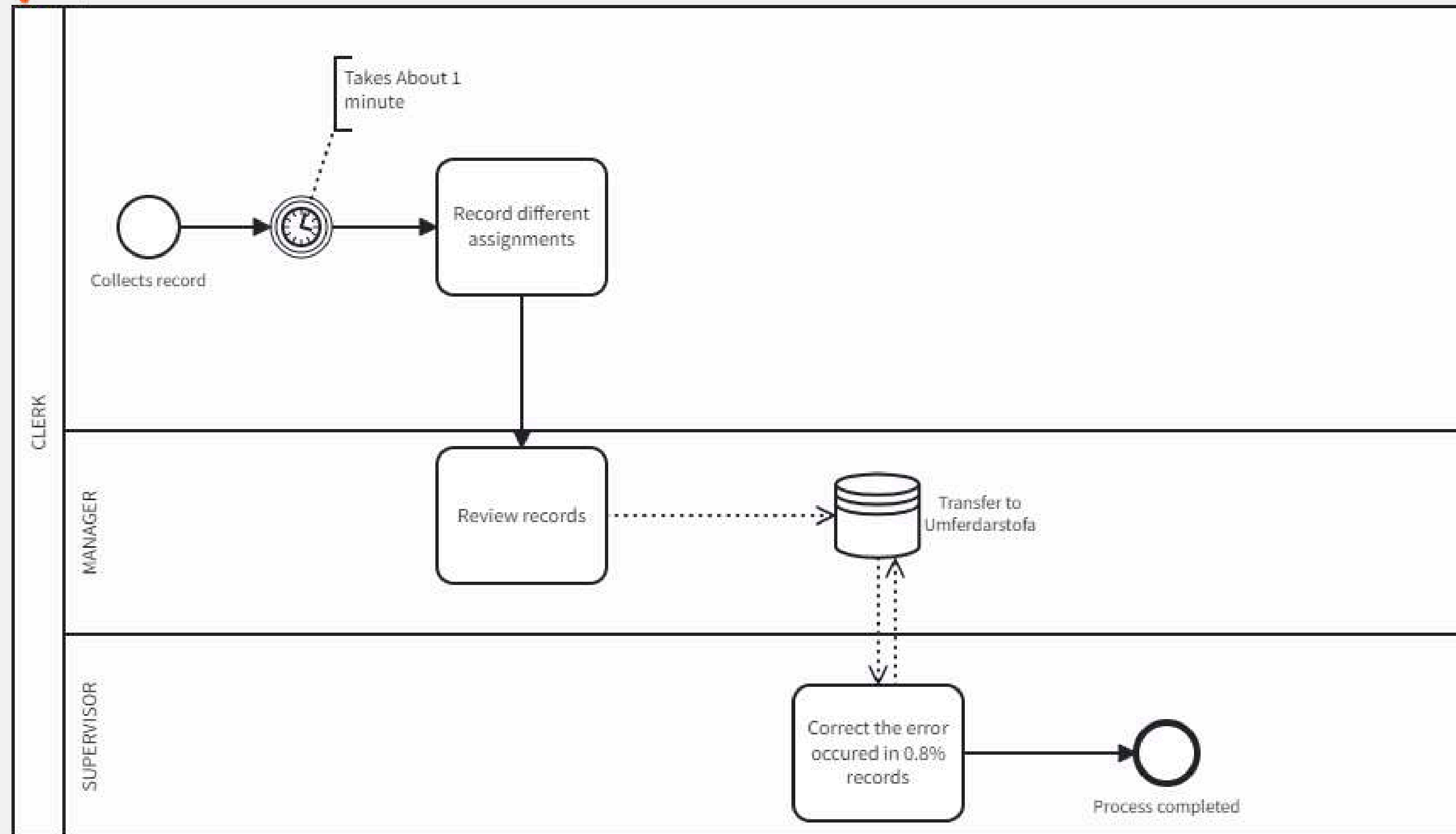
Description of Elements- Final

- Clock indicates the record collection time of 1 minute by the clerk.

- The manager reviews the records and sends them to the database.

- Hall supervisor corrects the 0.8% errors in records.

- Send them back to database.

- Process ends.

Issue Register

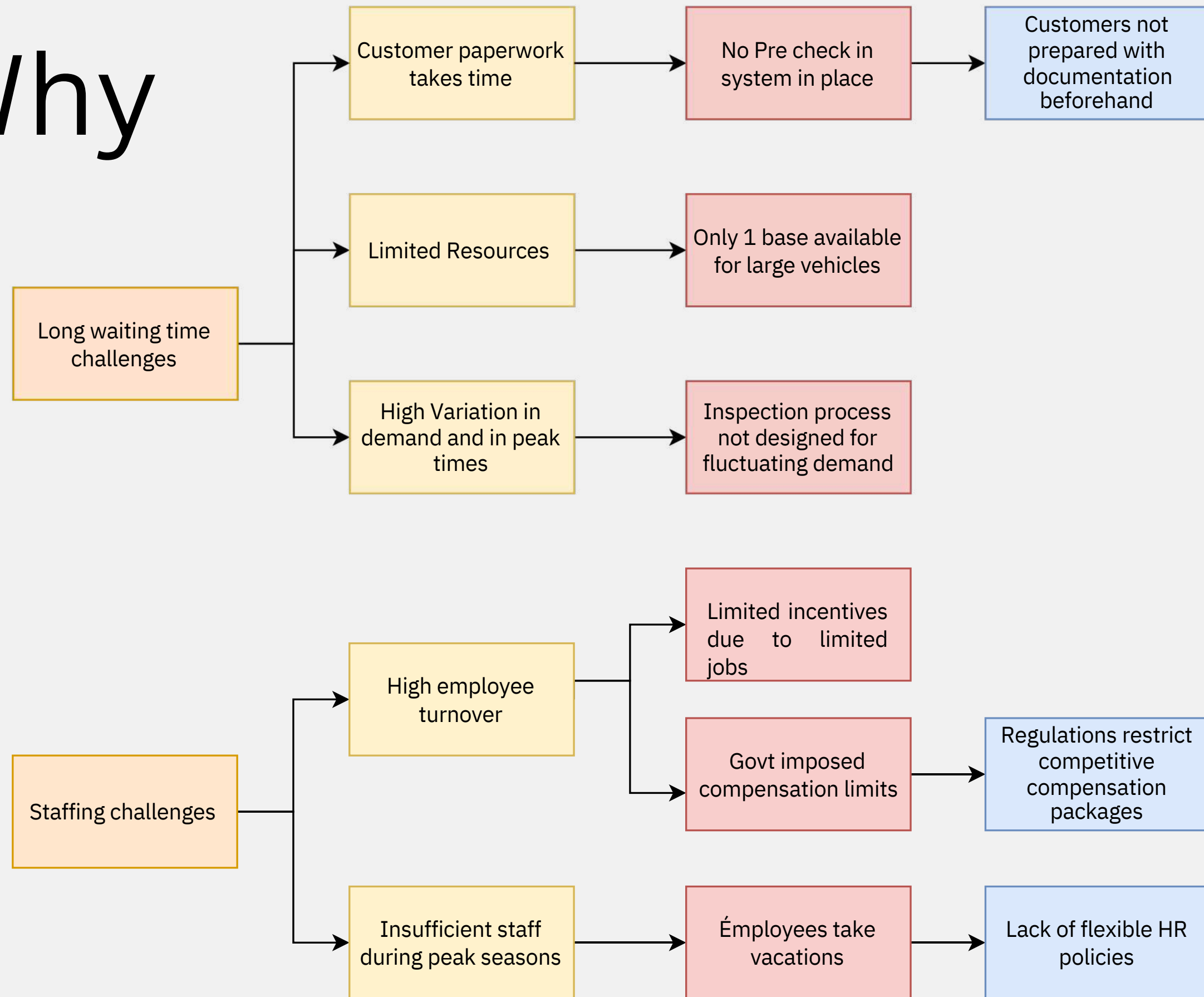| Issue ID	Issue Description	Qualitative Impact	Quantitative Impact	Suggested Solution
1	Check-in and inspection- Long waiting times are one of pain points	Customer dissatisfaction, potential negative word-of-mouth, reduced customer loyalty	Average waiting time of up to 16 minutes at check-in and up to 90 minutes for inspection; potential loss of customers	Implement a queue management system
2	High failure rate at Base 2 due to minor issues	Customer inconvenience, repeated visits causing frustration	15% of vehicles fail at Base 2, leading to increased re-inspection traffic and additional processing time	Educate customers on common issues before inspection
3	Staffing challenges due to high turnover, seasonal demand variations, and compensation limitations	Low employee morale, potential burnout, difficulty in maintaining service quality	22-23% annual turnover rate; high demand in summer with insufficient staff; compensation limits affecting competitive hiring	Offer better incentives and improve workforce management
4	Inadequate facility layout for increasing number of large vehicles	Customer dissatisfaction due to delays, potential safety hazards	Increased inspection time for large vehicles; It will create potential bottlenecks in inspection lanes	Upgrade facilities to accommodate larger vehicles
5	Lack of clear signage	Customer confusion and frustration, inefficient process flow	Instances of customers missing their turn or proceeding incorrectly, causing delays	Improve signage in inspection hall

Why Why

Long waiting time challenges
- Customer paperwork takes time → No Pre check in system in place → Customers not prepared with documentation beforehand
- Limited Resources → Only 1 base available for large vehicles
- High Variation in demand and in peak times → Inspection process not designed for fluctuating demand

Staffing challenges
- High employee turnover
  - Limited incentives due to limited jobs
  - Govt imposed compensation limits → Regulations restrict competitive compensation packages
- Insufficient staff during peak seasons → Émployees take vacations → Lack of flexible HR policies

Value Added Analysis

Step Description	VA/NVA/BVA	Justification
Customer takes number and waits for service	NVA	Waiting does not add value, can be minimized
Receptionist checks documents and processes payment	VA	Necessary step for verification and payment
Customer moves car to inspection lot	NVA	Movement is required but adds no direct value
Inspector conducts emissions test and initial checks	VA	Ensures vehicle meets emission standards and safety regulations
Inspector conducts brake test	VA	Ensures vehicle braking system is functional and safe
Inspector conducts undercarriage inspection	VA	Ensures vehicle's structural integrity and safety
Clerk records inspection results	BVA	Necessary for compliance but adds no direct value to inspection

Queuing Analysis-Requisites

Assumptions
- Average waiting time for check-in: 16 minutes during peak times.
- Average inspection time per base: 10 minutes (Base 2), 2 minutes (Base 3), 12 minutes (Base 4).
- Number of inspectors: 3 for standard-sized vehicles.

Check-In
- Arrival rate (λ) : 75 vehicles/day≈ 9.38 vehicles/hour.
- Service rate (μ) : Based on 16-minute wait time, 1 vehicle every 2 minutes = 30 vehicles/hour.

Using the M/M/1 queuing model on calculator:
- Traffic intensity (ϱ)
- (ρ) =λ/μ = 9.38 / 30 = 0.313

Average number in the system (L):

$$L = \frac{\rho}{1-\rho} = \frac{0.313}{1-0.313} \approx 0.46$$

Average time in the system (W):

$$W = \frac{1}{\mu-\lambda} = \frac{1}{30-9.38} \approx 0.043 \text{ hours} \approx 2.58 \text{ minutes}$$

Queuing Analysis-Requisites

Base 2
- Arrival rate (λ): Based on previous steps, assume 3 vehicles/hour.
- Service rate (μ): 1 vehicle every 10 minutes = 6 vehicles/hour.
- **Traffic intensity $\rho=\lambda/\mu=3/6=0.5$**

Base 3
- Arrival rate (λ): 3 vehicles/hour.
- Service rate (μ): 1 vehicle every 2 minutes = 30 vehicles/hour.
- **Traffic intensity (ρ)=3/30=0.1**

Base 4
- Arrival rate (λ): 3 vehicles/hour.
- Service rate (μ): 1 vehicle every 12 minutes = 5 vehicles/hour.
- **Traffic intensity (ρ)=3/5=0.6**

Queuing Analysis-Summary

Summary:
- Check-In: Average time is 2.58 minutes; improvements needed to reduce wait time.
- Base 2: High traffic intensity; improve processing time to avoid bottlenecks.
- Base 3: Low traffic intensity; efficient process with minimal wait times.
- Base 4: High traffic intensity; optimize inspection processes.

Recommendations
- Queue Management System: Implement a robust system to handle peak times and reduce wait times.
- Pre-Check-In System: Enable online or app-based documentation and payments to reduce check-in time.
- Staffing Solutions: Use flexible staffing policies and advocate for compensation reforms.
- Customer Education: Educate customers on common inspection failure issues to reduce re-inspections.
- Facility Upgrades: Upgrade facilities to handle larger vehicles and prevent delays.

Redesign

1. Implementing an Appointment System.

Reintroducing an advance appointment system with online booking, supported by SMS/email reminders and a small deposit fee, can manage demand fluctuations and reduce waiting times despite previous no-show issues.

- Reduced waiting times during peak periods.

- Smoother workload distribution.

- Enhanced customer satisfaction through better visit planning.

- Initial resistance from walk-in customers.

- Implementation and maintenance costs.

2. Separate Lanes for First & Second Inspections

Creating dedicated lanes for first-time inspections and re-inspections streamlines operations and reduces delays, ensuring quicker re-inspections don't congest initial inspection lanes.

- Decreased waiting times for all customers, addressing complaints about lengthy wait times for minor follow-ups.

- Efficient use of inspection lanes and improved throughput.

- Cost of reconfiguring existing infrastructure.

- Additional staff and/or training to manage the new separate lanes system effectively.

Redesign

3. Enhanced training programs and incentives for inspectors.

Comprehensive training and competitive incentives reduce turnover, improve service consistency, and decrease errors. Performance-based incentives should be explored within legal constraints.

- Reduced error rates and enhanced inspection accuracy.

- Increased employee satisfaction and lower turnover.

- Higher quality customer interactions, improving company reputation.

- Increased costs for training and incentives.

- Increased time for training new employees, temporarily impacting operations.

- Potential challenges with incentive programs due to regulatory constraints.

4. Digitalization of Inspection Records and Real-Time Data Entry

Implementing an automated system for real-time data collection and entry minimizes errors, enhances data accuracy and accessibility, and improves security when done through proper channels.

- Reduced overtime for clerks.

- Lower error rates in records.

- Faster report processing and submission.

- Improved data tracking and analysis.

- High initial costs for infrastructure and training.

- Possible technical issues during transition.

Discarded Changes

1. Outsourcing Certain Inspection Functions

Reason for Discarding: Outsourcing reduces control over quality and consistency, crucial to Frumherji's market advantage.

2. Reducing Operating Hours to Cut Costs

Reason for Discarding: Increasing waiting times and decreasing customer satisfaction conflicts with service excellence goals.

3. Introducing Higher Fees for Peak Time Inspections

Reason for Discarding: Seen as exploitative, negatively impacting customer satisfaction and company reputation.
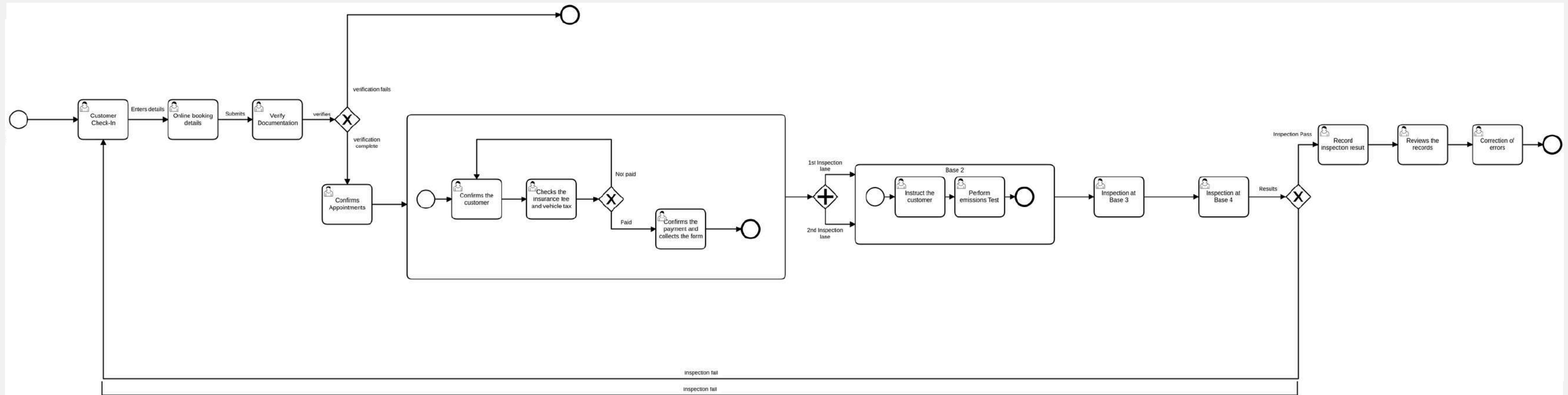
4. Increasing the Number of Inspectors

Reason for Discarding: Shortage of qualified mechanics and high turnover rates; doesn't address underlying process inefficiencies.

5. Implementing a Penalty System for No-Shows

Reason for Discarding: Could harm customer relations and discourage bookings.

Automation

THANK YOU!

QUESTIONS?