Software Requirements Specification

for

JDECo Services Management system

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version

Hana Albidaq, Shahd Muharb, Hadeel Sawalha, Salam Rabi	14/2/2023	First draft	1.0 Draft
Hana Albidaq, Shahd Muharb, Hadeel Sawalha, Salam Rabi	26/2/2023	final version	1.1

1. Introduction

1.1 Purpose

The purpose of this document is to provide a detailed description and design of the requirements specifications to design, develop and implement a mobile application and web-based JDECO Services Management System "JDECo -SMS", its features,what the software will do, technical dependencies and the constraints under which it must operate to meet JDECo stakeholders needs and satisfaction.

This document allows for a complete understanding of what is to be expected from the JDECo -SMS to be constructed, designed and developed. The clear understanding of the system, its concept and its functionalities will allow for the correct software to be developed for the JDECo Stakeholders. This SRS document provides the foundation for the project. Using this SRS, the JDECo -SMS can be designed, constructed, developed and finally tested to ensure that the expected requirements of the JDECo stakeholders are satisfied.

This document is generated based on the Scope of Work JDECo Stakeholders based on the information gathered during the site visits and desk review conducted with relevant stakeholders, and based on lessons learned through the reviewing of other systems such as Inventory system, and Billing system.

1.2 Document Conventions

This document will follow the Software Engineering Standards Committee of the IEEE Computer Society which was approved on 25 June 1998 (IEEE Std. 830-1998).Requirements in this document will be organized based on the Use-Case diagrams attached in appendix B separated for each main actor.

1.3 Project Scope

JDECo-SMS is a mobile and web- based system, it will be used to manage and track all services requested by JDECo customers, emergency works, and company plans to expand and upgrade the electrical grid under their area of concession. The system will also be able to integrate with

other systems working in JDECo to exchange the information and notify the responsible department / employee with the progress done and if it is required to act or make a decision regarding the request. One of the most important feature in this system is that the customers will be involved in this process, so the customer could login to the system using the credential as the application number, and his receipt number and view where is the service now or stuck and the status, and the time needed to be finished, not only this, but also the system could send SMS to the customer notifying with the status and if there and step needed from customer side.

This will increase the satisfaction of customers, and increase efficiency of using JDECo resources.

1.4 References

The users of this SRS document may need the following documents for reference:

[1] Vision and Scope Document.pdf

[2] Elicitation Document.pdf

[3] https://www.jdeco.net/

[4] https://www.jdeco.net/userfiles/server/2022/ANN_REPORT_2021.pdf

[5] Interviews and meetings with staff

[6] Other systems (Inventory, Billing)

[7] [3] "1998_IEEE_Standard_IEEE Recommended Practice for Software Requirements Specifications.pdf."

2. Overall Description

This section gives an overview of the whole JDECo-SMS. The system will be explained in its context to introduce the basic functionality of it. It will also describe the operating environment requirements and at last, the constraints, dependencies and assumptions of the system will be presented.

2.1 Product Perspective

The system is a green field project based on a custom web interface design where all types of users can use, maintain and administer the system's components based on their privileges. The JDECo-SMS is a stand-alone but at the same time it's integrated with inventory and billing systems mainly.

To access the product, users shall have an active username/password with sufficient privileges. All data will be kept in the servers allocated to the system at the JDECo premise.

2.2   User Classes and Characteristics

2.2.1 JDECo-SMS Class Diagram

To understand on what JEDCo-SMS will be based, the data required to be available in the system, and how JEDCo-SMS will integrated and exchange data with other in used systems in JDECo, we tried to represent all mentioned the the chart below, which contains the main classes of JDECo-SMS, and required classes and data from other systems.
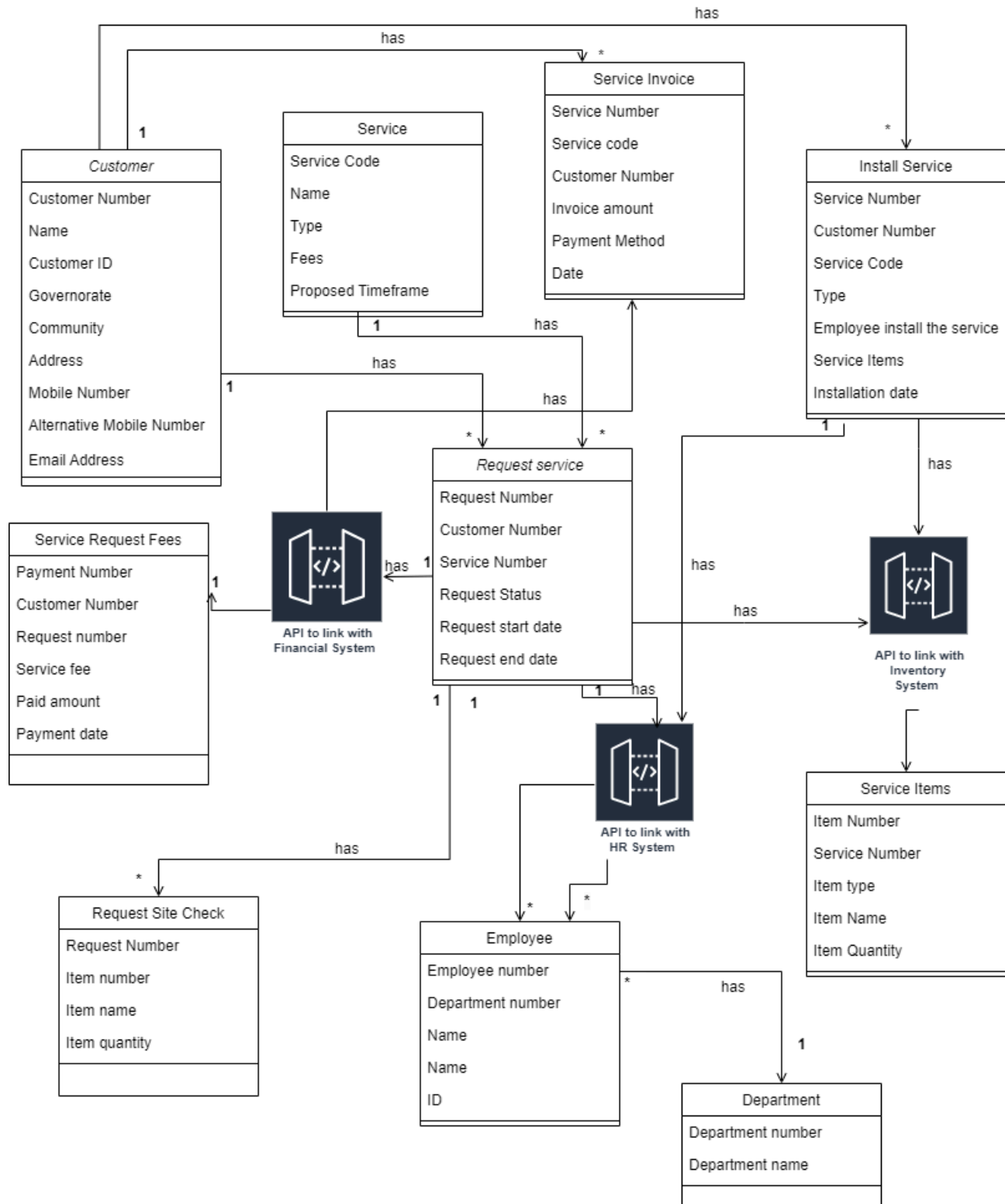
Figure1: JDECO-SMS Class Diagram

2.2.2 JDECo Use Cases

Primary actor	Use cases
Customer	1. Request a service. 2. Update Service Request . 3. Cancel Service Request . 4. Pay Service Invoice .
Customer Services	5. Create/ update service on the system
Financial department	6. Create payment requests based on the required items list. 7. Create Invoice.
Technical department	8. List all requested items and material for any service. 9. Install Infrastructure . 10. Install Network. 11. Install Service. 12. Test the readiness of the location where the Service will be installed . 13. Connect Service.
Inventory department	14. Manage Inventory.

2.2.3 JEDCo-Uses Case Diagram

JDECo-SMS is a tracking and monitoring system that will show all stakeholders of it the status of the service on time, when the service started, and when it was installed or fixed. To install or fix a service several types of users of the system have to do their participation and role to move the

service to the next stage and so on until the service is implemented, or rejected. The following are the steps that the service go through:

1. From the JDECo-SMS or JDECo- website the customer request a service, if the customer already subscriber of JDECo, then he have a user credential, he could access the system using them, but if he is a new customer its required to register on the system,through a form developed for this purpose in this form the customer have to fill his basic information, Name, Identity number, and if the identity is Jerusalem or westbank, the mobile number and emails, and after that customer could select the service:

   a. New 1- phase subscription

   b. New 3- phase subscription

   c. Upgrade subscription from 1-phase to 3-phase

   d. Move subscription from location to another

   e. Increase subscription power (Number of Ampere)

   f. Stop subscription temporary or forever

   g. Test subscription meter

   h. Move pole (wrong place or dangerous)

   i. Change subscription Tariff

   j. Change subscription plate

2. According to the service list of supporting documents the customer have to upload, and fill-in all required field with data, and submit the request, now the customer and the customer service department receive a notification on the system that new request submitted, and the customer will receive SMS telling that your request is submitted to customer service, and you will be informed if your request is approved or rejected after one week.

3. CS check the request received, and check all supporting documents and data, if all are available then CS create new subscribers on the billing system with status new if the requested service is (a, b), and the request is something else customer also check the supporting documents and the subscriber information and history on the billing system and based on that CS change the status of the request to Site check, here a SMS a notification on

the system sent to both technical department TD, and to the customer that your request is moved to technical department for site check.

4. TD schedules time for the site visit for the request, updates the status of the request to "site check on date dd-mm-yy, at hh:mm" then notify the customer and the team selected to do the site check.the customer also receives SMS with the site check date.

5. TD goes to the location to check the site of the request, based on a visit to the list of all required items needed to install the services on the JDECo-SMS, then the status of the request will be changed to "site check done, you will receive a payment request with all items and requested amount to be paid within 2-days", or the request is rejected because of technical issue, the customer has to fix it, and request new site check, and it could be rejected totally because of hazard issue or outside the company area.   But, when they arrive at the site and find it closed, then they notify that they found the site closed on JEDCo-SMS, here TD and customer will see the notification, so the TD back to step 4, to reschedule time for a second visit.

6. TD recheck the list of items, and update it if needed and approve the list after. Once the list is approved by TD, notification will be received by the Financial Department "FD", accordingly FD generates a payment request for the customer including the fees and the cost of required items for this request. notification received by the customer, and the CS.

7. If the customer paid the requested amount within the 60 days, the status of the request changed to Paid and ready to be installed, so the TD, and inventory department "ID" are notified with this paid request , and the customer will receive an SMS confirming the amount paid. If the customer didn't pay within 60 days, then the request was deleted from the system.If the customer found the amount is high, or found the items is not needed, customer arrange a meeting with JDECo, mainly the technical estimator, and the team visited the site, based on that meeting the customer will pay the amount, or request new site visit.

8. The payment request was paid, an invoice generated by FD, and the status of the request were modified to be paid and service ready for installation. This means ID and TD received notification that this service/ request is ready for installation. Here the TD request from ID checks the availability of requested items to install this service/ request, if it is available, then the TD schedules a date for installation and JDECo-SMS will notify the customer with the date and time for installation. But, if the items are not available, JDECo-SMS will notify the customer that your service will be delayed until all requested items are available in JDECo stock.

9. The TD installs the service after receiving all items from stock, through a selected team, home notified by the system, and updates the status on JDECo-SMS the service installed, and ready to be connected.notification received by the customer and the TD.

10. The customer here has to come to submit a new request under the name of test service. This service is different from site check. In this request, the process will be repeated, until the TD to schedule a date to test the infrastructure installation inside the site where the service requested. and notify the customer with the time and date.

11. Based on the schedule, the TD assigned team applies the test, and if the site passes the test, they connect the service, and update the required information on the system. If the site test fails, they notify the customer that your service failed, and what is the reason the customer has to fix, after that the customer repeats steps 9-11.
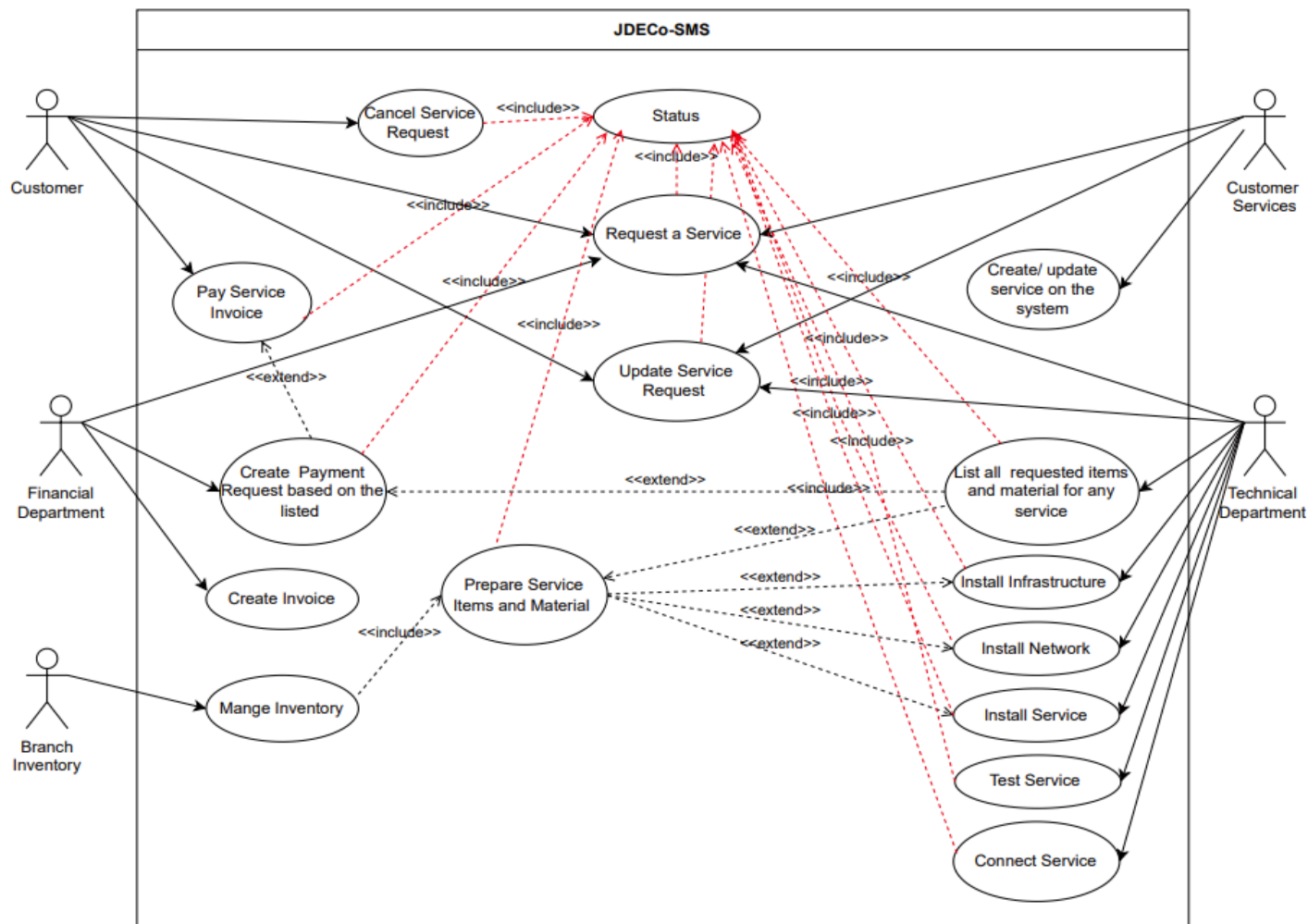
Figure2: JDECO-SMS Use Case Diagram

2.3   Operating Environment

The JDECo-SMS production environment will consider the following elements:

OE-1	JDECo-SMS shall be compatible with standard web browsers on Windows, Mac, and Web-enabled smartphone platforms.
OE-2	The system will be hosted internally at the JDECo Head office in Jerusalem, in a physical environment based on the JDECo infrastructure (HW, SW, LAN, WAN,

	Firewalls, … etc.), security principles, assurance and standards. JDECo will have an option to host the solution in a third-party environment if desired.

2.4 Design and Implementation Constraints

CO-1	The request will be canceled if it is approved and the customer didn't pay the invoice after six months.
CO-2	The customer could cancel the request the service items transfer from inventory to technical department for implementation
CO-3	Manage users, groups, roles and security levels will be through the security module (Users Management module) in the system.
CO-4	The system shall be accessed using database credentials (username/password) which shall be stored encrypted in the database.
CO-5	System users shall understand the concepts and standard terms used in the system.

2.5 Assumptions and Dependencies

AS-1 The employees have the skill and capacity to work on the system

AS-2 The technical,Inventory departments did their work and updated the systems to reflect on theJDECO-SMS system.

DE-1 The system shall use "Email Server" as an email server that will be used to send email notifications according to pre-configured system notifications.

DE-2 Safety, security and policies must be maintained by the JDECo ICT staff.

DE-3 The system will leverage the existing JDECo network infrastructure.

DE-4 The JDECo is responsible to deliver the required hardware to make the system work properly.

3.   System Features

Any person could access JDECo-SMS system after creation of user credential if he is a new customer and use his credential if he is a current subscriber through mobile app or JDECo-SMS website, and request one of the electrical services JDECo provides. The electrical service could be:

1. New 1- phase subscription
2. New 3- phase subscription
3. Upgrade subscription from 1-phase to 3-phase
4. Move subscription from location to another
5. Increase subscription power (Number of Ampere)
6. Stop subscription temporary or forever
7. Test subscription meter
8. Move pole (wrong place or dangerous)
9. Change subscription Tariff
10. Change subscription plate

Customers have to pay 81 NIS for any non-refundable request, and he has the ability to cancel or change the request before it is approved and from CS and transferred to TD to visit the site and assess the requested items and material to install the requested service.

If the customer doesn't follow-up, the progress of any request, it will be deleted from the system automatically after 60 days..

3.1 JEDCo-SMS Features Scope and limitation
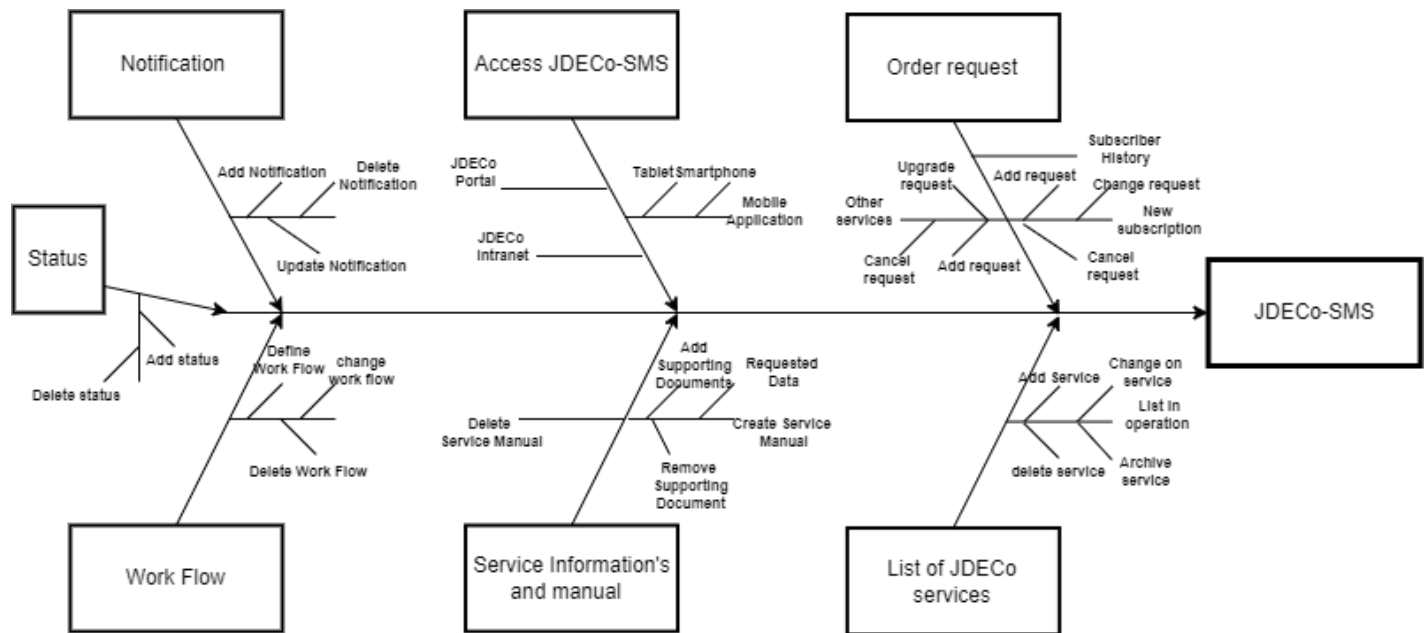
Figure3: JDECO-SMS Features

3.2 System Requirement Specification

3.2.1 Request a service from JDECo " we will choose the new 1-phase subscription"

3.2.1.1 Description

This service is the most common service in JDECo, and the majority of subscribers has 1- phase service. To get 1-phase service from JDECo, multiple steps the customer and the request should go through starting from paying a request of service to supporting documents, in the next section we have the stimulus for this service.

3.2.1.2 Stimulus/Response Sequences

Stimulus	*The customer want to to install new 1-phase services*
Respons	*the customer has to access JDECo-SMS using mobile application or JDECo portal*
Stimulus	*Customer is the first time to request a service, and their is no*

	subscriber account
Respons	*JDECo-SMS request creating new account with basic data*
Stimulus	*the customer want New 1- phase service*
Respons	*JDECo-SMS list all available documents*
Stimulus	*customer want to know requirement and fees, and the time frame for installing the service*
Respons	*JDECo-SMS list all information related to the service and the fees and estimation cost of the service and the time to have the service installed*
Stimulus	*The customer fill in the data requested, and uploading the supporting documents*
Respons	*JDECo-SMS validates the data entered, and notify the customer if some fields are missing, or wrong data entered, then save the request.*
Stimulus	*Customer has to pay the fees of the request, and verify to system the payment.*
Respons	*JDECo-SMS list payment method accepted by JDECo Financial Department.signed out from JDECo-SMS, and receive notification*
Stimulus	*Customer signed out from JDECo-SMS*
Respons	*JEDCo-SMS Notifies the customer that his request is registered on the system, and JDECo will start work on it from this moment. also JDECo-SMS will notify the CS about this new request.*
Stimulus	*CS will check the received request and verifying the data and supporting documents, if all are correct then CS approve the request*
Respons	*JDECo-SMS notify the customer that his request approved from CS*
Stimulus	*CS create a new subscriber on the Billing system*

Respons	JDECo-SMS Notify the TD about the new subscription
Stimulus	TD schedule the site visit for the request, and assign it to one of estimator team
Respons	JDECo-SMS notify the customer with the date of the site visit
Stimulus	TD estimator list all items needed for the visited request
Respons	JDECo-SMS allow estimator to insert all items on the system, and notify the customer that the site visit done
Stimulus	TD verify the list of items and modify it if needed
Respons	JDECo-SMS notify the FD with the items list for request, and notify the customer that the request transferred to FD
Stimulus	FD prepare a payment request including the fees for the 1- phase service, and the extra items needed to install the service
Respons	JDECo-SMS notify the customer" you have a payment request including the fees and the items for total amount of"
Stimulus	Customer accept to pay the requested amount, and FD generate invoice with the with the amount under the subscriber name
Respons	JDECo-SMS notify the customer with verification of the paid invoice, and notify the TD to list the service on their schedule to be installed
Stimulus	TD schedule request from ID to check the availability of the items for the service
Respons	JDECo-SMS Notify the TD with the availability of the items
Stimulus	TD if the items is exist they schedule a time for installing the service, and assign the team
Respons	JDECo-SMS notify the customer with the date and time for installation of the service

Stimulus	*TD team install the service*
Respons	*JDECo-SMS notify the customer that your service is installed, and it's the time to request for Site check, and modify the status of the service to installed*
Stimulus	*Customer submit new request under the name of "Site check" and pay the fees*
Respons	*JDECo-SMS notify the CS and TD with the request*
Stimulus	*TD schedule a date for site check, and testor team*
Respons	*JDECo-SMS notify the customer with the date*
Stimulus	*TD testor test the service infrastructure installation if up to standard of JDECo and pass the test or not, if it pass, they connect the service, if not they request upgrade of the site installation, and to submit new site check request*
Respons	*JDECo-SMS notify the customer TD, and CS with the result of the test,*
Stimulus	*TD change the status of the subscription to running and enter the required information, like meter number, type of meter, tariff type, service number, location code, reading of the meter*
Respons	*JDECo-SMS congratulate the customer on the installation of ne service*

3.2.2 Update Service Request:

3.2.2.1 Description

This use could happen alot, if the customer has a business, or big house and after submitting the request for new service, the customer discovered or advised by the technician , or even by the company when they visit the site, so the customer update request.

3.2.2.2 Stimulus/Response Sequences

Stimulus	Customer want to update/ change the request
Respons	*the customer has to access JDECo-SMS using mobile application or JDECo portal*
Stimulus	*Customer want to upgrade his service request from 3-phase standard to 3-phase 150 ampere*
Respons	*Customer hase to reflect the request on JDECo-SMS*
Stimulus	*Customer check the status of his request, if it still not reach site visited, then he could change the request, if yes he need to pay the fees of request again*
Respons	*JDECo-SMS list the list of service*
Stimulus	*Customer select the service 3-phase, and enter the number of amperes needed*
Respons	*JDECo-SMS list all information related to the service and the fees and estimation cost of the service and the time to have the service installed*
Stimulus	*The customer fill in extra data based on the change, and uploading the extra supporting documents*
Respons	*JDECo-SMS validates the data entered, and notify the customer if some fields are missing, or wrong data entered, then save the request.*
JDECo-SMS continue as the same in case 1- phase new service, and could be different as described in the following	

3.2.3 Manage Inventory:

3.2.3.1 Description

The responsibility of the Inventory department is to manage the inventory system, and the availability of items needed to install, fix, and maintain the services and networks under JDECo supervision, to satisfy the customers by providing good quality and sustainable power supply.

The main idea in the managing the inventory is to keep the most used items for service installation available, by setting and configuring the system with minimum and maximum limit for each items in the inventory, to avoid reaching a point of items not available which affect the installation and delayed number of service which lead to dissatisfaction and losses for JDECo.

3.2.3.2 Stimulus/Response Sequences

Stimulus	ID manage the items in the inventory
Respons	*JDECo inventory system could add item, update item, delete item, define item minimum level, define item maximum level*
Stimulus	*ID find item reach the minimum limit*
Respons	*JEDCo inventory system not allow to get out the item only for emergency service, and notify the Procurement to order the item*

3.2.4 Install Infrastructure:

3.2.4.1 Description

In order to provide the services they have to build the strong infrastructure and electrical grid medium voltage and low voltage to be able to connect services of the subscribers in their area.This could be done by the team of JDECo, or if the size of work is huge they contract contractors to provide this service for them.

Building the grid or upgrading it, it could be based on customer request, or plan from JDECo.

3.2.4.2 Stimulus/Response Sequences

Stimulus	JDECo want to build new electrical grid
Respons	*JDECo-SMS from customer request which need to install new / expand/ upgrade grid, in order to JEDCo to be able to provide the service*
Stimulus	*TD install new / expand/ upgrade grid*
Respons	*JEDCo SCADA system add the install new / expand/ upgrade grid to monitor and control and manage the load distribution*

4.   Data Requirements

4.1   Data Dictionary

Data Element	Description	Composition or data type	Length	Values
Customer number	The unique number given to the customer when register on the system	Number	10 -Digits	
Customer Name	The full name of the customer based as identity	varchar	100	
Customer ID	The identity number of the customer	Here its depend on the identity type the customer hold:	20	Here its depend on the identity type the customer hold:

		1- Palestinian ID 2- Jerusalem ID 3- Passport		1- Palestinian ID 2- Jerusalem ID 3- Passport
Governorate	Where the customer want to install the service requested from the company	varchar	50	list of values: 1- Jerusalem 2- Bethlehem 3- Ramallah 4- Jericho
Community	The specific community in the Governatore	varchar	50	list of values and linked to governorate
Address	Description of the exact address of the site	varchar	200	
Mobile number	The number of the customer mobile to be contacted on	number	15	
Alternative mobile number	other number when customer didn't answer	number	15	
Email Address	Email Address	varchar	50	
Service code	The unique code or non short mane used in JDECo	Varchar	10 -Digits	
Service Name	The Name/description of the service	varchar	50	
Service type	What is the type of work	varchar	100	list of value:

	this service is classified			1- New service 2- maintain service 3- fix service 4- Operational service
Service Fee	The amount that the customer have to pay to get the service	Number	5-Digits	
Service Time frame	The estimated time to finish the service in days	Number	5-Digits	
Service number	The unique number given to the service when customer request a service	Number	10 -Digits	
Invoice amount	The amount the customer had paid to install the requested service	number	10-Digits	
Payment method	How the customer paid the invoice amount	Varchar	200	list of values: 1- online transfer 2- credit card 3- cash
Date	The date of invoice created and paid	Date		Current date
Request Number	The unique number given to the request when customer ask for it system	Number	10 -Digits	

Request status	Status used to understand where is the request	varchar	50	List of values: 1- New 2- CS approved 3- Site Visited 4- Amount 5- Paid 6- Installed 9- Delayed no items
Start Date	When the request created	Date		
End Date	When the service installed	Date		
Department	The department of JDECo according to Organization Structure	Name, and Number	150	List of Values: 1- Customer service CS 2- Technical Dep. TD 3- Inventory Dep. ID 4- Financial Dep. FD
Employee (from HR system)	JDECo employee according to Organization Structure	Name, ID, department		list of values:

4.2   Reports

4.2.1 Request service information

Report ID	JDECo-SMS-R1
Report Title	Request Service Information
Report Purpose	The customer services and customer could use report to document the service request details,and progress done: - when the request started - Request fee - Request type - Service requested - The list of items required to implement the service - The service Fee - The extra cost of needed items - Site test status, test date, and how many time done - Site test fee - when the service installed
Priority	High
Report user	CS, User
Data Source	JDECO- databases
Frequency and Disposition	Report is generated on demand by CS and customers. Data in the report is static. Report is displayed on the user's web browser screen on a computer, tablet, or smartphone. It can be printed if the display device permits printing**.**
Latency	Complete report must be displayed to Patron within 5 seconds after it is requested.
Visual Layout	Portrait
Header and footer	Report header shall contain the report title,CS employee name, and date range specified. If printed, the report footer shall show the page number.
Report Body	Fields shown and column headings: ● Request Number ● Service Number ● Customer number ● Subscriber number ● Request title / code/ type ● Service code/ name ● Request Date ● Request Fee ● Site visit estimator ● List of items and quantities ● Invoice Number ● Invoice amount

	● Invoice Details ● Service location ● service tariff ● Service classification ● Service installation date ● Test site date, fee, and how many test ● service connection date
End-of-Report Indicator	Within the time frame , less than the time frame, or more than the time frame
Security Access Restrictions	A customer may retrieve only his own service requests./ while CS could access all service requests

4.3   Data Acquisition, Integrity, Retention, and Disposal

DI-1: The JEDCo-SMS shall retain customer service requests for ever following the Service Install date.

DI-2: The JEDCo-SMS shall retain a list of services for 1 year following the service date.

5.   External Interface Requirements

5.1   User Interfaces

UL-1	Home icon at the top always brings the user to the homepage
UL-2	input fields of name ,ID, address,phone number size must be adjusted to the amount of te xt input in it .
UL-3	the system shall allow users to upload a photo to their profile .
UL-4	When a process is made ,a confirmation message must appear to the user that process was successful .

UL-5	when a function is being processed by system,the system shall display an icon indicating the processing .
UL-6	The system shall provide a help link from each displayed page to explain how to use this page.
UL-7	system shall allow users to navigate customers ,using mouse in web application and touch screen in mobile app .
UL-8	all icons of navigation must change color when the mouse is over them ,and when clicked .
UL-9	The Fields with input less than or equal 10 words in all forms shall be wide enough to accomodate 95% of expected entries without requiring either horizontal or vertical scrolling.
UL-10	The homepage with links and menus is the same in the website as in the mobile version .

5.2   Software Interfaces

SI-1	Database system
SI-2	The JDECO shall send all data form of the customer to the database system
SI-3	The JDECO shall send all data from customer service to the database system
SI-4	The JDECO shall store all customer / Customer service department /Manage service requests /manager profiles in the database system

5.3   Hardware Interfaces

HI-1: The JDECO system is an online system over the internet, therefore, all hardware required to connect to the internet are the hardware interfaces.

HI-2: The system should be able to run on windows and linux.

HI-3: The JDECO system should be hosted on virtual servers.

Hi-4: The system should provide storage of all databases on redundant computers with automatic switchover.

5.4   Communications Interfaces

CI-1:The JEDCo-SMS must send a notification or an e-mail to the customer when the service request is approved.

CI:2: The JEDCo-SMS must send a notification to the customer for a site check date.

6.   Quality Attributes

6.1   Usability

UR-1: All users should be able to use JDECo after an hour of training and explanation.

UR-2: JDECo should reduce the error of entering, updating and deleting data.

UR-3: Messages and notifications of JDECoshould be simple, understandable and short as possible.

UR-3: Customers can search services maximum at 30 seconds.

6.2   Performance

PE-1: The system shall accommodate 100 users during the peak usage time window of 10 A.M. to 3:00 P.M with an estimated average session duration of 8 minutes.

PE-2: Responses to queries shall take no longer than 4 seconds to load onto the screen after the user submits the query.

PE-3: The system shall display confirmation messages to users within 3 seconds after the user submits information to the system.

6.3 Security

SE-1: All network transactions that involve financial information or personally identifiable information shall be encrypted.

SE-2: Users shall be required to log in before all operations except viewing the services that are provided by JDECo.

SE-3: The system shall permit only the administrator who is authorized to create a customer account.

SE-4: The system shall permit customers to view only their services, not services requested by other customers.

6.4 Scalability

The system must be scalable to an increased number of users yearly. Moreover, the number of supplied services is changeable and increases.

6.5 Availability

The system shall be available to users on 99.9% of the time between 10:00 A.M. and 3:00

6.6   Robustness

If the connection between the user and the system is broken prior to a request being either confirmed or canceled, the JDECo shall enable the user to recover an incomplete requested service.

7.   Internationalization and Localization Requirements

1. The JDECO system supports both Arabic and English language.
2. The JECO system supports 3 currencies.
3. The JDECO system can be accessed from any region in the world.

8.   Requirements Evaluation

8.1 Conflict

8.1.1 Create/Update service on the system

Requirements:
- The customers are able to enter data about the service they require, such as type of service, location, Supporting documents and any specific requirements.
- The customer service department should verify the information entered by the customer to ensure it is complete and accurate.
- The ability to update or edit the service request after it has been submitted.
- Notifications to customers regarding the status of their service request, including confirmation of receipt, updates on progress, and confirmation of completion.
- Integration with other departments, such as the Technical department for installation and testing of the service, and the Financial department for payment and invoicing.

A conflict that could happen in this use case is between the requirements for flexibility and control. Customers may want the ability to make changes to their service request after it has been submitted, while the Customer Services department may want to limit changes to avoid confusion or delays in the installation process.

The conflict type is between functionality and usability. Flexibility and control are both important aspects of a service request system, but they can sometimes be at odds with each other.

To resolve this conflict, a compromise solution could be to allow customers to make changes to their service request up until a certain point, such as 24 hours before the scheduled installation date. After that point, changes would need to be approved by the Customer Services department to avoid delays or confusion. This solution provides customers with the flexibility they desire while also giving the department the control they need to manage the installation process efficiently.

8.1.2 Install Service

Requirements:

- The technical department should have access to a list of all requested items and materials for any service.
- The technical department should have the ability to install the service.
- The technical department should test the readiness of the location where the service will be installed before installation.
- The technical department should connect the service after installation.

Requirement 2 states that the technical department should have the ability to install the service, while requirement 3 states that the technical department should test the readiness of the location where the service will be installed before installation. These requirements conflict because if the technical department installs the service without testing the readiness of the location, it may lead to errors and failures.

Conflict between requirement 3 and requirement 4: Requirement 3 states that the technical department should test the readiness of the location where the service will be installed before installation, while requirement 4 states that the technical department should connect the service after installation. These requirements conflict because if the technical department tests the readiness of the location after installation, it may lead to errors and failures.

Conflict Types:

Scheduling conflict

Inconsistency conflict

Conflict Resolution Techniques:

Scheduling Conflict: To resolve the scheduling conflict between requirement 2 and requirement 3, the technical department can test the readiness of the location before installing the service. This will ensure that the location is ready before installation and reduce the risk of errors and failures.

Inconsistency Conflict: To resolve the inconsistency conflict between requirement 3 and requirement 4, the technical department can test the readiness of the location during installation. This will ensure that the location is ready before connecting the service and reduce the risk of errors and failures.

8.1.3 Cancel Service Request

Requirements:

- The customer must be able to cancel their service request at any time.
- If the service request has already been assigned to a technician, the technician must be notified of the cancellation.
- If the service request has been partially completed, the customer must be informed of any charges or fees that may apply.

Conflicts:

Conflict 1: The customer wants to cancel the service request but has already paid for the service.

Conflict 2: The technician has already begun work on the service request but the customer still wants to cancel.

Conflict resolution techniques:

Conflict 1: In this case, the customer should be informed that the payment is non-refundable and they will not be able to cancel the service request once payment has been made.

Conflict 2: If the technician has already begun work on the service request, the customer should be informed that they will still be charged for the work that has been completed. If the customer still wants to cancel, they will need to pay for the work that has already been completed.

8.2 DDP-style risk analysis

In this section we concentrate on most risks that may affect the objectives of JDECo system. These risks are related to availability of items in inventory. Also, the hosting environment of the system causes a real risk. The approach that is followed to determine the criticality of each risk and how it affects the system's objectives is DDP-style risk analysis and that is found at table 8.2.1.

Then we suggest some alternatives to avoid these risks and the reduction of risk for each countermeasures are evaluated as shown in table 8.2.2. The table shows that providing items before reaching the lower limit has achived the better overall effect on reducing the risk in the system. Therefore, the score of options for this countermeasure is attached in table 8.2.3 and the weighted matrix is evaluated. the result that the option of emergance call achive the highest score. So it is selected to be one of the requirnment in JDECo.

Objectives		late of items arriving	technical team commit	accumulative of old items	unreliable hosting environment	loss obj
	liklihood / weight	0.8	0.4	0.5	0.3	
install the service within the time frame	0.7	0.9	0.7	0.3	0.5	0.91
user satasfication	0.8	0.8	0.7	0.2	0.4	0.91
tracking service status	0.6	0.5	0.5	0.1	0.6	0.5
risk criticality		1.26	0.54	0.22	0.31	

Table 8.2.1: The impact matrix for risks of JDECo.

countermeasures	late of items arriving	technical team commit	accumulative of old items	unreliable hosting environment	over all effect of countermeasure
evaluate traders	0.8	0	0.4	0	1
provide items before reaching the lower limit	0.9	0.6	0	0	1.5
risk criticality	1.26	0.54	0.22	0.31	
combine risk reduction	0.98	0.6	0.4	0	

Table 8.2.2: Elaborated effectiveness matrix of JDECo.

evaluation criteria	significant weight	emergane call	email notificatio
reliable respnse	0.5	0.6	0.4
minimal inconvenience	0.5	0.7	0.5
total		0.65	0.45

Table 8.2.3: Weighted matrix for JDECo.

Appendix A: Glossary

Term	Definition
Service	Electrical service, fix, maintain, upgrade and build electrical grid.
Timeframe	The limited time to provide the service.
Install	Make all settings to provide the electricity.
Subscribers/ Customer	The person who owns a Home, School, Company, University, SuperMarket, or any other building that needs to be lit and operate the electrical machines.
JDECo	Jerusalem District Electricity Company.
Item	Any electrical equipment which is needed for the service.
Site	the location where the electrical service will be provided.
Status	The current state of service that indicates the progress for completing the service.

Appendix B: Analysis Models

- **Activity Diagram for Request a service from JDECo " we will choose the new 1-phase subscription"**
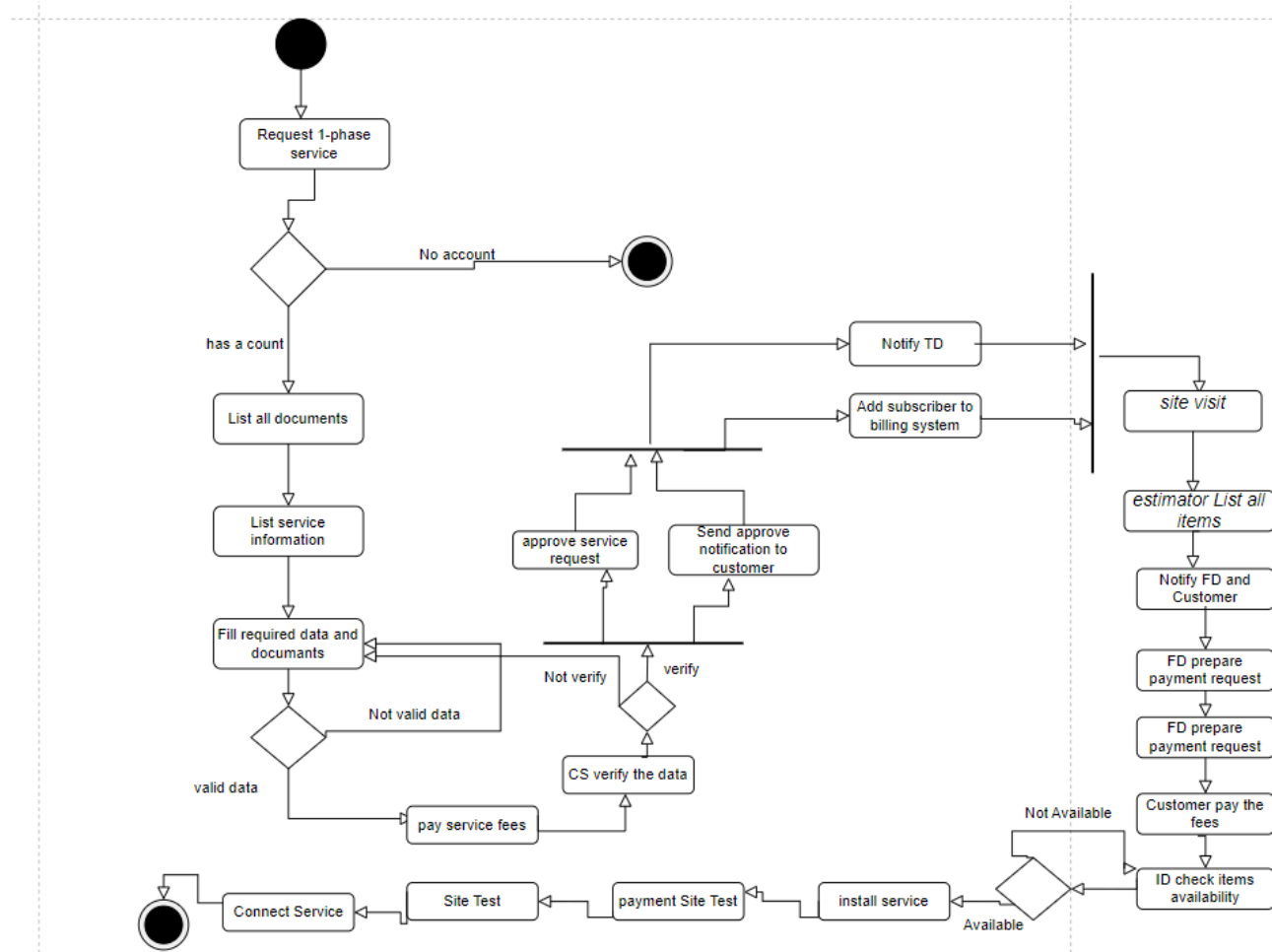

Figure4: Activity Diagram for Request a service from JDECo " we will choose the new 1-phase subscription"

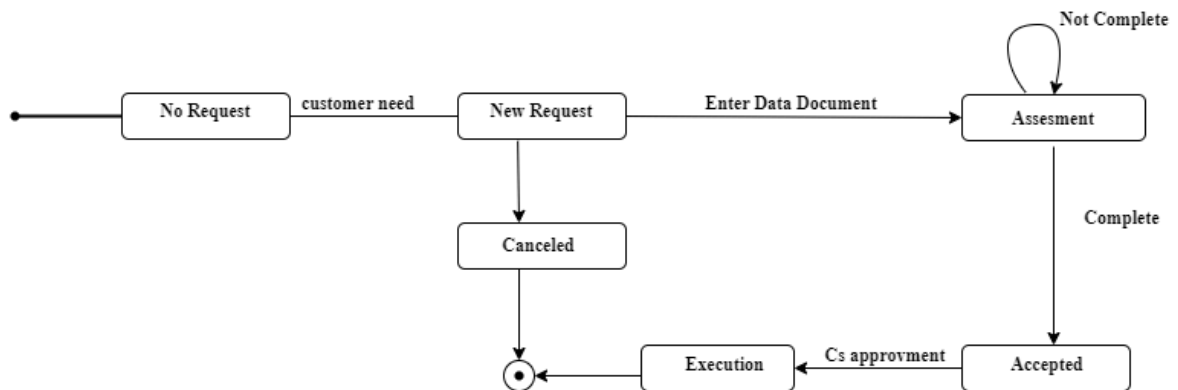● **State Chart Diagram- Request**

Figure5: State Chart Diagram- Request
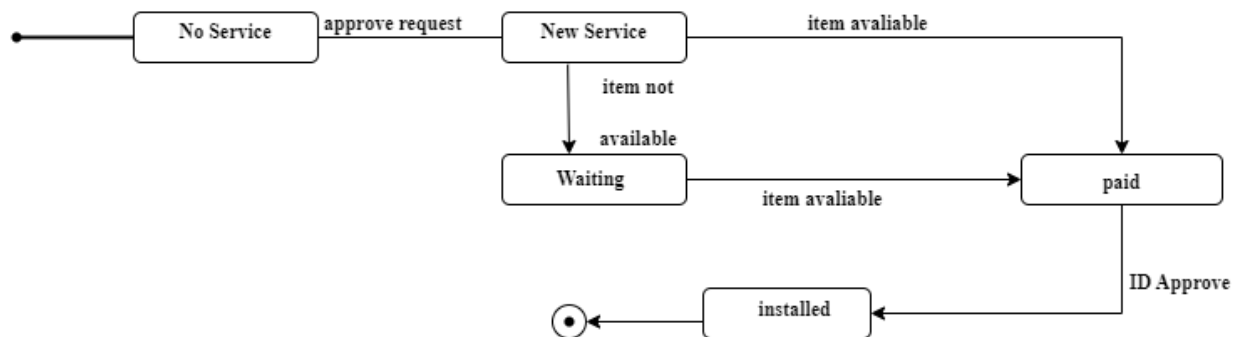
● **State Chart Diagram- Service**

Figure6: State Chart Diagram- Service
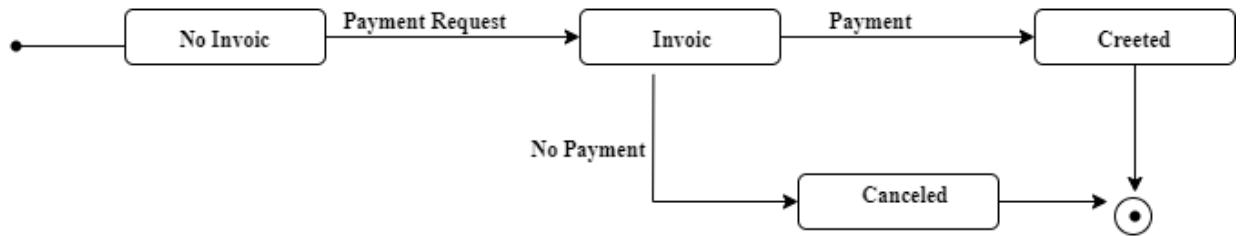
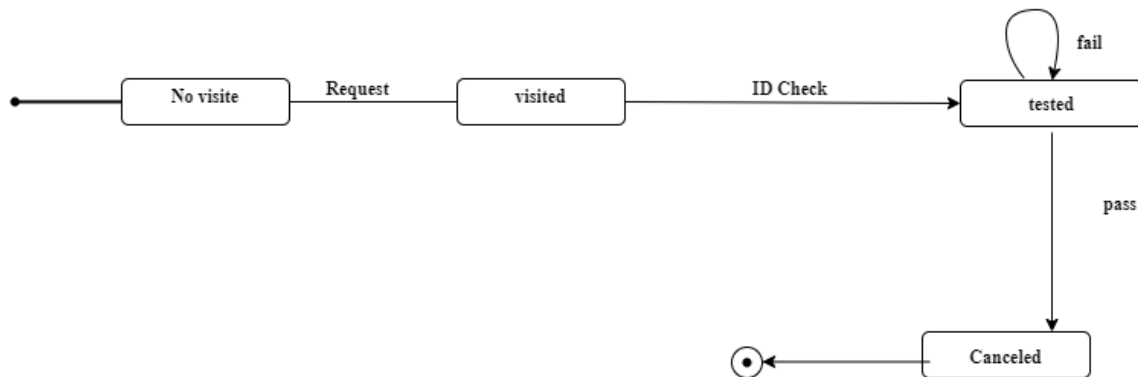● **State Chart Diagram- Invoice**

Figure7: State Chart Diagram- Invoice

● **State Chart Diagram- Site**

Figure8: State Chart Diagram- Site