CENG Newton Teamja Turtles

Requirements Specification Document 3.0
EngVidia
PTracker: Warrantied Product Tracking System

Zhangze Chen
Galen Conell
Clement Liu
Duncan MacDonald
Vincent Potrykus
Jordan Sandberg
Naomi Schaufele

Nov 14th , 2019

Contents

List of Table and Figures 4
Revision History 6
1 Introduction 8
1.1 Purpose 8
1.2 Project Scope 8
1.3 Glossary of Terms 8
1.4 References 11
1.5 Overview 12
2 Overall Description 12
2.1 Product Perspective 12
2.2 Product Features 12
2.3 User Classes and Characteristics 13
2.4 Operating Environment 13
2.5 Design and Implementation Constraints 13
2.6 Assumptions and dependencies 14
3 System Features 14
3.1 Product Entry 14
3.1.1 Description 14
3.1.2 Functional Requirements 14
3.2 Employee Profile 15
3.2.1 Description 15
3.2.2 Functional Requirements 15
3.3 Customer Contact 15
3.3.1 Description 15
3.3.2 Functional Requirements 15
3.4 Employee Interface Functions 16
3.4.1 Description 16
3.4.2 General Functional Requirements for All Employees 16
3.4.3 S/R Interface Requirements 16
3.4.4 Technician Interface Requirements 16
3.4.5 System Administrator Interface Requirements 16
3.5 Customer Interface Functions 17
3.5.1 Description 17

3.5.2 Functional Requirements 17
4 External Interface Requirements 17
4.1 Barcode 17
4.1.1 Description 17
4.1.2 Functional Requirements 18
5 Other Non-Functional Requirements 18
5.1 Performance Requirements 18
5.2 Security Requirements 18
5.3 Software Quality Attributes 19
5.3.1 Reliability 19
5.3.2 Availability 19
5.3.3 Maintainability 19
5.3.4 Usability 20
5.3.5 Accessibility 20
5.3.6 Learnability 20
6 Other Requirements 20
7 Use Cases 21
8 Entity Relationship Diagram 43
9 Data Flow Diagrams 45
10 PTracker System-Level Sequence Diagram ??
11 UI Models ??
Appendix: Issues List ??

List of Tables and Figures

Table 1. Use Case UC1 CreateProfile 23
Table 2. Use Case UC2 SystemAdministratorSearchProfile 24
Table 3. Use Case UC3 SystemAdministratorViewProfile 25
Table 4. Use Case UC4 EmployeeViewProfile 26
Table 5. Use Case UC5 EmployeeEditProfile 27
Table 6. Use Case UC6 SystemAdministratorEditProfile 28
Table 7. Use Case UC6.1 EditProfile with Cancel 29
Table 8. Use Case UC7 DeleteProfile 30
Table 9. Use Case UC8 AddProductEntry 31
Table 10. Use Case UC9 SearchProductEntryByUID 30
Table 11. Use Case UC10 SearchProductEntryByEntryInfo 31
Table 12. Use Case UC11 SearchProductEntryByCustomerInfo 32
Table 13. Use Case UC11.1 SearchProduct with ProductNotFound 33
Table 14. Use Case UC12 EmployeeViewProductEntry 34
Table 15. Use Case UC13 CustomerViewProductEntry 35
Table 16. Use Case UC14 EditProductEntry 36
Table 17. Use Case UC15 ArchiveProductEntry 37
Table 18. Use Case UC16 EditTimeEstimate 38
Table 19. Use Case UC17 IntiateStageChange 39
Table 20. Use Case UC18 AcceptStageChange 40
Table 21. Use Case UC19 AddNote 41
Table 22. Data Dictionary for PTracker 45

Figure 1. Use Case Diagram for PTracker 22
Figure 2. Entity-Relationship Diagram for PTracker 44
Figure 3. Data Flow Diagram Level 0 (Context Diagram) for PTracker 46
Figure 4. Data Flow Diagram Level 1 for PTracker 47
Figure 5. Data Flow Diagram Level 2 for PTracker 48
Figure 6. CreateProfile Sequence Diagram 49
Figure 7. SystemAdminisratorSearchProfile Sequence Diagram 50
Figure 8. SystemAdministratorViewProfile Sequence Diagram 50
Figure 9. EmployeeViewProfile Sequence Diagram 51
Figure 10. EmployeeEditProfile Sequence Diagram 52

Figure 11. SystemAdministratorEditProfile Sequence Diagram 53
Figure 12. EditProfile with Cancel Sequence Diagram 54
Figure 13. DeleteProfile Sequence Diagram 55
Figure 14. AddProductEntry Sequence Diagram 55
Figure 15. SearchProductEntryByUID Sequence Diagram 56
Figure 16. SearchProductEntryByEntryInfo Sequence Diagram 56
Figure 17. SearchProductEntryByCustomerInfo Sequence Diagram 57
Figure 18. EmployeeViewProductEntry Sequence Diagram 57
Figure 19. CustomerViewProductEntry Sequence Diagram 58
Figure 20. EditProductEntry Sequence Diagram 59
Figure 21. ArchiveProductEntry Sequence Diagram 60
Figure 22. EditTimeEstimate Sequence Diagram 61
Figure 23. InitiateStageChange Sequence Diagram 62
Figure 24. AddNote Sequence Diagram 63
Figure 25. CreateProfile Storyboard 64
Figure 26. SystemAdministratorSearchProfile Storyboard 65
Figure 27. SystemAdministratorViewProfile Storyboard 66
Figure 28. SystemAdministratorEditProfile Storyboard 67
Figure 29. DeleteProfile Storyboard 68
Figure 30. AddProductEntry Storyboard 69
Figure 31. SearchProductEntryByUID Storyboard 70
Figure 32. SearchProductEntryByEntryInfo Storyboard 71
Figure 33. EmployeeViewProductEntry Storyboard 72
Figure 34. CustomerViewProductEntry Storyboard 73
Figure 35. EditProductEntry Storyboard 74
Figure 36. ArchiveProductEntry Storyboard 75
Figure 37. EditTimeEstimate Storyboard 76
Figure 38. InitiateStageChange Storyboard 77

Revision History

Name	Date	Reason for Changes	Version
CENG Newton Teamja Turtles	Sept. 25th, 2019	Initial Draft of the Requirements Document (RD)	0.1
Duncan MacDonald	Sept. 26th, 2019	Additions to the overall description	0.2
Naomi Schaufele	Sept. 26th, 2019	Additions to Section 5: Other Non-Functional Requirements	0.3
Jordan Sandberg	Sept. 26th, 2019	Additions to the Introduction	0.4
Naomi Schaufele	Sept. 29th, 2019	Added Non-Functional Requirement details from email clarification	0.4
Zhangze Chen	Sept. 29th, 2019	Added the software interface and user interface	0.5
Vincent Potrykus	Sept. 29th, 2019	Added to External Interface Requirements	0.6
Galen Conell	Sept. 29th, 2019	Added to System Features	0.7
Clement Liu	Sept. 29th, 2019	Added to Interfaces	0.8
Vincent Portrykus	Sept. 29th, 2019	Added to Non-Functional Requirements and proofread the document.	0.8
CENG Newton Teamja Turtles	Sept. 30th, 2019	Editing and cleanup of the Requirements Document	0.9
CENG Newton Teamja Turtles	**Sept. 30th, 2019**	**Final Draft of the Requirements Document (RD)**	**1.0**
CENG Newton Teamja Turtles	Oct. 9th, 2019	Initial Draft of the Requirements and Specification Document 1.0 (RSD 1.0)	0.1
Naomi Schaufele	Oct. 10th, 2019	Updated Section 5 and 6 based on client feedback	0.2
Vincent Potrykus	Oct. 10th, 2019	Updated Section 2 based on client feedback	0.3
Duncan MacDonald	Oct. 10th, 2019	Updated Section 2 based on client feedback	0.4
Galen Conell	Oct. 10th, 2019	Updated Section 3 based on client feedback	0.5
Vincent Potrykus	Oct. 11th, 2019	Updated Section 4 based on client feedback, added to the Glossary, added to the References section.	0.5
Vincent Potrykus	Oct. 12th, 2019	Updated Section 5 based on client feedback and reformatted requirements	0.5
Duncan MacDonald	Oct. 15th, 2019	Additions to the glossary and to section 2. Added section 7.	0.5
Galen Conell	Oct. 15th 2019	Changes to the References section	0.5
Jordan Sandberg	Oct. 15th, 2019	Updated Section 1 based on feedback and edit use cases	0.6
Vincent Potrykus	Oct. 15th, 2019	Updated Section 3 based on client feedback	0.6
Zhangze Chen	Oct. 15th, 2019	Update Section 4 based on client feedback	0.7
Clement Liu	Oct. 15th, 2019	Update Section 3 and 4 based on client feedback	0.8
Naomi Schaufele	Oct. 15th, 2019	Added Accessibility requirements based on client feedback to Section 6	0.8
CENG Newton Teamja Turtles	Oct. 15th, 2019	Editing and cleanup of the Requirements and Specification Document	0.9
CENG Newton Teamja Turtles	**Oct. 15th, 2019**	**Final Draft of the Requirements and Specification Document 1.0 (RSD 1.0)**	**1.0**

CENG Newton Teamja Turtles	Oct. 22nd, 2019	Updating document based on client and TA feedback	1.1
CENG Newton Teamja Turtles	Oct. 23rd, 2019	Updating document based on client and TA feedback	1.2
Duncan MacDonald	Oct. 27th, 2019	Rearranged Use Cases, added context diagram	1.3
Naomi Schaufele	Oct. 27th 2019	Added proofreading edits and Use Case table labels	1.4
Galen Conell	Oct. 29th 2019	Added Data Dictionary and general edits	1.5
Vincent Potrykus	Oct. 29th 2019	Edited the glossary, requirements, proofread the document	1.6
Clement Liu	Oct. 29th 2019	Corrected the requirement numbers and relocate some requirements to the correct location	1.7
Zhangze Chen	Oct.29th 2019	Corrected the use case diagram and create the data flow diagram and ER diagram	1.8
Jordan Sandberg	Oct. 29th 2019	Added data flow diagram 2	1.9
CENG Newton Teamja Turtles	**Oct. 29th, 2019**	**Final Draft of the Requirements and Specification Document 2.0 (RSD 2.0)**	**2.0**
CENG Newton Teamja Turtles	Nov. 6th, 2019	Updating document based on client and TA feedback	2.1
Zhangze Chen	Nov. 6th, 2019	Updating the Use Case diagram and ER diagram	2.2
Galen Conell	Nov. 8th, 2019	Updating the Functional Requirements and Data Dictionary	2.3
Naomi Schaufele	Nov. 12th, 2019	Updated Section 5: Non-Functional Requirements, List of Figures & Tables, added content to Sections 6, 7 10, and general proofreading	2.4
Clement Liu	Nov. 13th, 2019	Updating System Feature and External Interface Requirement	2.5
Duncan MacDonald	Nov. 13th, 2019	Updated Use Cases, create sequence diagrams and aligned storyboards	2.6
Clement Liu	Nov. 13th, 2019	Add in sequence diagrams	2.7
Zhangze Chen	Nov. 13th, 2019	Updated Use Case diagram and ER diagram, created sequence diagrams and aligned storyboards	2.8
Vincent Potrykus	Nov. 13th, 2019	Updated Storyboards and Use Case diagrams, proofread the document.	2.9
CENG Newton Teamja Turtles	**Nov. 14th, 2019**	**Final Draft of the Requirements and Specification Document 3.0 (RSD 3.0)**	**3.0**

1 Introduction

1.1 Purpose

Version 3.0 of this document describes the specified behaviour of the solution system by outlining the requirements, constraints, and giving a high-level description for the interfaces of EngVidia's request for the Warrantied Product Tracking System. The solution system will be referred to as PTracker throughout this document. PTracker, when implemented, will replace EngVidia's exiting process of tracking the RMA Process. The existing methodology does not allow EngVidia's staff to access information regarding an item's Stage in the RMA Process efficiently. The purpose of the PTracker is to improve the accessibility of EngVidia's existing process of storing and accessing the Stage information. Providing a method for EngVidia's Employees to easily access RMA information will indirectly improve the efficiency of the RMA Process.

1.2 Project Scope

PTracker will enable any Employee to:

- record the current Stage of the RMA Process for a Product Entry,
- view the Completion Time Estimate for each Product Entry,
- record and view Notes for each Product.

PTracker will enable each Customer to:

- view the Completion Time Estimate for that Customer's Product,
- see which RMA Stage the Product is currently in.

PTracker will improve the overall efficiency and accuracy of the current workflow as well as improve Customer Satisfaction Ratings.

1.3 Glossary of Terms

Archive	To mark an item as having finished the RMA Process in PTracker's database
Company-wide Private Network	EngVidia's computer network of IP addresses that are only visible to Employees
Completion Time Estimate	Completion Time Estimates is an estimate of when the Product will be finished the RMA Process.
Customer	A person or company who owns a Product currently being repaired by EngVida.
Customer Information	Contains the following information about each Customer: ● Customer name, ● Customer email address, ● return address.
Customer	A metric that shows how satisfied the Customers are by the customer service.

Satisfaction Ratings	Rated on a scale of 1 to 5.
Customer Support Team Member	An EngVidia employee that provides support for Customer inquiries regarding information about Product Stages. Each Customer Support Team Member also acts as a System Administrator.
Employee	A person employed by EngVidia. Employees are General Technicians, Quality Assurance Technicians, Customer Support Team Members, System Administrators and S/R staff.
Employee Profile	Each Employee has an Employee Profile in PTracker. The Employee Profile stores the following information about that Employee: ● first name, ● last name, ● email address, ● department.
EngVidia	The client company of CENG Newton Teamja Turtles.
GUI	Graphical User Interface.
General Technician	A Technician that can do refurbishing work on any Product in EngVidia's facility.
Man-hours	The total amount of time spent working on any given Product.
Manufacturer Serial Number	A unique identifier generated by a manufacturer that identifies the Product.
Memory Technician	A Technician that can do refurbishing work on memory-related Products in EngVidia's facility.
Navigable Element	An interface element that causes a context change to the interface. Typical examples include menus, links, buttons, and pages.
Note	A Note contains supplemental information added to any given Product Entry by any Employee. Each Note can be used for internal communication between Employees about details relevant to the repair process. Also used as a means for RMA Process traceability.
Notifications	A PTracker feature that notifies each Customer that opted into this feature about the Stage change of that Customer's Product.
Priority	A rank that is assigned to each Product Entry to denote the urgency (and thus their relative order) of repair service. Priorities are assigned by Technicians in a system that is external to PTracker.
Processor	A Technician that can do refurbishing work on processor related Products in

Technician	EngVidia's facility.
Product	A computer component belonging to any given Customer. That computer component is being repaired at EngVidia's facility.
Product Entry	Contains the following information about a particular Product: ● Customer name, ● Customer email address, ● return address, ● Stage, ● Completion Time Estimate, ● total time the Product has been at EngVidia, ● Product name, ● Priority level, ● Manufacturer name, ● Product serial number, ● Unique Identification Number.
Product Status Information	Contains the following information about the Product: ● Completion Time Estimate, ● Current RMA Stage, ● Total time the Product has been at EngVidia.
Product Manufacturer	A company that produces goods for sale.
PTracker	The proposed system being developed for EngVidia.
Quality Assurance	The department that manages the testing each Product after that Product's repair is completed to ensure that the issues with Products have been solved.
Quality Assurance Technician	A Technician whose role is to perform diagnostic tests on any given Product to ensure that Product is performing correctly.
Refurbishing Process	The process by which a Product is repaired and restored.
RMA Process	Return Merchandise Authorization. The process of a Customer returning a device to receive a refund, replacement, or repair during the Product's warranty period. The Stages included in this process are: 1. Receiving, 2. Assessment, 3. Repair/Replacement or Return, 4. QA (Quality Assurance), 5. Shipping.
Shareholder	An owner of shares in a company.
Shipper and	An Employee whose role is to receive shipments and send shipments.

Receiver (S/R)	
Stage	The step of the RMA Process a given Product is in. The Stages are Receiving, Assessment, Repair/Replacement or Return, QA (Quality Assurance) and Shipping.
System-wide Delay	A delay that affects each Product that is currently in the RMA Process, including delays within EngVidia and external delays. External delays can include Canada Post delays, natural disasters and other unexpected events.
System Administrator	An Employee responsible for maintaining PTracker that has read and write access to all data stored in PTracker. Each System Administrators also acts as a Customer Support Team Member. Each System Administrator is responsible for the creation and deletion of any Employee Profile in PTracker.
Technician	An Employee that does technical work in the Refurbishing Process. A Technician may be a General Technician, Quality Assurance Technician, Memory Technician or a Processor Technician.
Unique Identification Number (UID)	A reference number that any given Client will use to find that Client's Product in PTracker. It is unique for each individual Product.

1.4 References

[1] EngVidia, Client Feedback Meeting. October 3rd, 2019. ECS 128.

[2] EngVidia, Elicitation Meeting. September 24th, 2019. ELW 215.

[3] EngVidia "EngVidia Home Page," September, 2019. [Online]. Available: https://sites.google.com/view/team3-engvidia/home. [Accessed September, 2019].

[4] RD1.1 EngVidia, "RD1.1: Feedback," October, 2019. [Online]. Available: https://sites.google.com/view/team3-engvidia/projects?authuser=0. [Accessed September, 2019].

[5] S. Andreen "Re: SENG 321 designer group," Personal email, Sept. 2019

[6] S. Andreen. "RE: SENG321 Questions and Clarifications," Personal email, Oct. 2019.

[7] S. Andreen. "RE: SENG 321 Team 2 Requirements Clarification," Personal email, Sept. 2019.

[8] EngVidia, "Warrantied Product Tracking System - Request for Proposal," September, 2019. [Online]. Available: https://sites.google.com/view/team3-engvidia/projects?authuser=0. [Accessed September, 2019].

1.5 Overview

This document will outline the features and requirements of EngVidia's Warrantied Product Tracking System. First, EngVidia's existing process of RMA tracking is described. The existing process is then compared to the proposed replacement system, PTracker, and the purpose and product features of PTracker are explained. Once an understanding of PTracker is established, the user classes, operating environment, and design constraints are laid out. Second, PTracker features and their functional requirements are described in more detail and the external interface requirements and other non-functional requirements are laid out. Third, the document then provides use cases for different user interactions, a use case diagram, an entity relationship diagram (ERD) and context/data flow diagrams (DFD). Finally, system-level sequence diagrams and user interface storyboards are provided to illustrate the temporal and visual sequence of interactions within PTracker.

2 Overall Description

2.1 Product Perspective

PTracker is a replacement to an existing process that involves a system where each EngVidia department manages that department's individual Microsoft Excel spreadsheet. In the existing process, each department's spreadsheet has to be manually updated with the time and location of each Product. The current system used by EngVidia requires that each Customer contacting Customer Support to request information about which Stage that Customer's Product is in. Each Customer's Stage request could take up to a day to be sent back to the Customer. PTracker's purpose is to provide a centralized method of tracking a Product through the RMA Process, and a more efficient alternative for Customers to retrieve information regarding their Products. PTracker will also improve communication between each department inside of EngVidia by serving as a single source of data about the Products being repaired. The data collected by PTracker will be used for the following:

- providing each Customer with a Completion Time Estimate for that Customer's Product to increase transparency in EngVidia's RMA Process,
- communicating comments and metrics about Products between each Employee via Notes.

2.2 Product Features

The basic features of PTracker cover the facilitation of tracking each Product's movement through the facility. PTracker will:

- let any Employee log the current Stage any Product is in,
- provide an automatically calculated Completion Time Estimate for each Product,
- store the amount of time that Customer's Product has been at the EngVidia facility,
- let any Technician override the Completion Time Estimate for any Product.

For each Product, any Technician will update that Product's Stage when that Product enters a new Stage. Based on that information, PTracker will then provide a Completion Time Estimate for the Product in

question. Additionally, PTracker will allow each Customer to do the following:

- view the current Stage that Customer's Product is in,
- view the amount of time that Customer's Product has been at the EngVidia facility,
- view an estimate of when that Customer's Product will be finished the RMA Process,
- receive alerts when that Customer's Product has changed stages.

2.3 User Classes and Characteristics

There are four user classes in PTracker. Their respective characteristics include the following:

- **Technician:** Each Technician can perform the following actions in PTracker:
    - view Notes for each Product Entry,
    - add Notes regarding any qualitative data about the Product,
    - update the Stage of any Product,
    - override the Completion Time Estimate if it's inaccurate.
- **Shipper and Receiver:** Each S/R can do the following actions in PTracker:
    - view Notes for each Product Entry,
    - create a new Product Entry for any new Product that arrives at EngVidia,
    - update the Stage of any Product,
    - archive any Product Entry after that Product has left the facility.
- **System Administrator:** Each System Administrator can do the following in PTracker:
    - view Notes for each Product Entry,
    - add Notes regarding any qualitative data about the Product,
    - create a new Product Entry for any new Product that arrives at EngVidia,
    - update the Stage of any Product,
    - archive any Product Entry after that Product has left the facility,
    - override the Completion Time Estimate if it's inaccurate.
- **Customer:** Each Customer has access to that Customer's Product's Completion Time Estimate, the Stage that Product is in and information on how long that Product has been at the EngVidia facility.

The stakeholders of PTracker include any Employee, Customer, EngVidia Shareholder, as well as the designers and developers of PTracker. PTracker will reduce the number of Man-hours put into a Product and reduce the cost of Product repairs.

2.4 Operating Environment

PTracker will be running in a computer part refurbishing plant owned by EngVidia. Each hardware platform must compatible with a barcode scanner, and be able to connect to the Company-wide Private Network. Each Customer's computer must be able to run one of the following:

- Google Chrome version 70 or greater,
- Mozilla Firefox version 65 or greater,
- Opera version 50 or greater.

2.5 Design and Implementation Constraints

PTracker must adhere to the following constraints:

- No Customer will be able to see Notes added by any Employee.
- No Customer will be able to see any information about any Employee.
- The cost of creating PTracker must not exceed EngVidia's budget of $100,000 CAD.

2.6 Assumptions and Dependencies

Since there are no connections between departments in the existing process, there will have to be a new network put in place that connects all of the departments to a centralized database in the Company-wide Private Network. With the implementation of PTracker, network security protocols will need to be considered. It is assumed that there will need to be an encryption protocol for data transfer inside of the network. It is assumed that there is no access control in the existing process for the different user classes.

3 System Features

This section contains descriptions and functional requirements for Product Entry, Employee Profile, Customer Contact, Employee Interface Functions and Customer Interface Functions.

3.1 Product Entry

3.1.1 Description

Each Product Entry contains that Product's Manufacturer Serial Number, information about the Customer who owns that Product and information about that Product's current Stage. Each Product has exactly one Product Entry. Each Product Entry also has a Priority that an employee can view which is used for determining where in a department a product is being stored.

3.1.2 Functional Requirements

SF-REQ-1.1 <High Priority>: Each Employee must be able to view the Unique Identification Number of a Product.

SF-REQ-1.2 <High Priority>: Each Customer must be able to view the Unique Identification Number of that Product.

SF-REQ-1.3 <High Priority>: Each S/R must be able to view the name of the Customer that owns that Product.

SF-REQ-1.4 <High Priority>: Each System Administrator must be able to view the name of the Customer that owns that Product.

SF-REQ-1.5 <High Priority>: Each S/R must be able to view that Product's return address.

SF-REQ-1.6 <High Priority>: Each System Administrator must be able to view that Product's return address.

SF-REQ-1.7 <High Priority>: Each S/R must be able to view the contact information of the Customer that owns that Product.

SF-REQ-1.8 <High Priority>: Each System Administrator must be able to view the contact information of the Customer that owns that Product.

SF-REQ-1.9 <High Priority>: Each Employee must be able to view the Product's name.

SF-REQ-1.10 <High Priority>: Each Employee must be able to view the Manufacturer Serial Number.

SF-REQ-1.11 <Medium Priority>: Each Employee must be able to create notes about that Product.

SF-REQ-1.12 <Medium Priority>: Each Employee must be able to view a Completion Time Estimate for that Product.

SF-REQ-1.13 <Medium Priority>: Each Customer must be able to view a Completion Time Estimate for that Product.

SF-REQ-1.14 <Medium Priority>: Each Employee must be able to view which Stage each Product is in.

SF-REQ-1.15 <Medium Priority>: Each Customer must be able to view which Stage each Product is in.

SF-REQ-1.16 <Low Priority>: Each Employee must be able to view the Priority of that Product.

3.2 Employee Profile

3.2.1 Description

Each Employee's Employee Profile contains information about that Employee, and serves as the Employee's account within PTracker. Employees are required to log into their Profiles in order to access and use PTracker's functionalities.

3.2.2 Functional Requirements

SF-REQ-2.1 <High Priority>: For each Employee, the Employee Profile must contain that Employee's information: first name, last name, phone number, home address, email address.

3.3 Customer Contact

3.3.1 Description

PTracker will automatically inform each Customer about changes to their Product in the RMA Process. Each Customer that opted into Notifications will be notified about each Stage change of that Customer's Product.

3.3.2 Functional Requirements

SF-REQ-3.1 <High Priority>: Each Customer must receive an email with that Customer's Product's Unique Identification Number.

SF-REQ-3.2 <Medium Priority>: Each Customer must be able to opt into Notifications.

SF-REQ-3.3 <Medium Priority>: Each Customer who opted in to Notifications must be notified when that Customer's Product is moved to another RMA Stage.

3.4 Employee Interface Functions

3.4.1 Description

The PTracker will be used by all Employees in EngVidia. When each Employee logs in to PTracker, the Employee Interface is different according to that Employee's role. System Administrators hold all the privileges, therefore, can do anything any other Employee can do in PTracker.

3.4.2 General Functional Requirements for all Employees

SF-REQ-4.1 <High Priority>: Each Employee must be able to view any Product Entry.

SF-REQ-4.2 <Medium Priority>: Each Employee must be able to search for each Product Entry based on that Product's Unique Identification Number.

SF-REQ-4.3 <Medium Priority>: Each Employee must be able to view that Employee's Employee Profile.

SF-REQ-4.4 <Medium Priority>: Each Employee must be able to edit that Employee's Employee Profile.

SF-REQ-4.5 <Medium Priority>: Each Employee must be able to view any Note belonging to any Product Entry.

SF-REQ-4.6 <Medium Priority> Each Employee must be able to search each Product based on that Product's UID.

3.4.3 S/R Interface Requirements

SF-REQ-4.7 <High Priority>: Each S/R must be able to create a new Product Entry.

SF-REQ-4.8 <High Priority>: When each Product leaves the S/R department, each S/R must be able to archive that Product's Product Entry.

SF-REQ-4.9 <Medium Priority>: Each S/R must be able to search for each Product Entry based on that Product's Customer Information.

3.4.4 Technician Interface Requirements

SF-REQ-4.10 <High Priority>: When any given Product moves to another Stage, any Technician working on that Product must be able to initiate Stage change in PTracker.

SF-REQ-4.11 <High Priority>: Any Technician working on a Product must be able to override the Completion Time Estimate for that Product.

SF-REQ-4.12 <Medium Priority> Each Technician must be able to confirm the Stage change initiated by the Technician in the previous Stage.

SF-REQ-4.13 <Medium Priority>: Each Technician must be able to add any number of Notes to any Product Entry.

3.4.5 System Administrator Interface Requirements

SF-REQ-4.14 <High Priority>: Each System Administrator must be able to create an Employee Profile.

SF-REQ-4.15 <High Priority>: Each System Administrator must be able to view any Employee Profile.

SF-REQ-4.16 <High Priority>: Each System Administrator must be able to edit any Employee Profile.

SF-REQ-4.17 <High Priority>: Each System Administrator must be able to delete any Employee Profile.

SF-REQ-4.18 <High Priority>: Each System Administrator must be able to archive that Product's Product Entry.

SF-REQ-4.19 <Medium Priority>: Each System Administrator must be able to add any number of Notes to any Product.

SF-REQ-4.20 <Medium Priority>: Each System Administrator must be able to search for each Product Entry based on that Product's Customer Information.

3.5 Customer Interface Functions

3.5.1 Description

The Customer Interface is used by each Customer to view that Customer's Product's Stage and Completion Time Estimate. Each Customer will receive an email containing a Unique Identification Number for that Customer's, which will allow that Customer to find that Product's information in PTracker. If any Customer has more than one Product, that Customer will be sent a separate email for each Product.

3.5.2 Functional Requirements

SF-REQ 5.1 <High Priority>: Each Customer must be able to find that Customer's Product's Product

Entry using that Product's Unique Identification Number.

SF-REQ-5.2 <High Priority>: Each Customer must be able to view the Completion Time Estimate for that Customer's Product.

SF-REQ-5.3 <High Priority>: Each Customer must be able to view how long that Product has been at the EngVidia facility.

SF-REQ-5.4 <Medium Priority>: Each Customer must be able to view the Stage that Customer's Product is currently in.

SF-REQ-5.5 <Medium Priority>: Each Customer must be able to see information about any System-wide Delay.

4 External Interface Requirements

4.1 Barcode

4.1.1 Description

The barcode contains the Unique Identification Number for a given Product. This feature will allow any Employee to easily process any Product by scanning the barcode instead of manually entering the Unique Identification Number.

4.1.2 Functional Requirements

EI-REQ-1.1 <High Priority>: PTracker must allow any Employee to scan the Unique Identification Number form a barcode.

EI-REQ-1.2 <Medium Priority>: PTracker must allow any S/R to print out a barcode for any Product.

5 Other Non-Functional Requirements

This section lists other requirements that outline the parameters of PTracker's characteristics in terms of various software quality metrics. Firstly, the performance requirements specify objectives concerning the response times, the total number of concurrent users, and the total number of Products being serviced. Secondly, the security requirements specify authentication conditions that PTracker must enforce in order to preserve Product Entry data integrity. Lastly, software quality attributes detail expectations regarding characteristics of PTracker, and serve to inform future design choices.

5.1 Performance Requirements

Since PTracker's main objectives include automating the tracking process of Product repairs, there are no

significant safety risks if PTracker were to experience a sudden network failure or power outage.

PTracker is expected to update the change of Stage of any given Product within 5 minutes. While larger margins of error likely will not interfere with the RMA Process, having accurate information provided to Customers will allow the Customer Service department to provide better support and time estimates.

PTracker is expected to be able to support at least 150 concurrent Employee users and at least 750 concurrent Products being serviced at any given time.

Performance expectations regarding speed and capacity for PTracker thus include the following:

NF-REQ-1.1 <High Priority>: Each change to the Stage of each Product Entry must be updated within 5 minutes.

NF-REQ-1.2 <High Priority>: PTracker must be able to support at least 750 concurrent Products being serviced at any given time.

NF-REQ-1.3 <Medium Priority>: PTracker must be able to support at least 150 concurrent Employee users.

5.2 Security Requirements

The most sensitive data that PTracker has access to are personally identifiable information relating to Customers and Employees. PTracker must, therefore, employ methods to restrict direct database access by the general public to ensure confidentiality of Customer and Employee information. PTracker must also provide an email and password login and authentication mechanism to Employees to ensure data integrity. Another, but less important, feature of PTracker would be to employ an encryption mechanism to add another layer of security to all personally identifiable information.

Requirements regarding security and privacy thus include the following:

NF-REQ-2.1 <High Priority>: The Customer Interface must never have direct access to the central database.

NF-REQ-2.2 <High Priority>: PTracker must provide an email and password-protected access for each employee to access the Employee Interface.

NF-REQ-2.3 <Low Priority>: All data relating to Customers and Employees must be encrypted.

5.3 Software Quality Attributes

Other software quality metrics for PTracker include reliability, availability, maintainability, usability, accessibility, and learnability.

5.3.1 Reliability

To ensure that up-to-date information regarding Product Entries is always accessible, PTracker must perform daily data backups to minimise data loss in the event of a network or power failure.

NF-REQ-3.1 <High Priority>: PTracker must perform daily data backups.

5.3.2 Availability

Ideally, PTracker would be available as much as possible, but due to the nature of the automated work being non-critical, the availability of the service is expected to be at least of the time 99% of the time.

NF-REQ-3.2 <Medium Priority>: PTracker must be operational 99% of the time.

5.3.3 Maintainability

PTracker should ensure that the Product Entry information for each Product is valid and updated in real time. Each interface must be simple to use, to better facilitate user interactions within PTracker and with the Customer Support Team Members.

NF-REQ-3.3 <High Priority>: Each System Administrator must be able to restore PTracker in the event of a system failure.

NF-REQ-3.4 <Low Priority>: PTracker must allow the addition of future functionalities by employing modular design.

5.3.4 Usability

PTracker should aim to have a simple GUI for each of the two interfaces and minimal navigation and menu choices to ensure that relevant information can be accessed within 3 navigational actions.

NF-REQ-3.5 <Medium Priority>: The number of Navigable Elements that a Customer must navigate to reach the desired Product information must not exceed 3.

NF-REQ-3.6 <Low Priority>: A Customer must be able to find information related to their Product in under 60 seconds.

5.3.5 Accessibility

The Customer Interface must be designed to be accessible for a wide range of users. PTracker therefore must be implemented in a way that will interface with standard screen-reader technologies and follow the Web Accessibility Guidelines 2.0 (ISO/IEC 40500).

NF-REQ-3.7 <Medium Priority>: The Customer Interface must be usable by any Customer with visual impairments.

5.3.6 Learnability

The Employee Interface must be simple enough to use so that new hires are able to efficiently manage Product Entries and Notes after one day of training. The performance efficiency of new hires will be assessed by the respective EngVidia department supervisors and will be a criterion that is external to PTracker.

NF-REQ-3.8 <Low Priority>: An Employee must be able to use PTracker proficiently after 1 day of training.

6 Other Requirements

Two important external dependencies are the following:

- A centralized database that houses all data pertaining to any given Product Entry (Stages and Notes) and any given Employee Profile, that can be accessed by any Employee and cannot be accessed by any Customer.
- A Company-wide Private Network that provides a secure connection between all departments, the centralized database, and the internet.

The following requirements dictate how PTracker is required to use these external dependencies:

OR-REQ-1.1 <High Priority>: PTracker must interface with the internet.

OR-REQ-1.2 <High Priority>: PTracker must interface with the Company-wide Private Network.

7 Use Cases

This section lists the expected sequence of actions and flow of events that dictate the interactions between the target users and PTracker to accomplish specific goals. Figure 1 below illustrates how all the following use cases relate to each other and to specific user roles within PTracker. Tables 1 to 20 detail the expected sequence of interactions and results for each specific use case within PTracker.

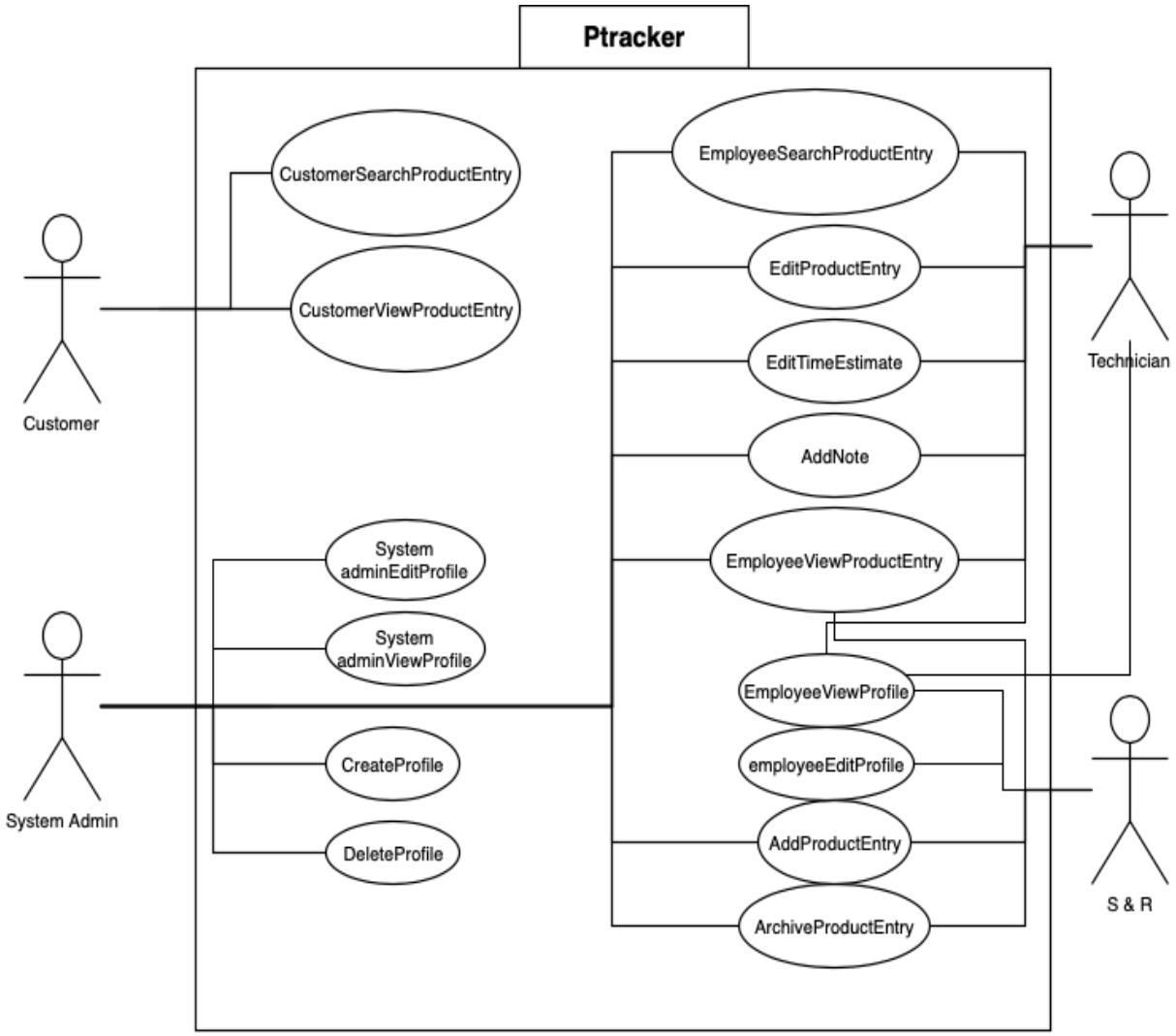


Figure 1. Use Case Diagram for PTracker.

Table 1: Use Case UC1 CreateProfile

Use Case: CreateProfile
ID: UC1
Brief Description: A System Administrator creates a EngVidia Employee Profile.
Actor: System Administrator
Preconditions: ● The Employee Profile must not already exist. ● The System Administrator must be logged in.
Main Flow: 1. The System Administrator chooses to create a new profile 2. While any field in the registration form is empty or invalid. 2.1. The System Administrator is prompted to enter Employee Profile information. 2.2. The Employee Profile's details are validated. 3. The System Administrator creates a new Employee Profile.
Postconditions: ● PTracker creates a new Employee ID. ● PTracker records all of that Employee's information given and that Employee's ID.
Alternative Flow: N/A

Table 2: User Case UC2 SystemAdministratorSearchProfile

Use Case: SystemAdministratorSearchProfile
ID: UC2
Brief Description: A System Administrator searches for a profile.
Actor: System Administrator
Preconditions: ● The Employee Profile must exist. ● The System Administrator must be logged in.
Main Flow: 1. While the Profile information entered does not match anything recorded in PTracker: 1.1. The actor enters the Profile information in PTracker. 2. The System Administrator is shown Profiles related to the Profile information.
Postconditions: N/A
Alternative Flow: N/A

Table 3: User Case UC3 SystemAdministratorViewProfile

Use Case: SystemAdministratorViewProfile
ID: UC3
Brief Description: A System Administrator views a profile.
Actor: System Administrator
Preconditions: ● The Employee Profile must exist. ● The System Administrator must be logged in.
Main Flow: 3. include(SystemAdminstratorSearchProfile). 4. The System Administrator selects an Employee Profile to view. 5. The System Administrator is shown the Employee Profile information.
Postconditions: N/A
Alternative Flow: N/A

Table 4: Use Case UC4 EmployeeViewProfile

Use Case: EmployeeViewProfile
ID: UC4
Brief Description: An actor views that actor's Employee Profile.
Actor: S/R, Technician
Preconditions: ● Employee Profile must exist. ● Actor must be logged in.
Main Flow: 1. The actor selects to view their profile. 2. The actor is shown their profile information.
Postconditions: N/A
Alternative Flow: N/A

Table 5: Use Case UC5 EmployeeEditProfile

Use Case: EmployeeEditProfile
ID: UC5
Brief Description: An actor edits an Employee Profile information.
Actor: Technician, S/R
Preconditions: ● The Employee Profile must exist. ● The actor must be logged in.
Main Flow: 1. The actor selects profile to edit. 2. While fields are blank, unchanged or invalid 2.1. The actor is prompted to enter new information. 3. The actor confirms the changes they have made.
Postcondition: ● Changed details are recorded in PTracker.
Alternative Flow: 2.1 b) CancelEdit

Table 6: Use Case UC6 SystemAdministratorEditProfile

Use Case: SystemAdministratorEditProfile
ID: UC6
Brief Description: A System Administrator edits an Employee Profile.
Actor: System Administrator
Preconditions: ● The Employee Profile must exist. ● The System Administrator must be logged in.
Main Flow: 1. The System Administrator searches for any Employee Profile using that Employee's name. 2. The System Administrator selects profile to edit. 3. While fields are blank, unchanged or invalid 3.1. The System Administrator is prompted to enter new information. 4. The System Administrator confirms the changes they have made.
Postcondition: ● Changed details are recorded in PTracker.
Alternative Flow: 3.1 b) CancelEdit

Table 7: Use Case UC6.1 EditProfile with Cancel

Use Case: EditProfile **Alternate Flow: CancelEdit**
ID: UC6.1
Brief Description: An actor wants to cancel editing an Employee Profile.
Actor: System Administrator, S/R, Technician
Preconditions: ● The actor has selected an Employee Profile to edit. ● The actor must be logged in.
Main Flow: 1. The alternate flow begins at step 2.1 of EmployeeEditProfile or 3.1 of SystemAdministratorEditProfile. 2. The actor chooses to cancel editing an Employee Profile. 3. The actor enters back in EditProfile the beginning of step 3.
Postcondition: ● An Employee Profile is not edited.
Alternative Flow: N/A

Table 8: Use Case UC7 DeleteProfile

Use Case: DeleteProfile
ID: UC7
Brief Description: A System Administrator deletes an Employee's profile.
Actor: System Administrator
Preconditions: ● The Employee Profile must exist. ● System Administrator must be logged in.
Main Flow: 1. The System Administrator searches for profile using profile details (name, ID, etc.). 2. The System Administrator selects to remove profile. 3. The System Administrator confirms they want to remove user.
Postcondition: ● The Employee Profile is removed from PTracker.
Alternative Flow: N/A

Table 9: Use Case UC8 AddProductEntry

Use Case: AddProductEntry
ID: UC8
Brief Description: An actor adds a Product Entry to PTracker.
Actor(s): S/R, System Administrator
Precondition: ● The Product is a computer component. ● The actor is logged into PTracker
Main Flow: 1. While all necessary fields are not filled in: 1.1. The actor enters Product information: ● Customer name, ● Customer email address, ● return address, ● Product name, ● Manufacturer name, ● Product serial number. 1.2. The actor confirms the information they entered.
Postconditions: ● A Unique Identification Number is generated for that Product. ● The Product Entry is recorded in PTracker's database.
Alternative Flows: N/A

Table 10: Use Case UC9 SearchProductEntryByUID

Use Case: SearchProductEntryByUID
ID: UC9
Brief description: The actor searches and views a Product Entry.
Actors: Technician, System Administrator, S/R, Customer
Preconditions: ● The actor is logged into PTracker.
Main Flow: 1. While the Unique Identification Number entered is invalid: 1.1. The actor enters the Unique Identification Number in PTracker. 2. The actor is shown the Product Entry related to that Unique Identification Number.
Postcondition: N/A
Alternative Flows: 1.1 b) ProductEntryNotFound

Table 11: Use Case UC10 SearchProductEntryByEntryInfo

Use Case: SearchProductEntryByEntryInfo
ID: UC10
Brief description: The actor searches and views a Product Entry.
Actors: Technician, System Administrator
Preconditions: ● The actor is logged into PTracker.
Main Flow: 1. While the Product Entry information entered does not match anything recorded in PTracker: 1.1. The actor enters the Product Entry information. 2. The actor is shown the Product Entries related to the Product Entry information.
Postcondition: N/A
Alternative Flows: 1.1 b) ProductEntryNotFound

Table 12: Use Case UC11 SearchProductEntryByCustomerInfo

Use Case: SearchProductEntryByCustomerInfo
ID: UC11
Brief description: The actor searches and views a relevant Product Entry list using the Customer information.
Actors: Technician, System Administrator
Preconditions: ● The actor is logged into PTracker.
Main Flow: 1. While the Customer Information entered does not match anything recorded in PTracker: 1.1. The actor enters the Customer Information in PTracker. 2. The actor is shown a list of Product Entries related to the Customer Information.
Postcondition: N/A
Alternative Flows: 1.1 b) ProductEntryNotFound

Table 13: Use Case UC11.1 SearchProduct with ProductNotFound

Use Case: SearchProductEntryByEntryInfo, SearchProductEntryByCustomerInfo, SearchProductEntryByUID **Alternative Flow: ProductEntryNotFound**
ID: UC11.1
Brief description: An actor entered a Product information that isn't recorded in PTracker's database.
Actors: Technician, System Administrator, Customer, S/R
Preconditions: ● The actor has searched for a Product Entry.
Main Flow: 1. The actor is told there is no Product Entry related to the information they have entered. 2. The actor is prompted to search for the Product again.
Postcondition: ● A list of relevant Product Entries is displayed on the screen.
Alternative Flows: N/A

Table 14: Use Case UC12 EmployeeViewProductEntry

Use Case: EmployeeViewProductEntry
ID: UC12
Brief Description: An actor views a Product Entry.
Actor: Technician, System Administrator, S/R
Preconditions: ● The Product Entry must exist in PTracker. ● The actor is logged into PTracker.
Main Flow: 1. include(SearchProductEntryByUID or SearchProductEntryByCustomerInfo or SearchProductEntryByEntryInfo) 2. The actor selects a Product Entry to view. 3. The Product Entry details are displayed on the screen.
Postconditions: N/A
Alternative Flow: N/A

Table 15: Use Case UC13 CustomerViewProductEntry

Use Case: CustomerViewProductEntry
ID: UC13
Brief Description: A Customer views a Product's information.
Actor: Customer
Preconditions: ● The Product is recorded in PTracker. ● The Customer knows the Unique Identification Number.
Main Flow: 1. While the Unique Identification Number entered is invalid. 1.1. The actor enters the Unique Identification Number in PTracker. 2. The Customer sees that Product's Status Information.
Postconditions: N/A
Alternative Flow: N/A

Table 16: Use Case UC14 EditProductEntry

Use Case: EditProductEntry
ID: UC14
Brief Description: An actor edits a Product Entry.
Actor: Technician, System Administrator
Preconditions: ● The Product Entry must exist in PTracker. ● The Product Entry is not archived. ● The actor is logged into PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor selects the Product Entry to edit. 3. The actor selects one or more of the Product Entry's fields and updates its information. 4. The actor confirms the changes they have made.
Postconditions: ● Changed Product Entry's fields are recorded in PTracker's database.
Alternative Flow: N/A

Table 17: Use Case UC15 ArchiveProductEntry

Use Case: ArchiveProductEntry
ID: UC15
Brief Description: The actor archives Product Entry.
Actor: S/R, System Administrator
Preconditions: ● The Product Entry must exist in PTracker. ● The Product Entry is not already archived. ● The actor Technician is already logged into PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor archives the Product Entry. 3. The actor confirms that they want to archive the Product Entry.
Postconditions: ● The Product Entry is recorded as archived in PTracker's database.
Alternative Flow: N/A

Table 18: Use Case UC16 EditTimeEstimate

Use Case: EditTimeEstimate
ID: UC16
Brief description: The actor overrides the Completion Time Estimate.
Actors: Technician, System Administrator
Preconditions: ● The Technician must be logged in to PTracker. ● The Product Entry must exist in PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor selects the Product's Completion Time Estimate to edit. 3. The actor enters a new time for the Product's Completion Time Estimate 4. The actor confirms the changes they have made.
Postconditions: ● New estimation is recorded in PTracker.
Alternative Flow: N/A

Table 19: Use Case UC17 InitiateStageChange

Use Case: InitiateStageChange
ID: UC17
Brief description: The actor initiates Stage change.
Actors: Technician, System Administrator, S/R
Preconditions: ● The Technician must be logged in to PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor selects the Product's Stage to edit. 3. The actor enters a Stage. 4. The actor confirms the changes they have made.
Postconditions: ● New Stage initiation is recorded in PTracker.
Alternative Flow: N/A

Table 20: Use Case UC18 AcceptStageChange

Use Case: AcceptStageChange
ID: UC18
Brief description: The actor accepts Stage change.
Actors: Technician, System Administrator
Preconditions: ● The Technician must be logged in to PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor selects the Product's Stage to edit. 3. The actor accepts the Stage change. 4. The actor confirms the changes they have made.
Postconditions: ● New Stage change is recorded in PTracker.
Alternative Flow: N/A

Table 21: Use Case UC19 AddNote

Use Case: AddNote
ID: UC19
Brief description: The actor adds a Note to a Product.
Actors: Technician, System Administrator.
Preconditions: ● The actor is logged in to PTracker. ● The Product Entry must exist in PTracker.
Main Flow: 1. include(EmployeeViewProductEntry) 2. The actor selects the Product Entry to edit. 3. The actor adds a new Note to the Product Entry.
Postcondition: ● Notes are recorded for the Product.
Alternative Flows: N/A

8 Entity Relationship Diagram

Figure 2 below illustrates the logical structure of relationships between entities with each other, as well as with their attributes (properties). This Entity Relationship Diagram provides the basis for documenting the collection of data and models that will be used when designing a database that interfaces with PTracker.

8.1 Entity Relationship Diagram

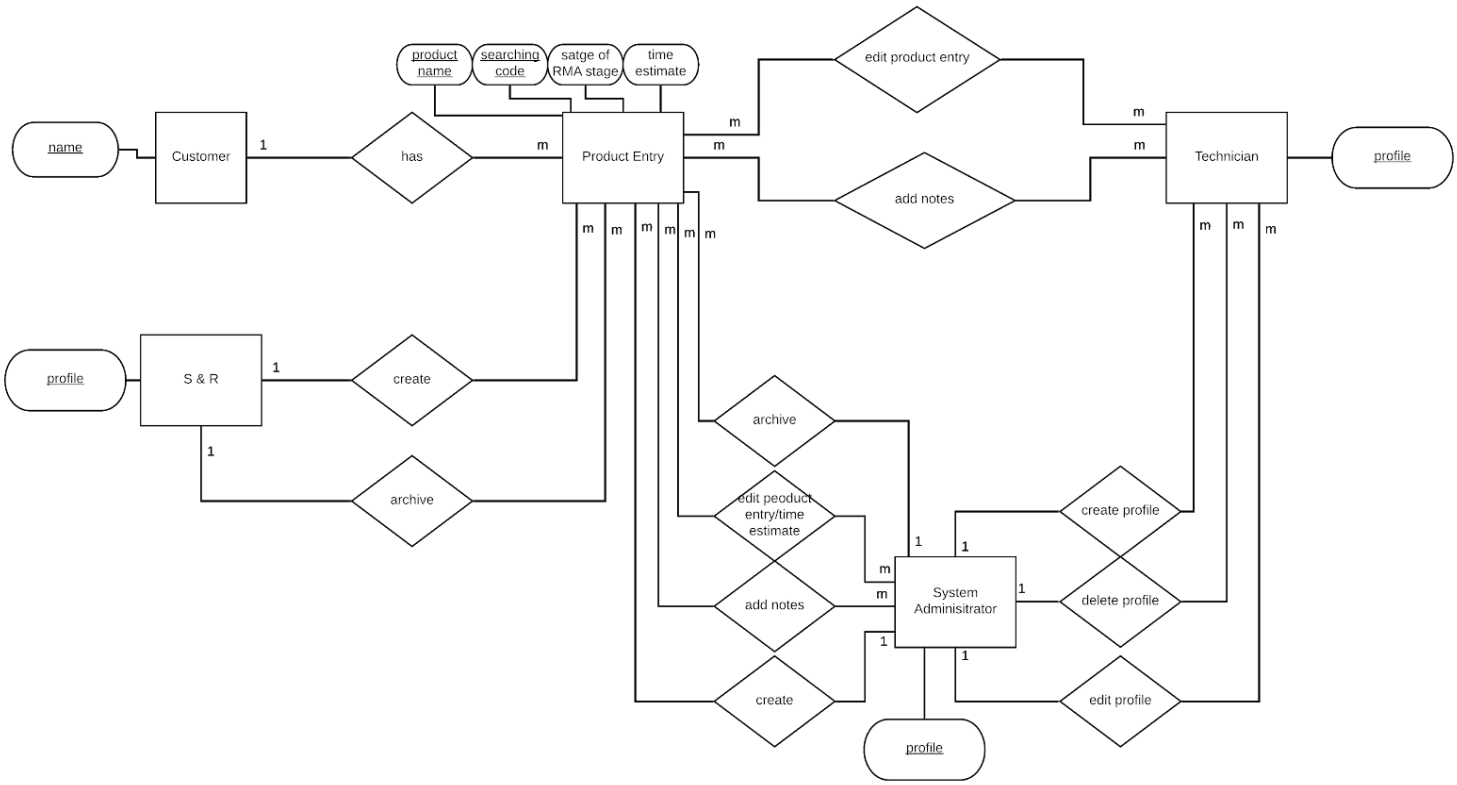


Figure 2. Entity Relationship Diagram for PTracker.

8.2 Data Dictionary

The Data Dictionary detailed below in Table 14 includes all attributes for each entity shown in the Entity Relationship Diagram in Figure 2, as well as properties for key pieces of data that PTracker handles.

Table 22. Data Dictionary for PTracker.

Name	Attributes
Customer	customer-name, product-name;
Product Entry	customer-name, email-address, return-address, product-name, manufacturer-name, product-serial-number, completion-time-estimate, unique-identification-number;
S&R	employee-profile;
System Administrator	employee-profile;
Technician	employee-profile;
customer-name	(name of the Customer who owns that Product);
product-name	(name of the Product belonging to the Customer);
email-address	(the primary method of communication used for contacting the Customer);
return-address	(the address used for returning the Customer's Product);
manufacturer-name	(the name belonging to the company that produced the Product being repaired);
product-serial-number	(a number generated by the manufacturer to identify the Product);
completion-time-estimate	(an estimate generated by PTracker to estimate how long a Product will be in a Stage);
unique-identification-number	(a number generated by EngVidia to identify the Product);
employee-profile	(a profile belonging to an Employee);

9 Data Flow Diagram

The following Data Flow Diagrams illustrate how the data and information flows between entities and processes as users interact with PTracker. The Context Diagram depicted in Figure 3 provides information for the general flow of inputs and outputs to and from each entity (the main user classes) and PTracker. The Data Flow Diagram Level 1 in Figure 4 expands the Context Diagram to describe the main processes within PTracker. The Data Flow Diagram Level 2 in Figure 5 further expands one process, specifically the Process Product Entry sub-process, to describe the data flow in more detail.

9.1 Data Flow Diagram Level 0 (Context Diagram)

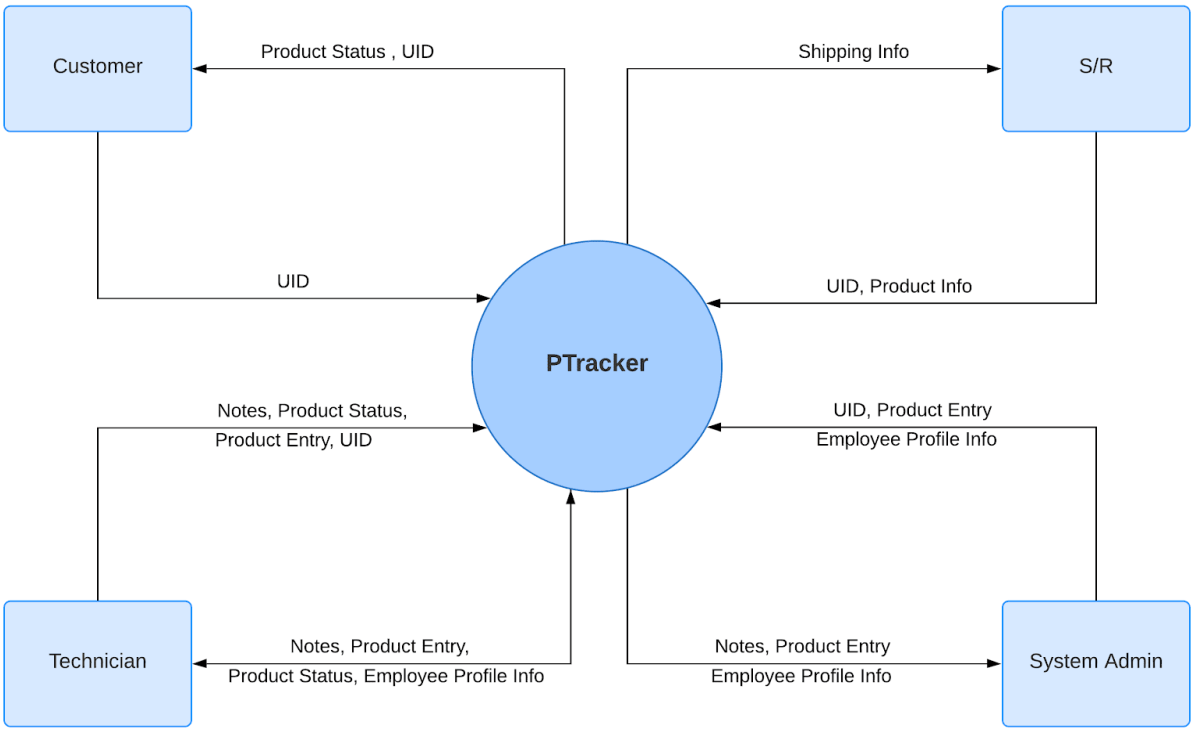


Figure 3. Data Flow Diagram Level 0 (Context Diagram) for PTracker.

9.2 Data Flow Diagram Level 1

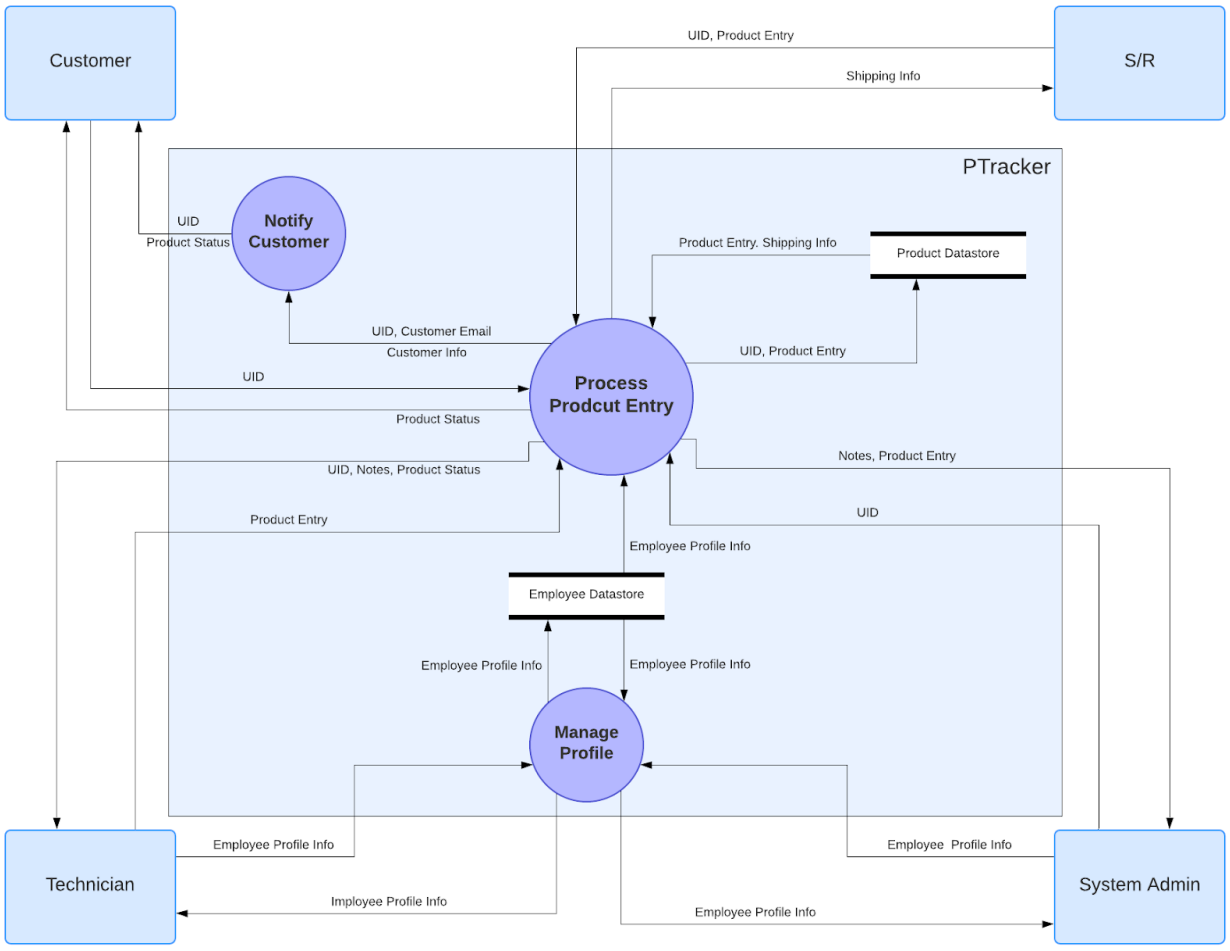


Figure 4. Data Flow Diagram Level 1 for PTracker.

9.3 Data Flow Diagram Level 2

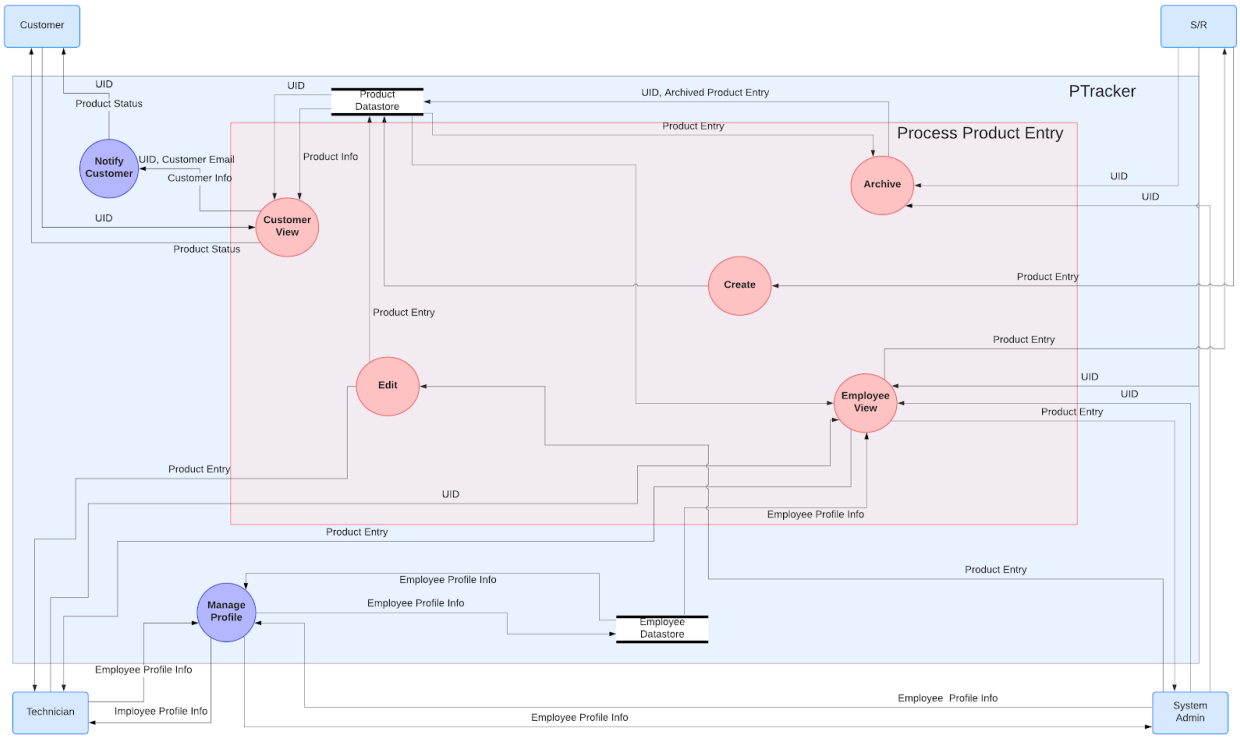


Figure 5. Data Flow Diagram Level 2 for PTracker.

10 PTracker System-Level Sequence Diagrams

The following figures depict the system-level sequence diagrams for each of the major use cases outlined in previous sections. Each sequence diagram represents the linear and temporal flow of events that occur as the main users (actors) interact with PTracker, as well as those that occur between PTracker and a relevant database.

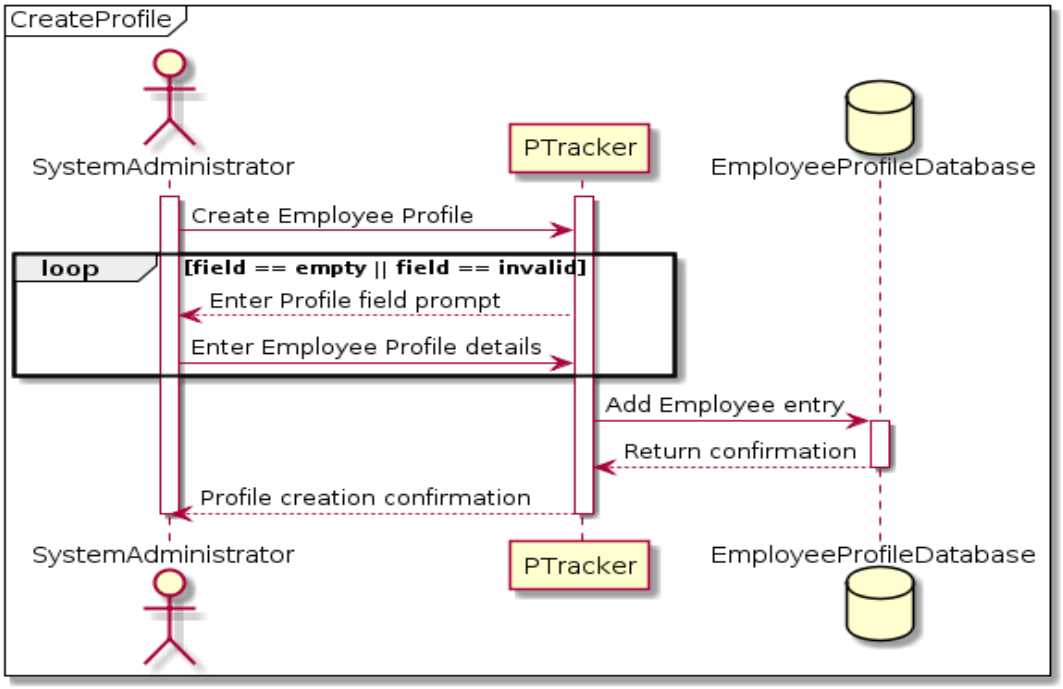


Figure 6. CreateProfile Sequence Diagram

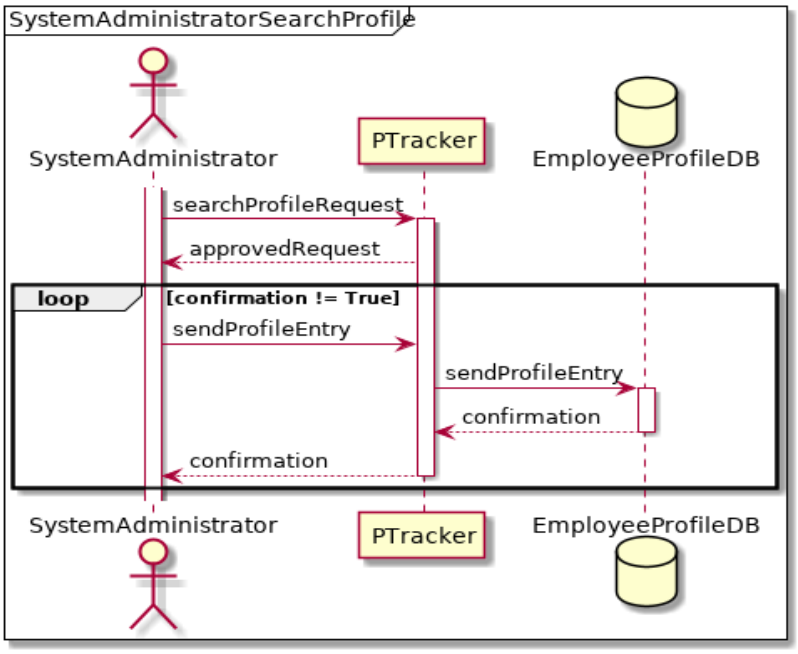


Figure 7. SystemAdministratorSearchProfile Sequence Diagram

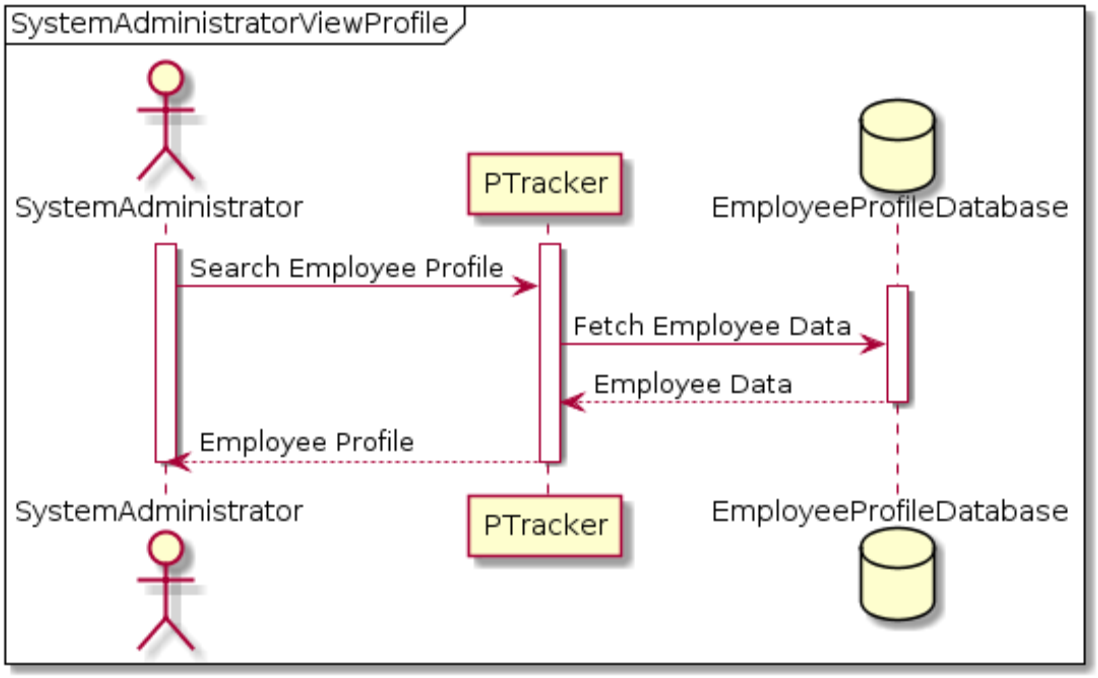


Figure 8. SystemAdministratorViewProfile Sequence Diagram

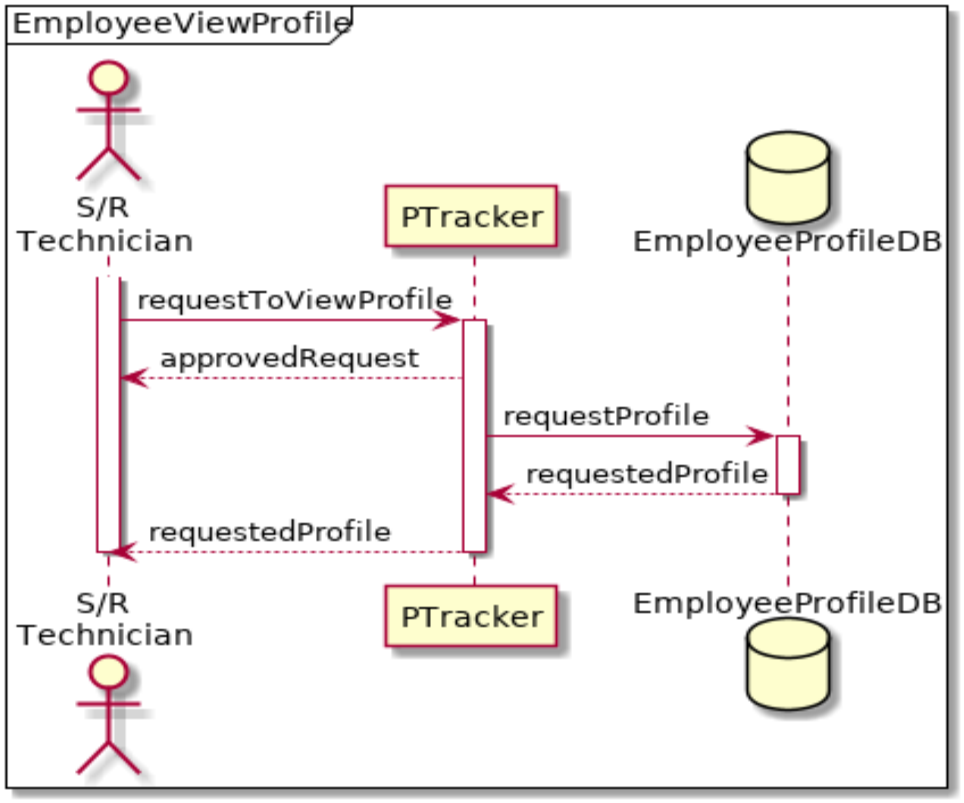


Figure 9. EmployeeViewProfile Sequence Diagram

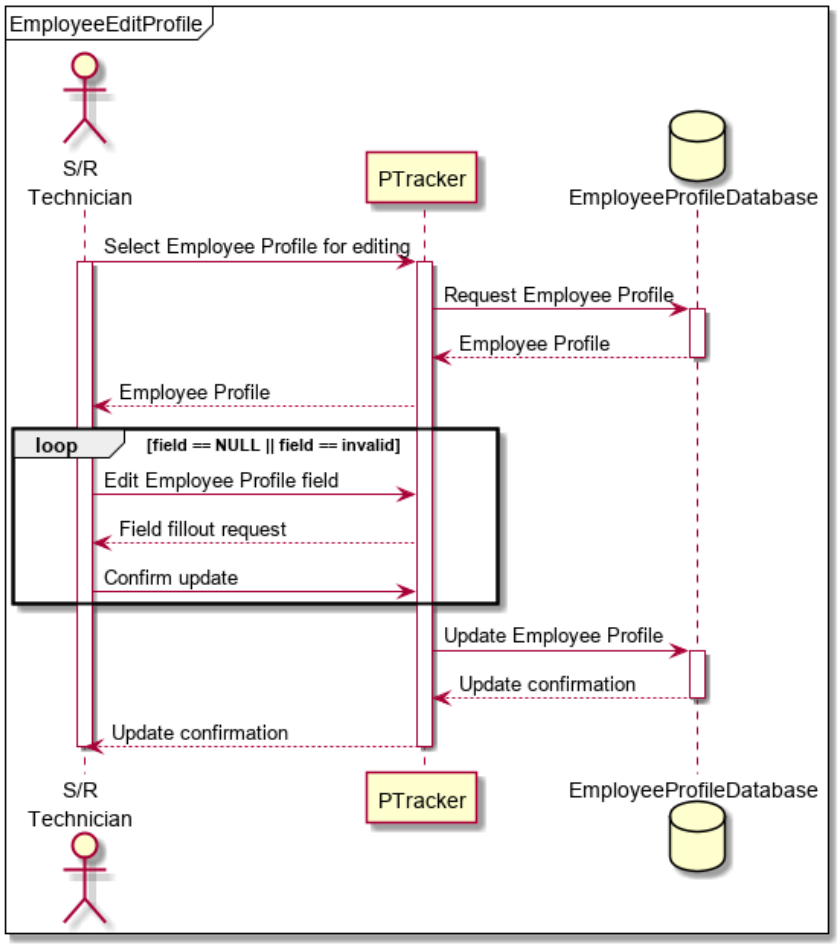


Figure 10. EmployeeEditProfile Sequence Diagram

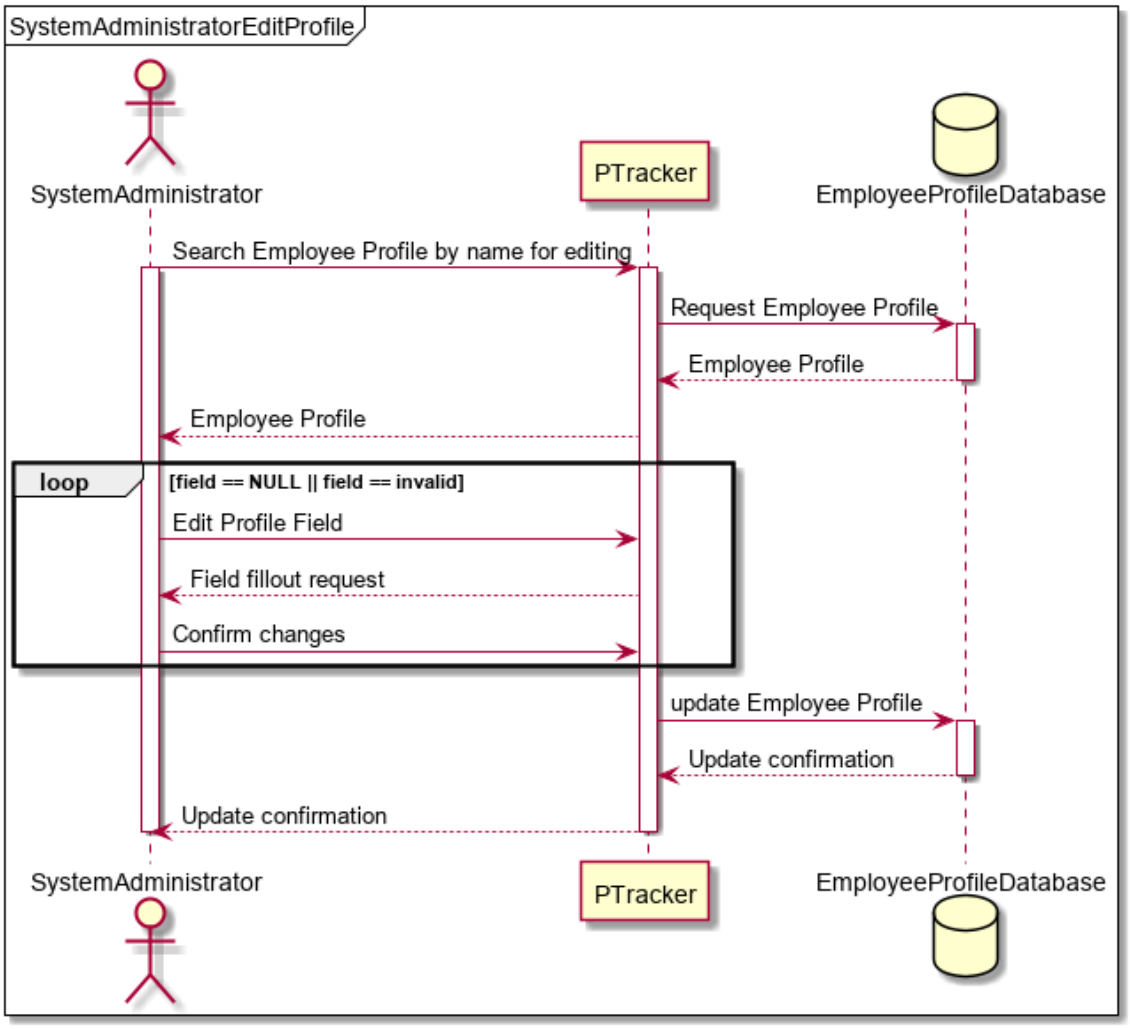


Figure 11. SystemAdministratorEditProfile Sequence Diagram

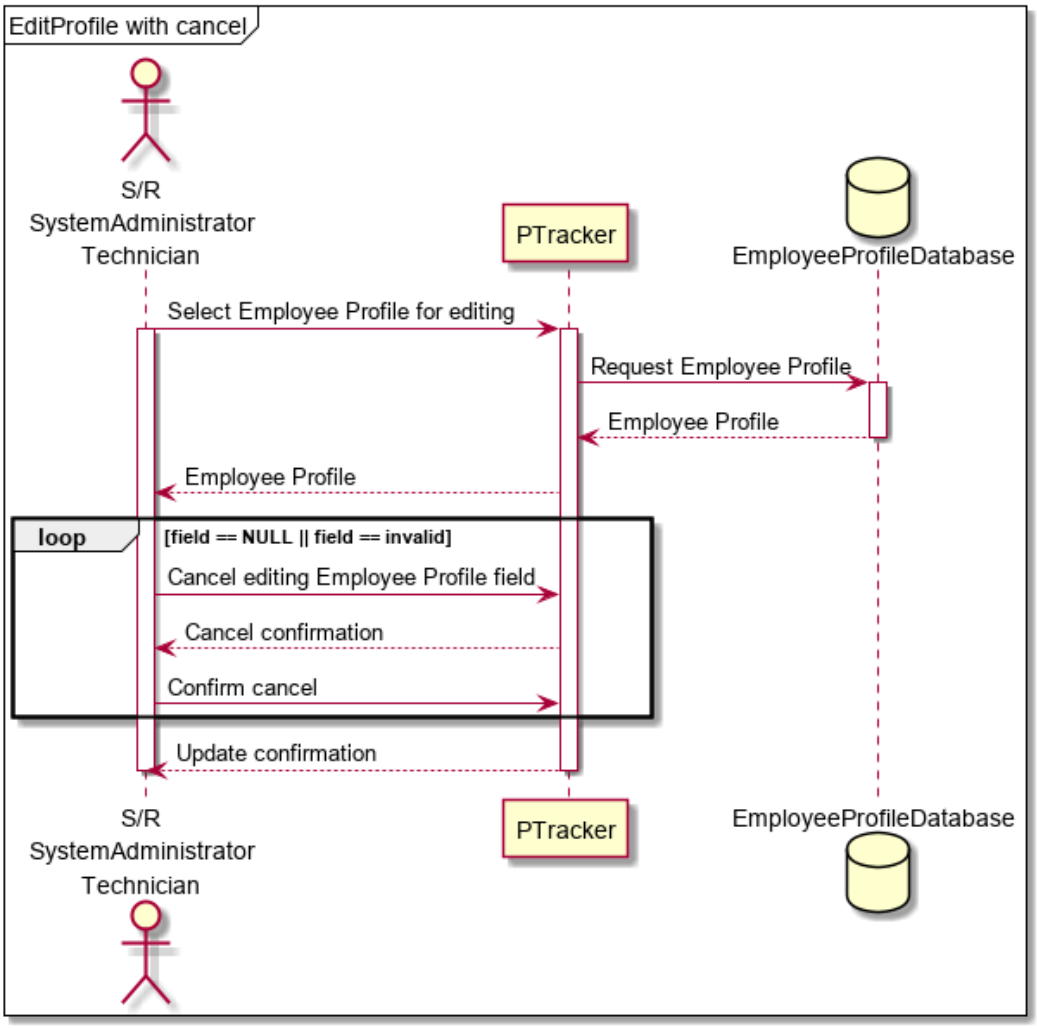


Figure 12. EditProfile with Cancel Sequence Diagram

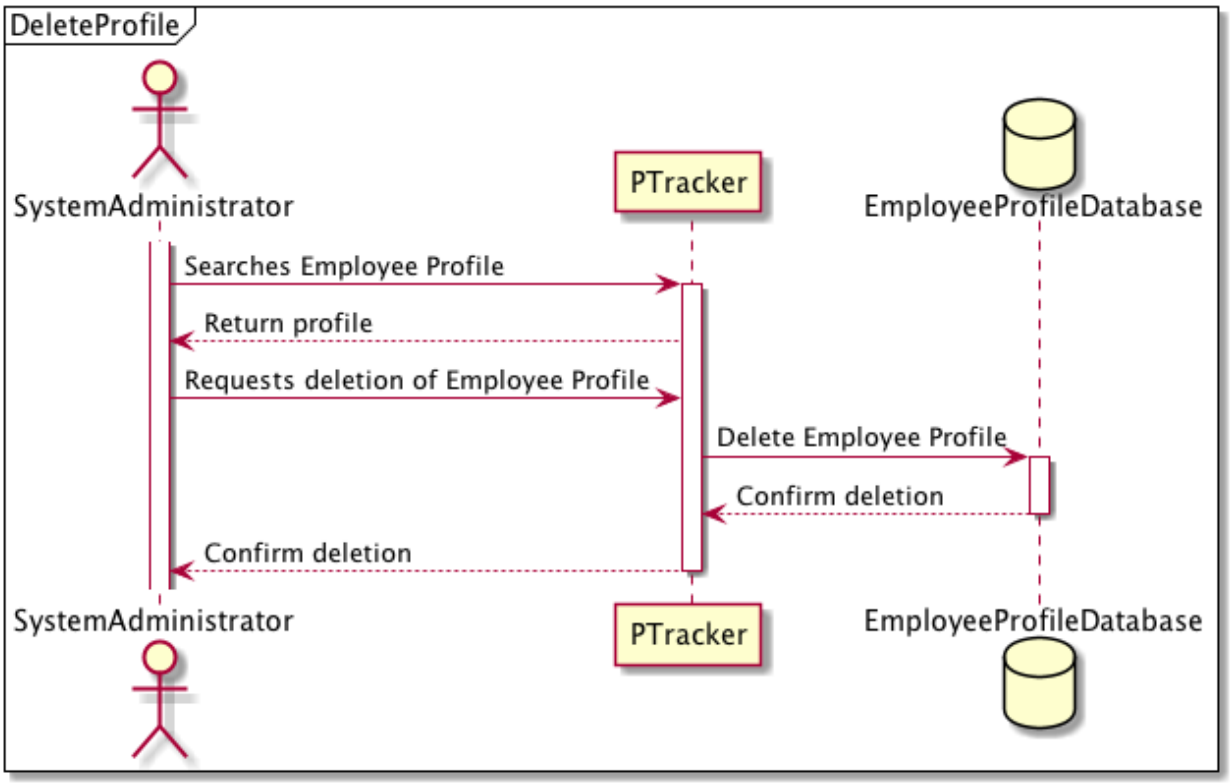


Figure 13. DeleteProfile Sequence Diagram

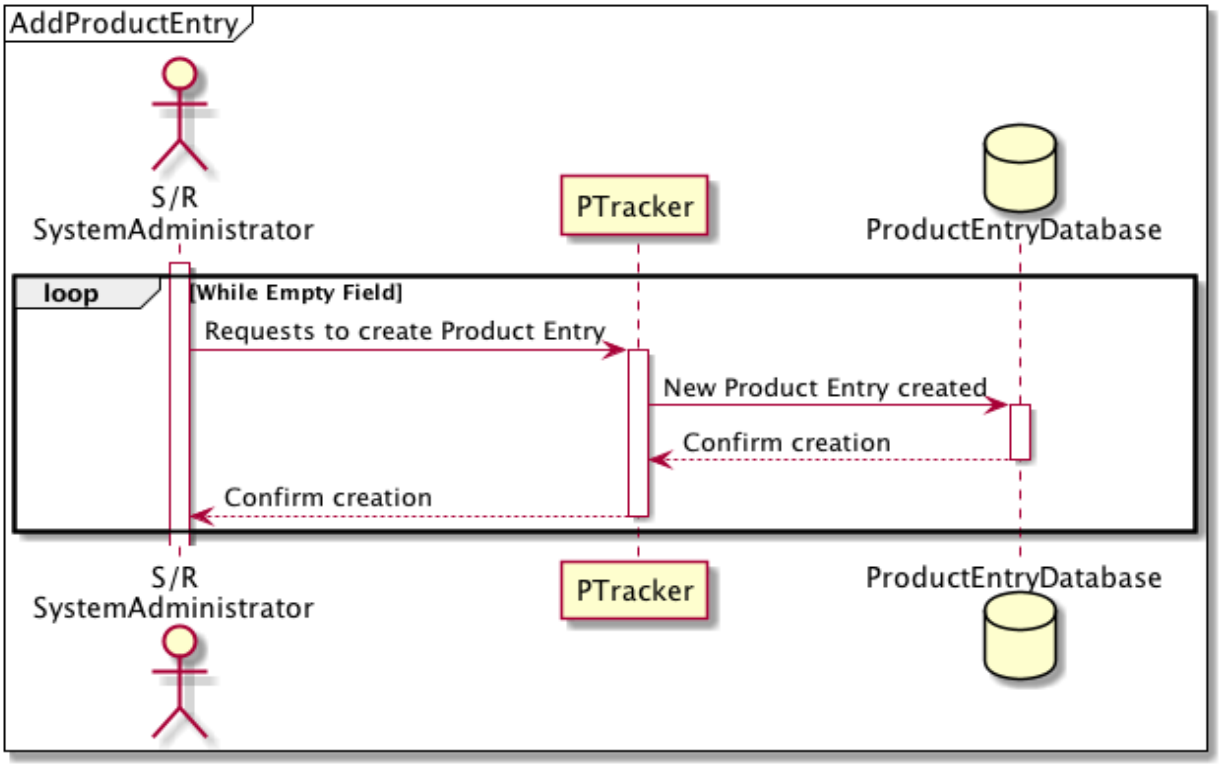


Figure 14. AddProductEntry Sequence Diagram

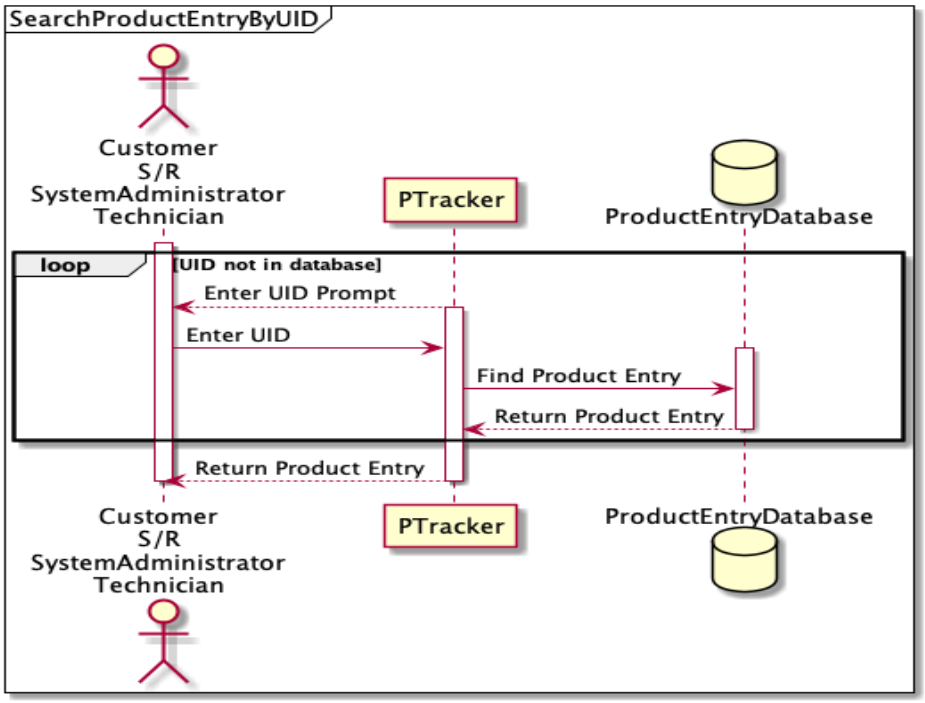


Figure 15. SearchProductEntryByUID Sequence Diagram

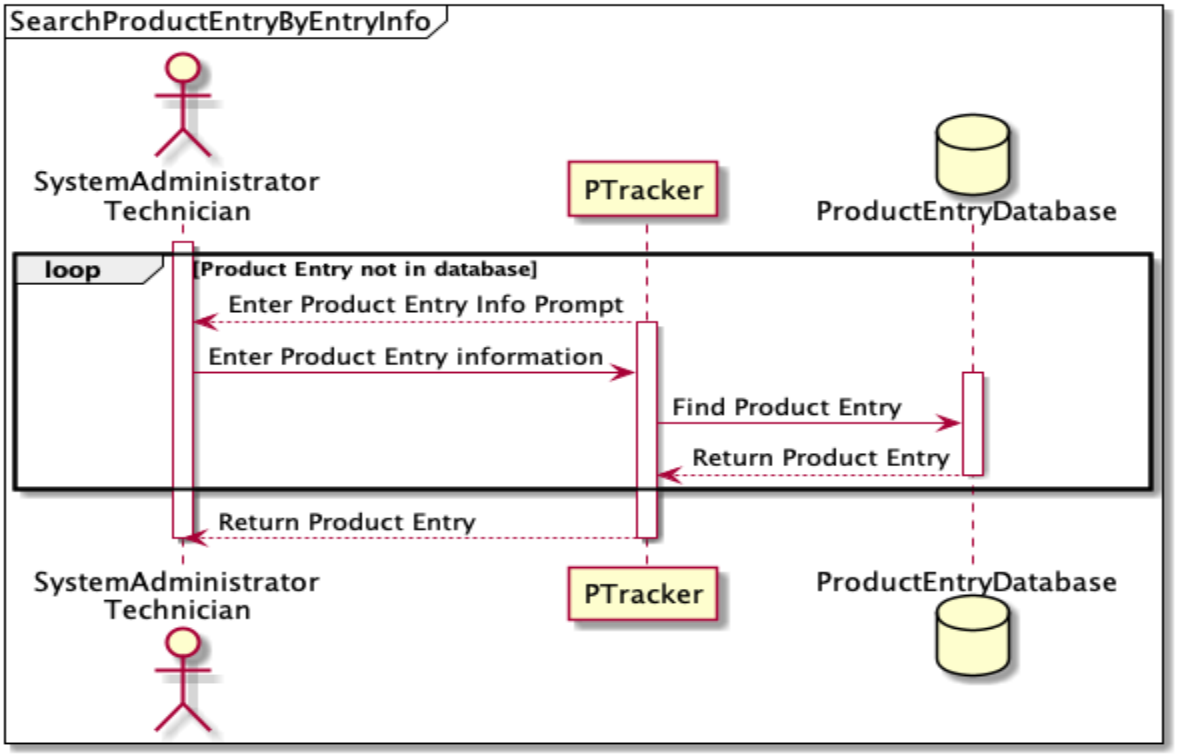


Figure 16. SearchProductEntryByEntryInfo Sequence Diagram

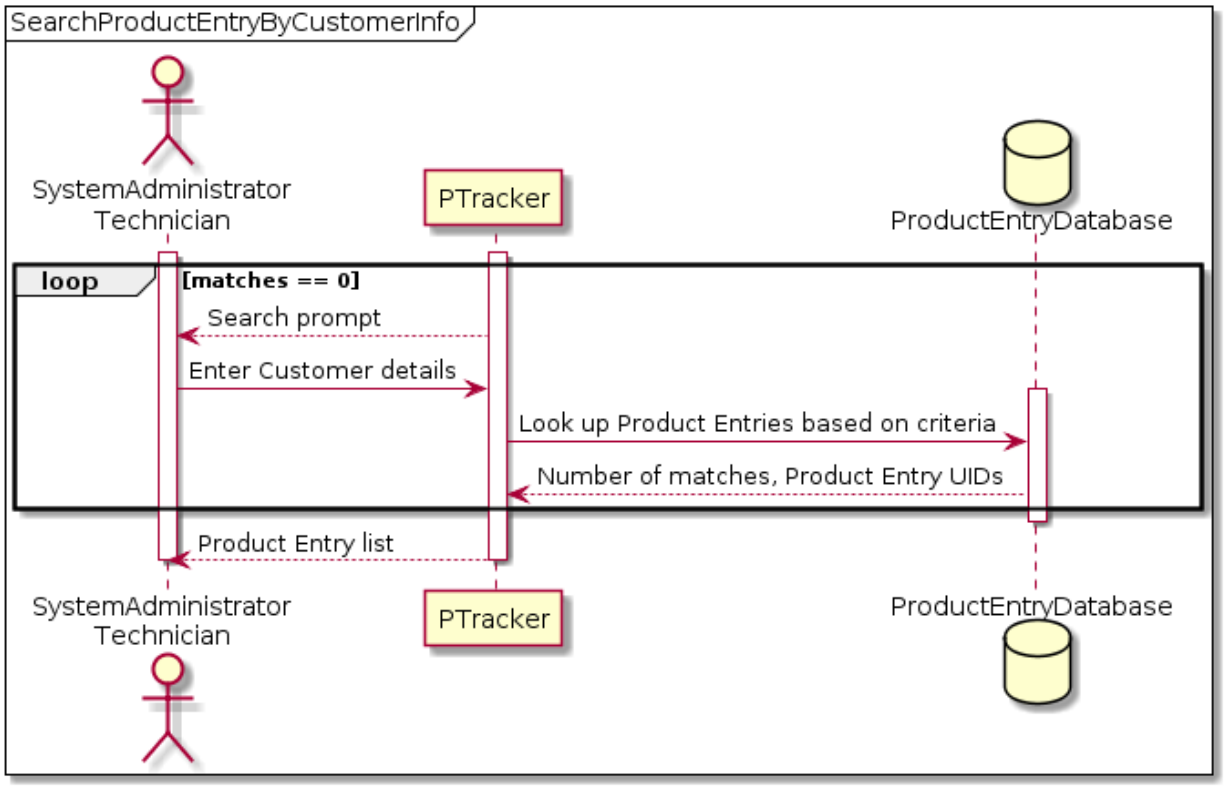


Figure 17. SearchProductEntryByCustomerInfo Sequence Diagram

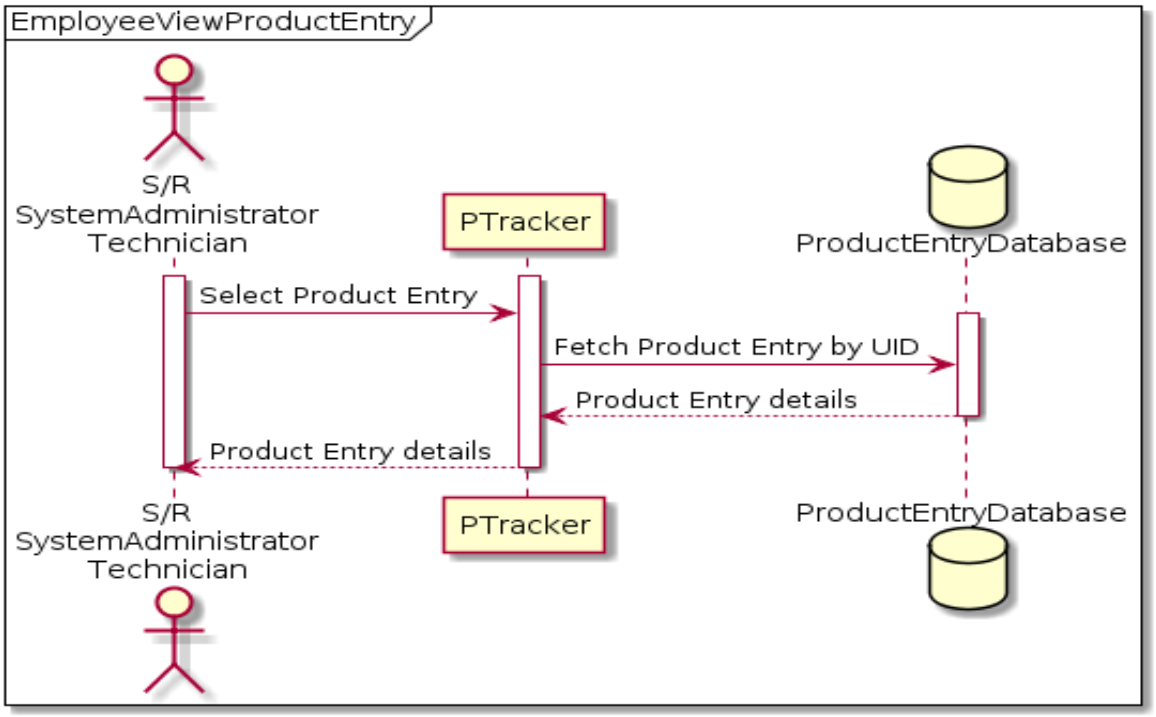


Figure 18. EmployeeViewProductEntry Sequence Diagram

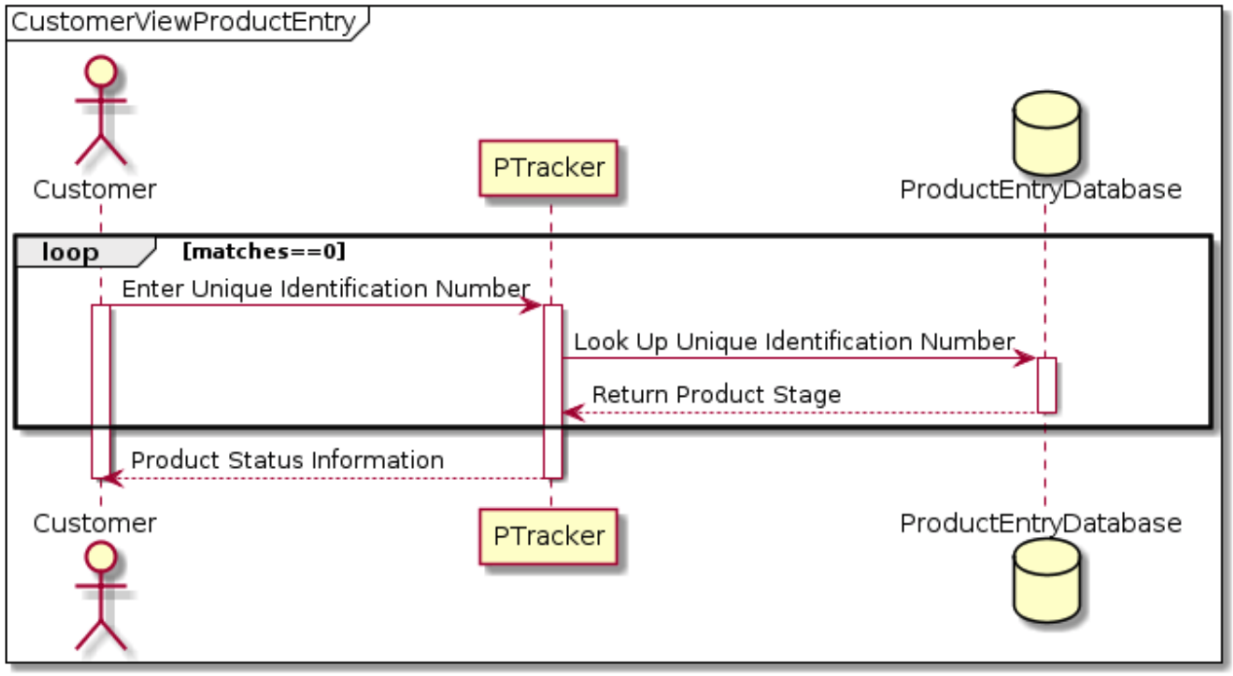


Figure 19. CustomerViewProductEntry Sequence Diagram

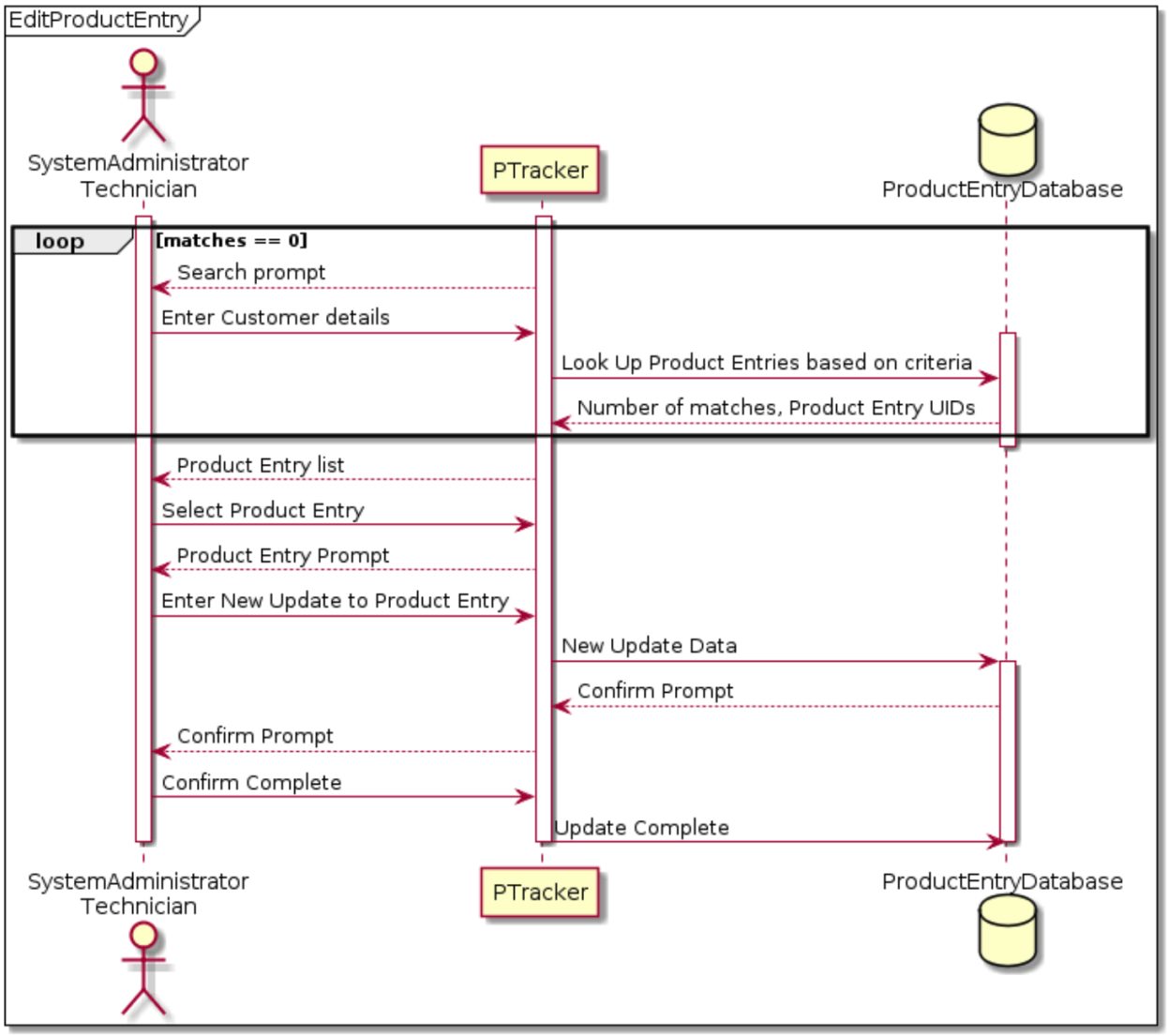


Figure 20. EditProductEntry Sequence Diagram

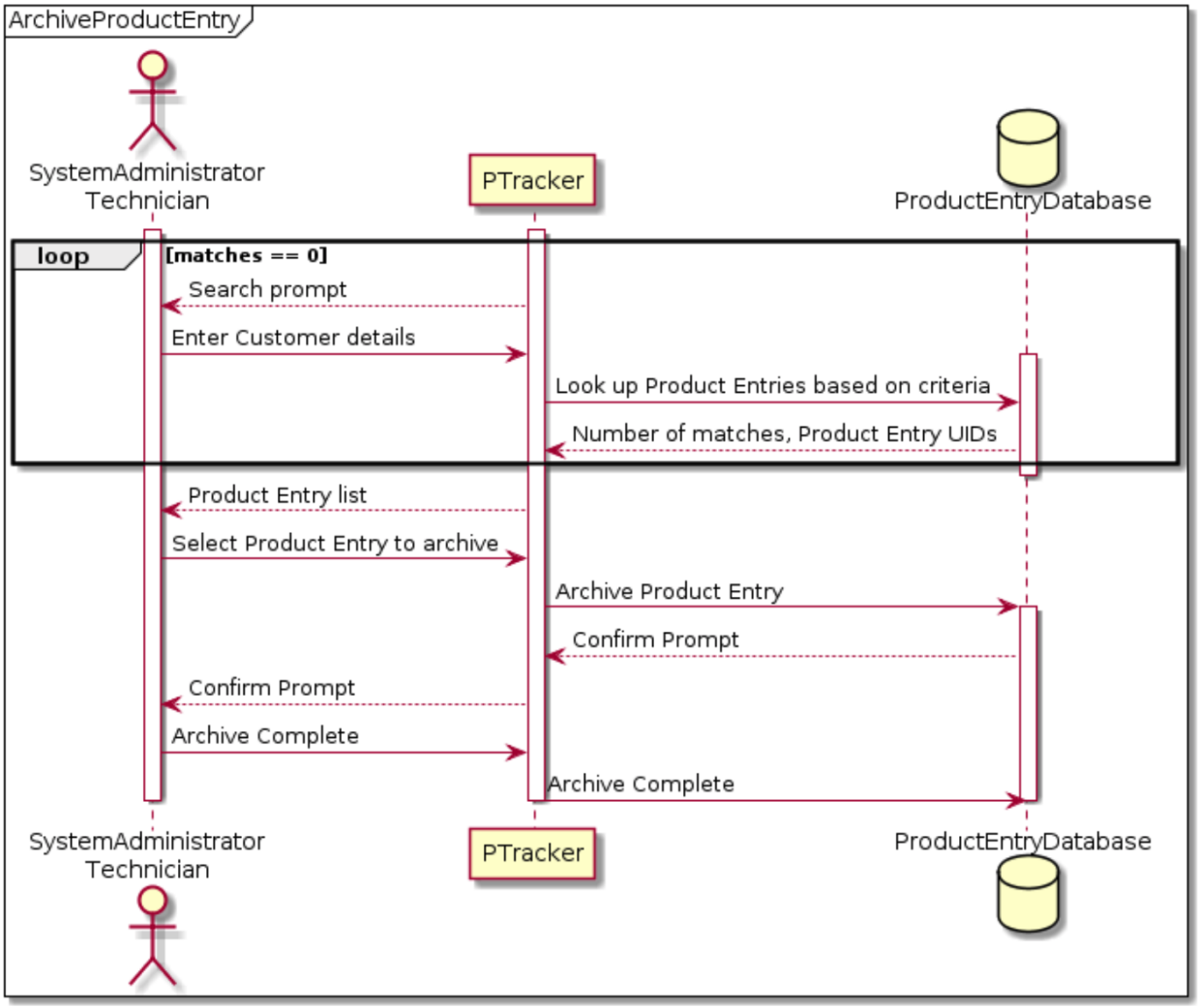


Figure 21. ArchiveProductEntry Sequence Diagram

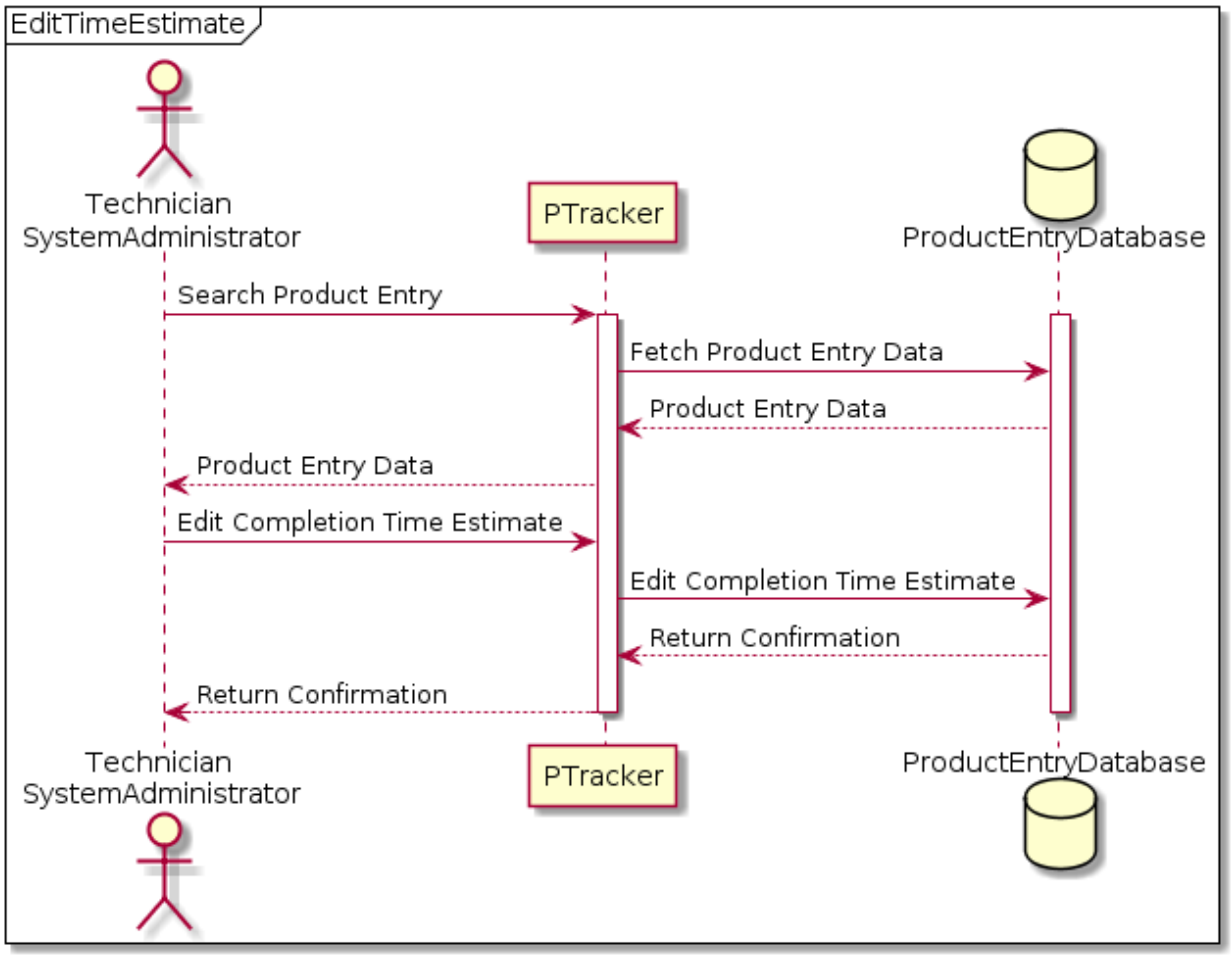


Figure 22. EditTimeEstimate Sequence Diagram

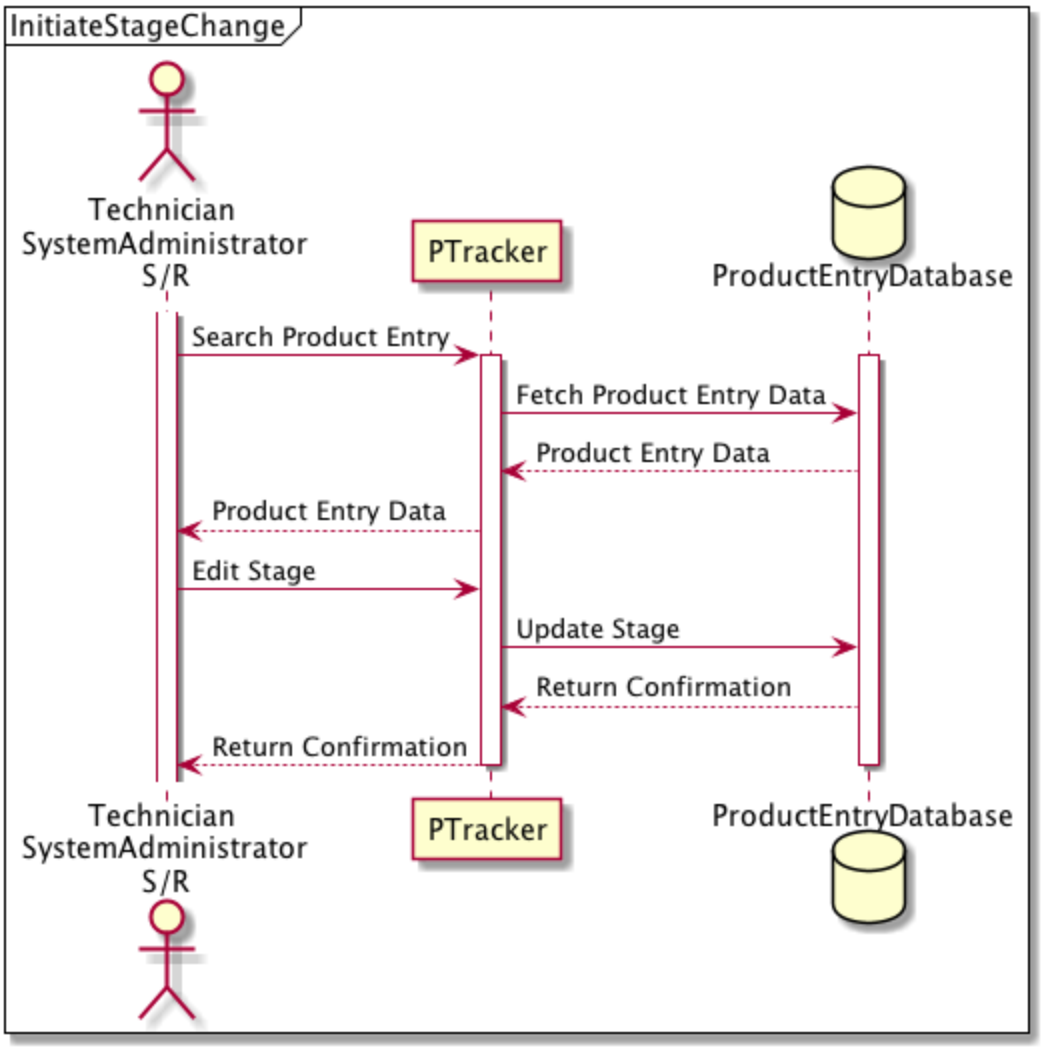


Figure 23. InitiateStageChange Sequence Diagram

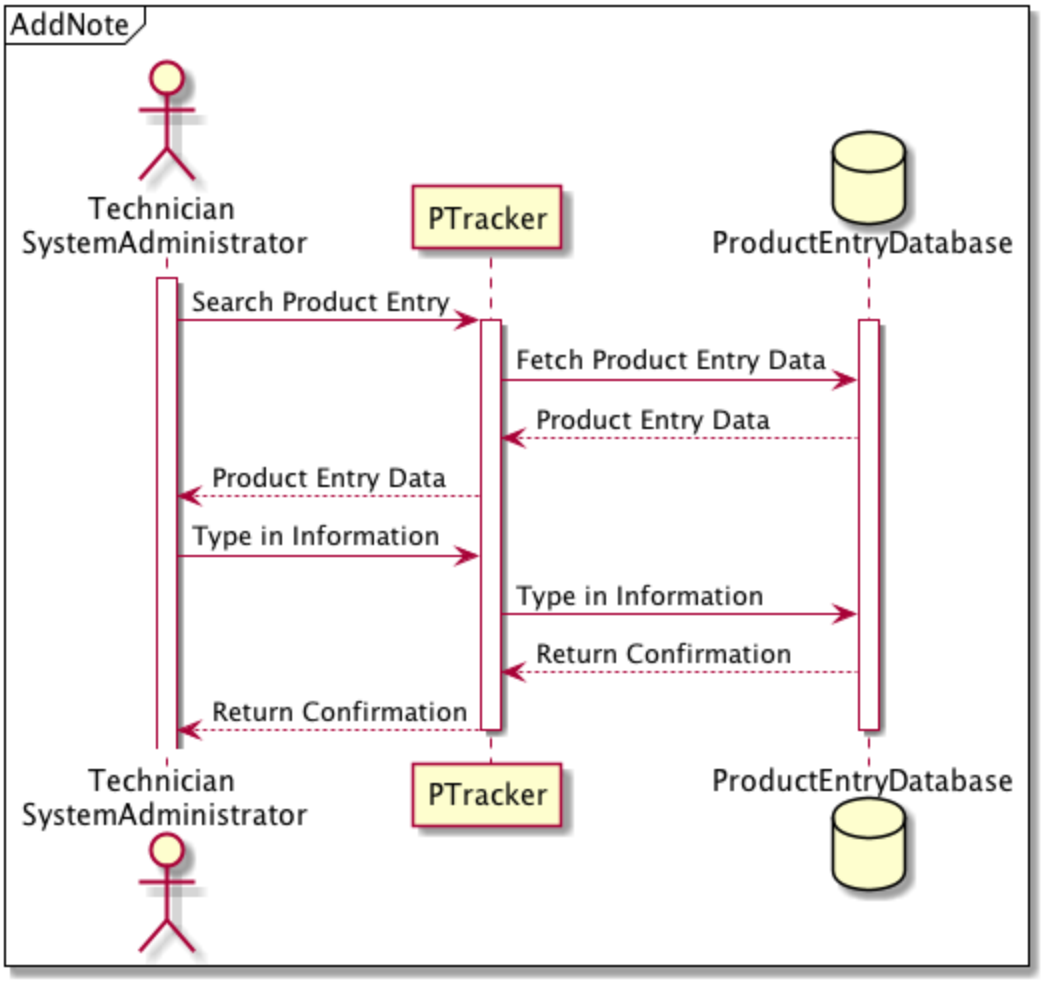


Figure 24. AddNote Sequence Diagram

11 UI Models

The following figures depict the visual sequence of user interface screens that occur as users interact with PTracker to accomplish a specific task. These storyboards illustrate the expected flow of interactions and interactions, as well as the initial designs for the Customer and Employee Interfaces.

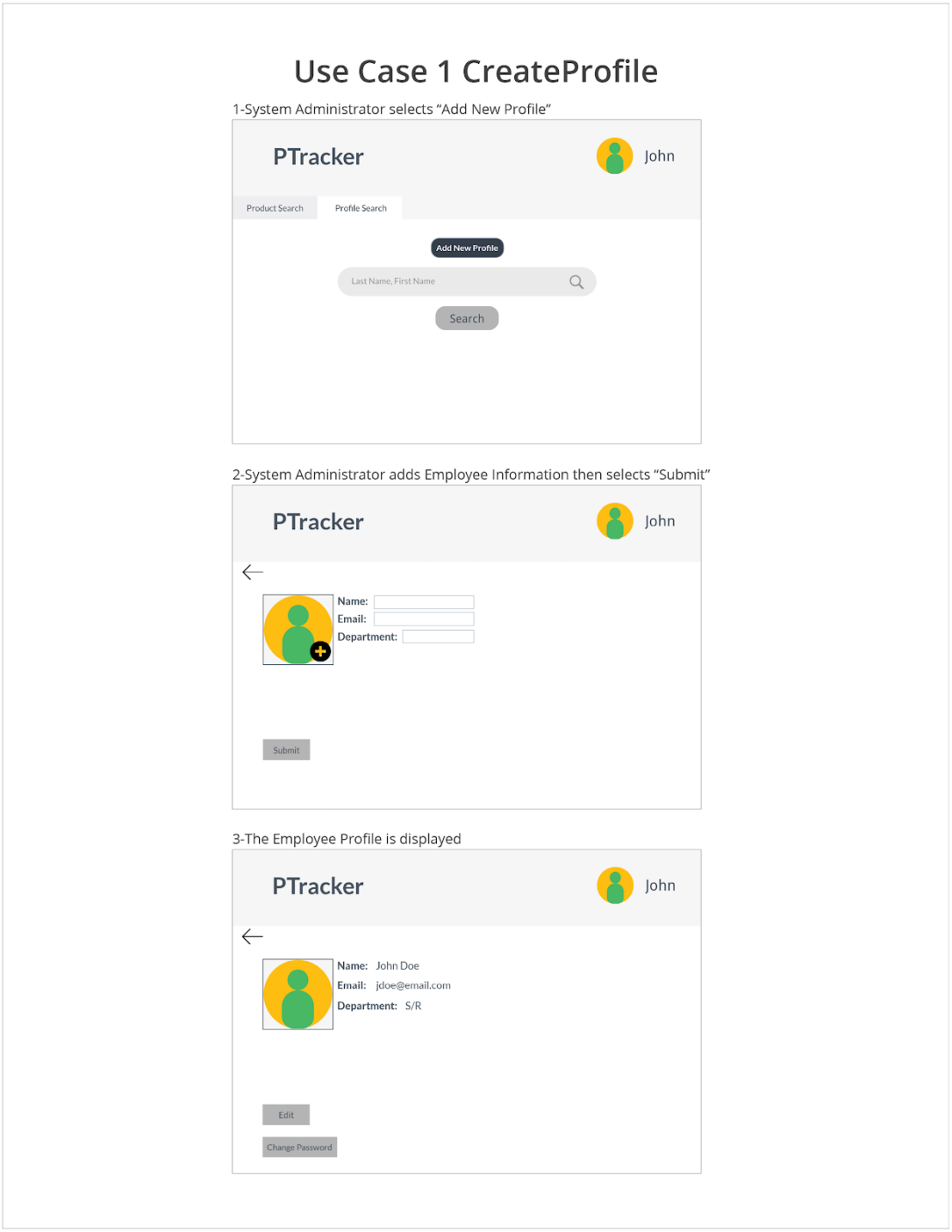


Figure 25. CreateProfile Storyboard

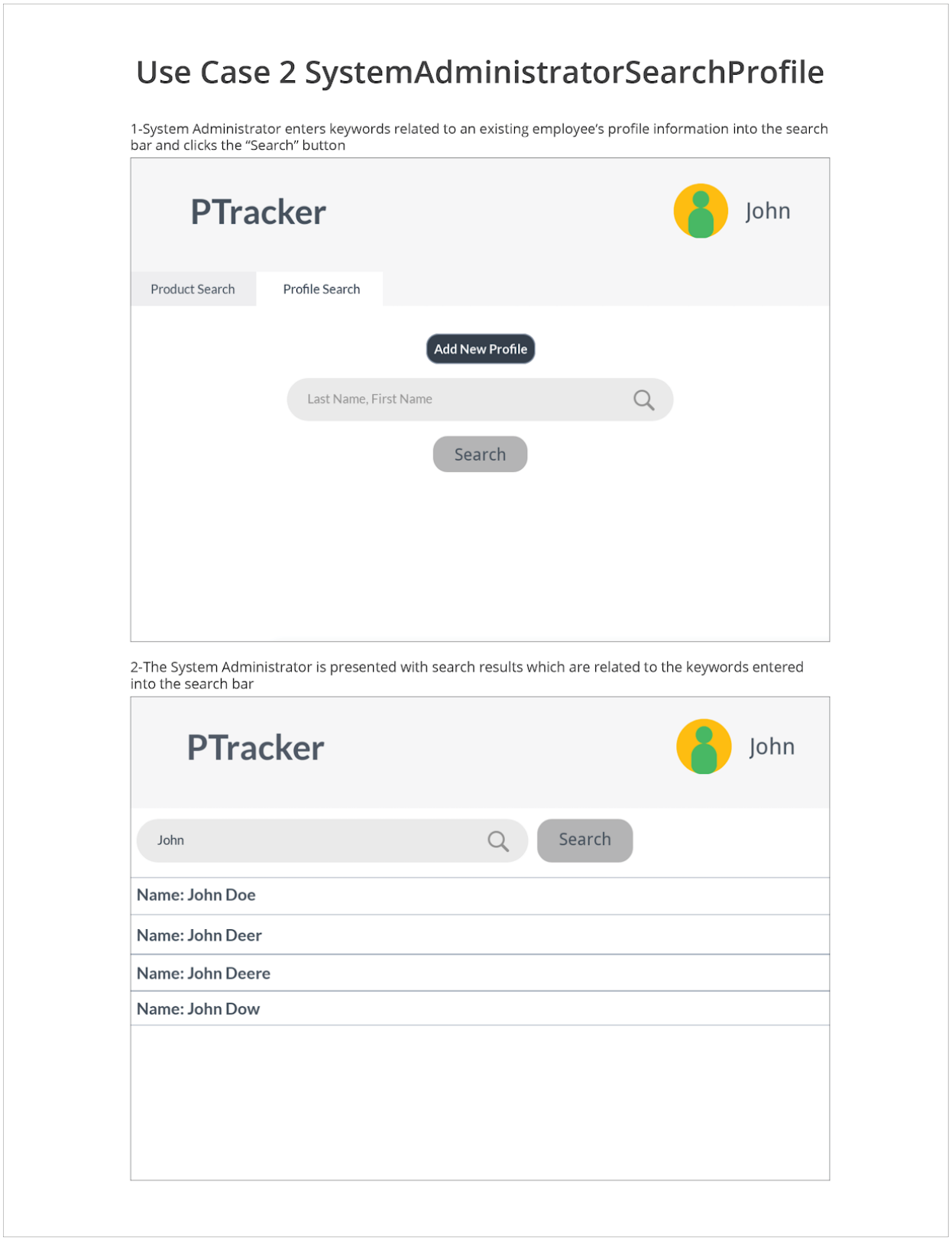


Figure 26. SystemAdministratorSearchProfile Storyboard

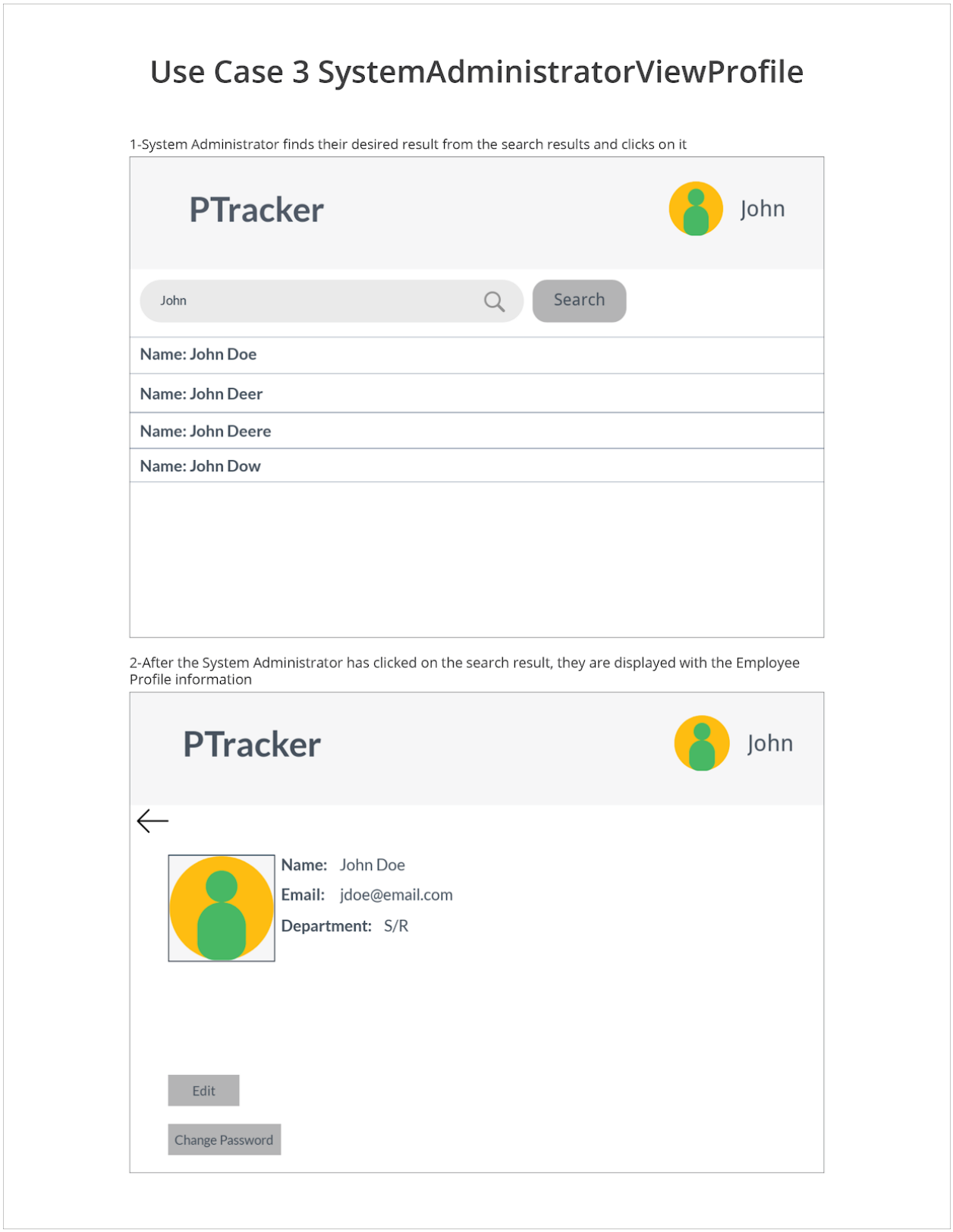


Figure 27. SystemAdministratorViewProfile Storyboard

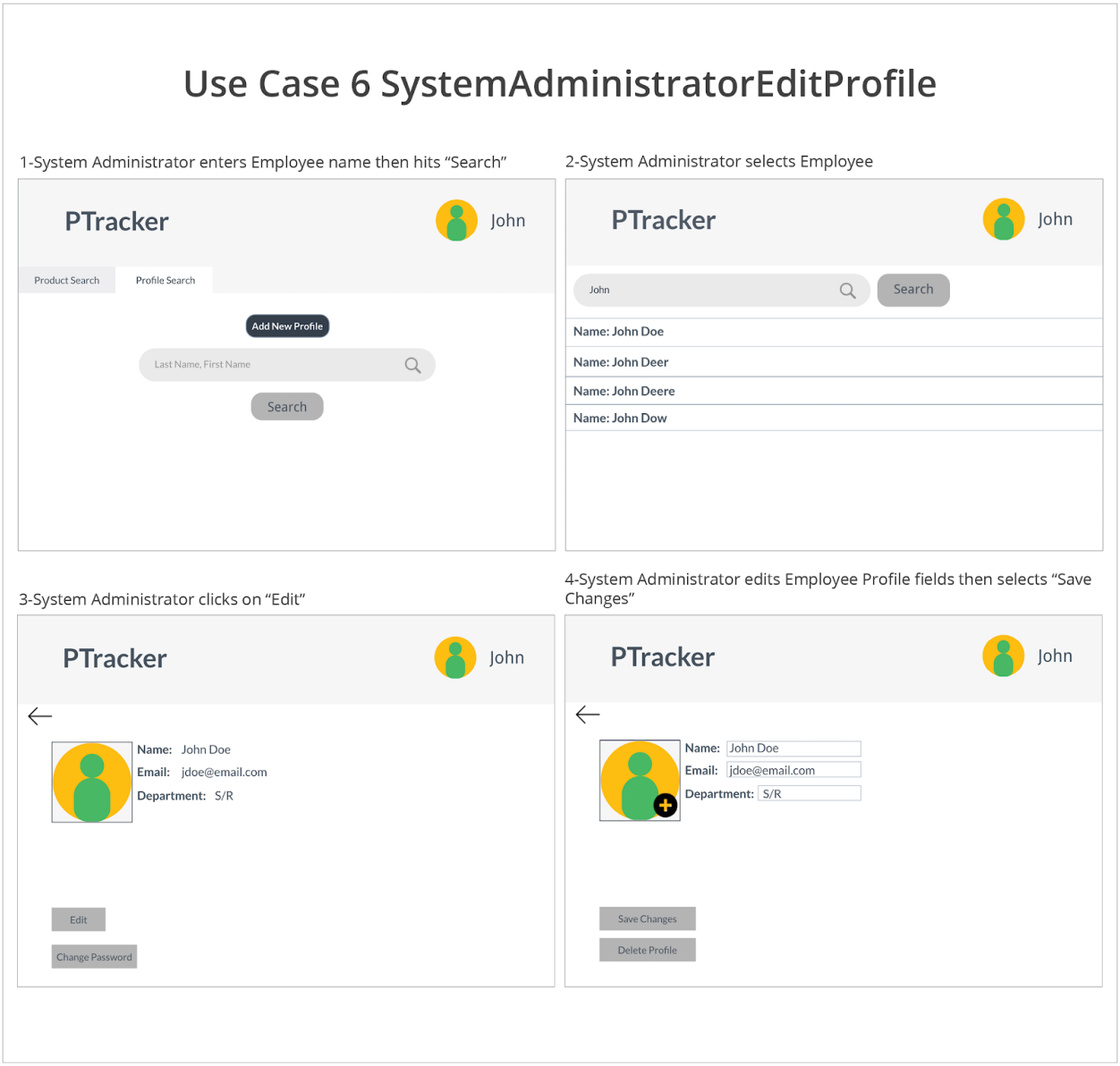


Figure 28. SystemAdministratorEditProfile Storyboard

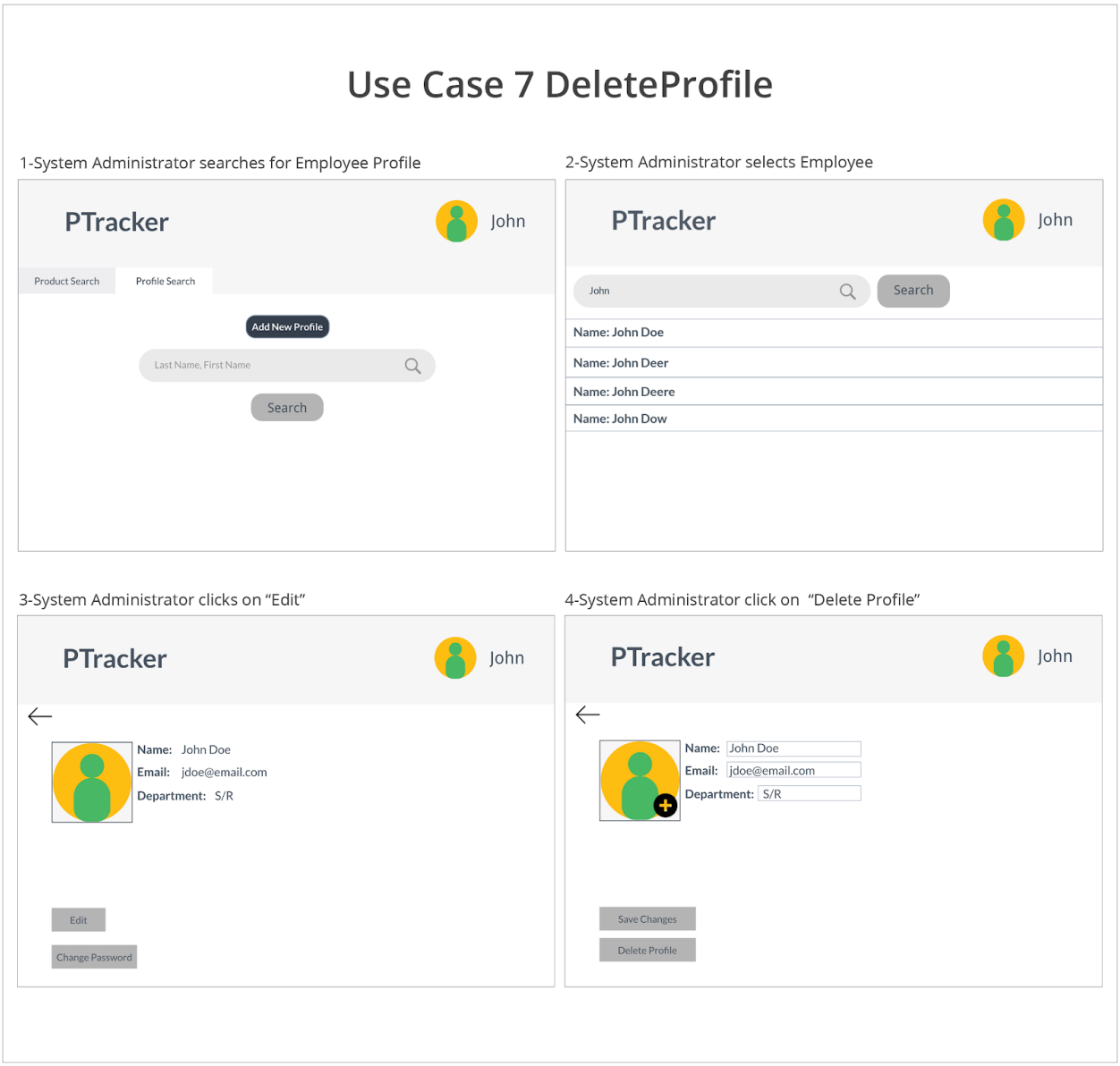
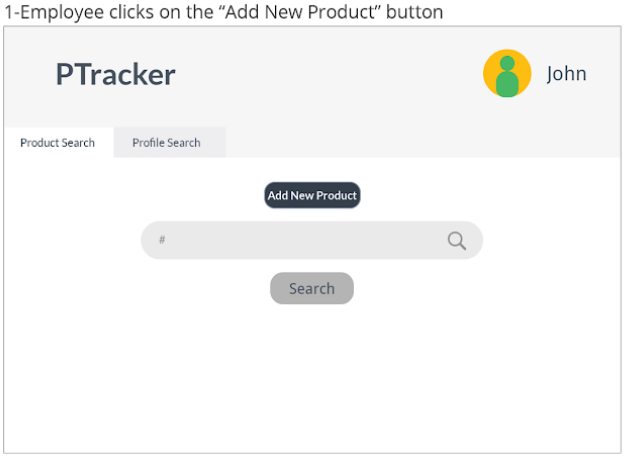


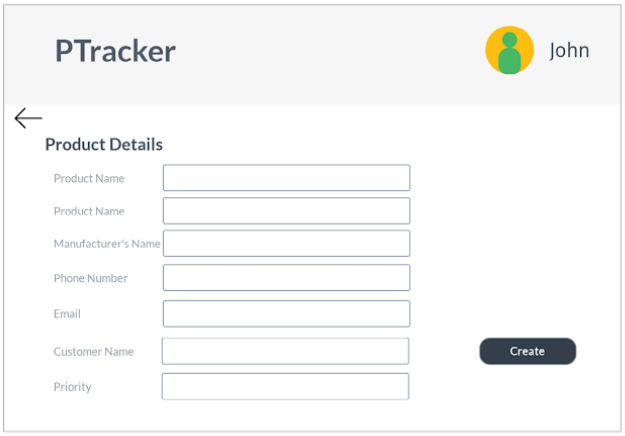
Figure 29. DeleteProfile Storyboard

Use Case 8 AddProductEntry

1-Employee clicks on the “Add New Product” button



2-Employee enters all relevant information about the product entry and clicks on “Create”



3-Employee is then asked to confirm the creation of the new product entry; to confirm, the Employee clicks on the “Create and Print” button

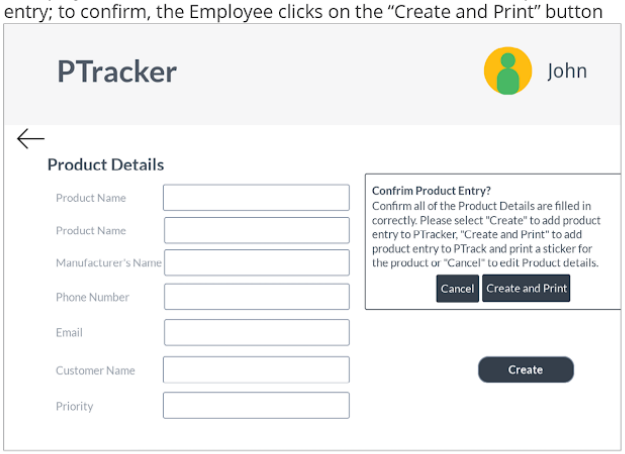


Figure 30. AddProductEntry Storyboard

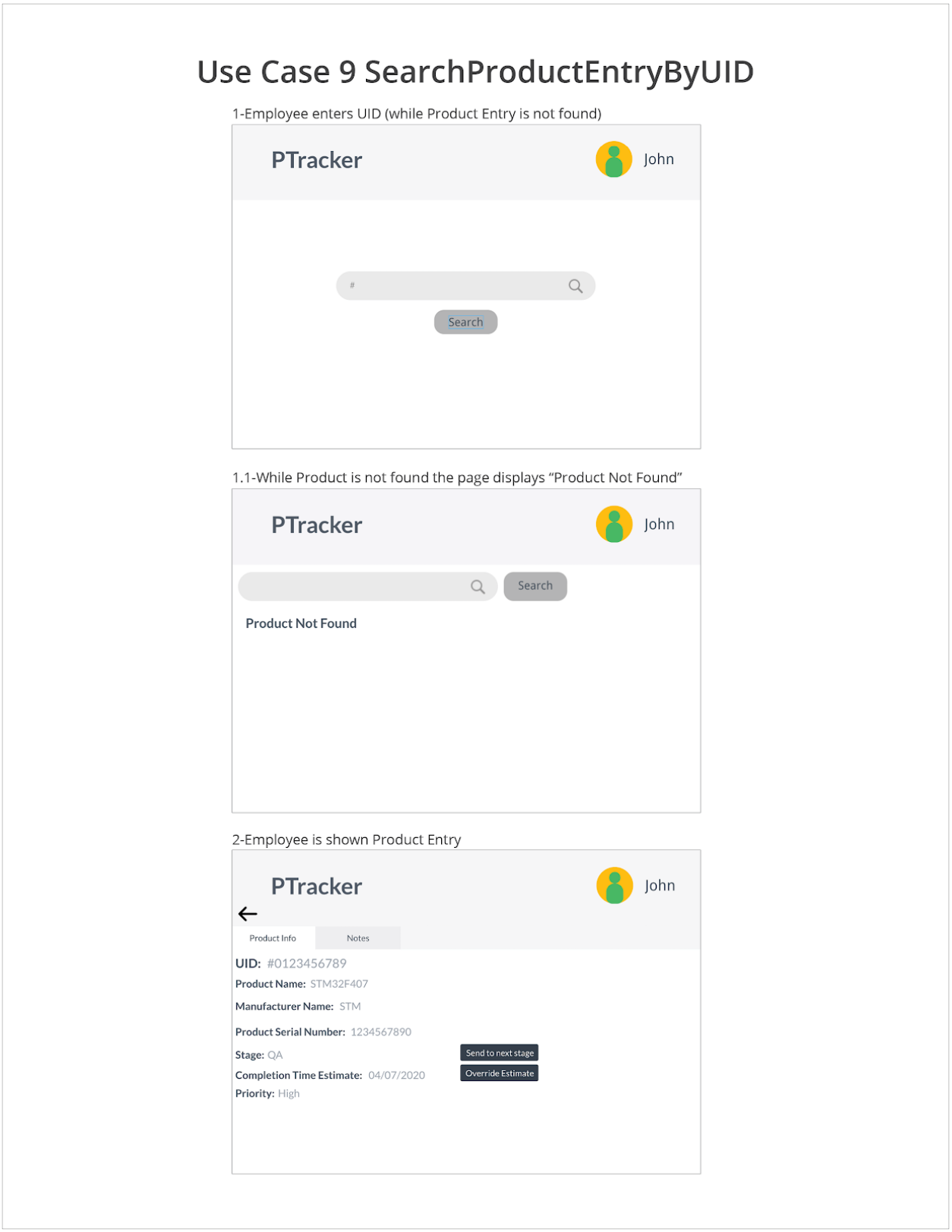


Figure 31. SearchProductEntryByUID Storyboard

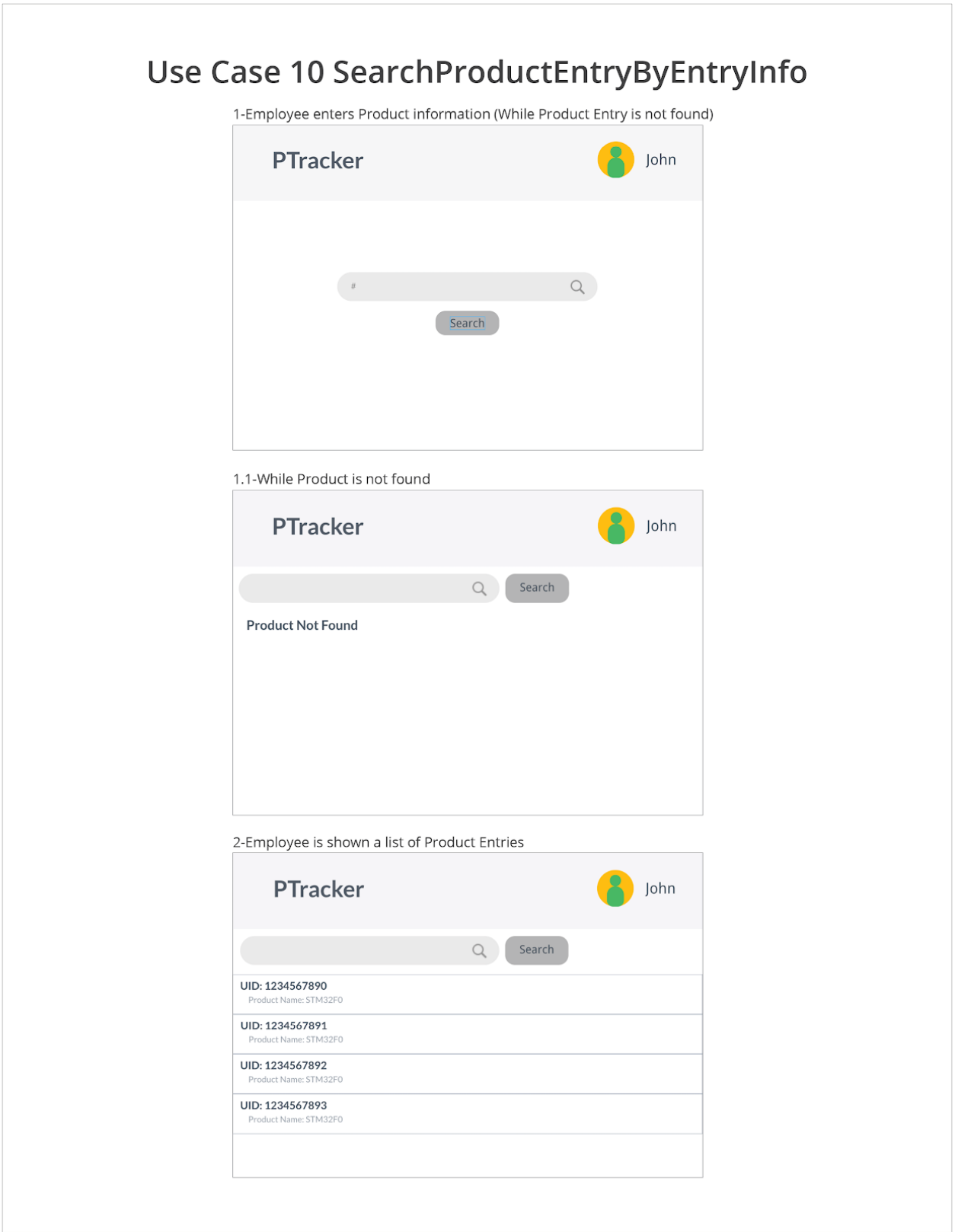


Figure 32. SearchProductEntryByEntryInfo Storyboard

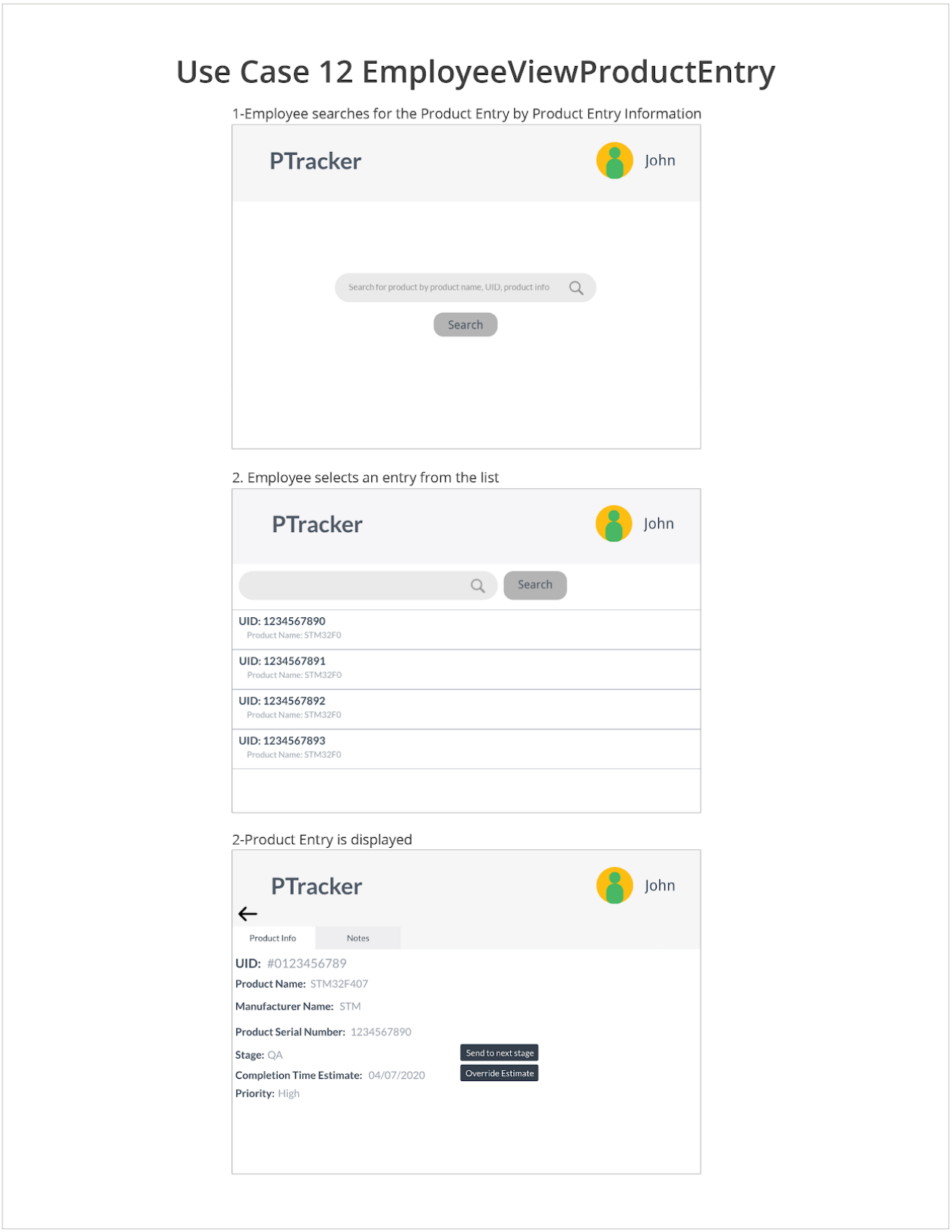


Figure 33. EmployeeViewProductEntry Storyboard

Figure 34. CustomerViewProductEntry Storyboard

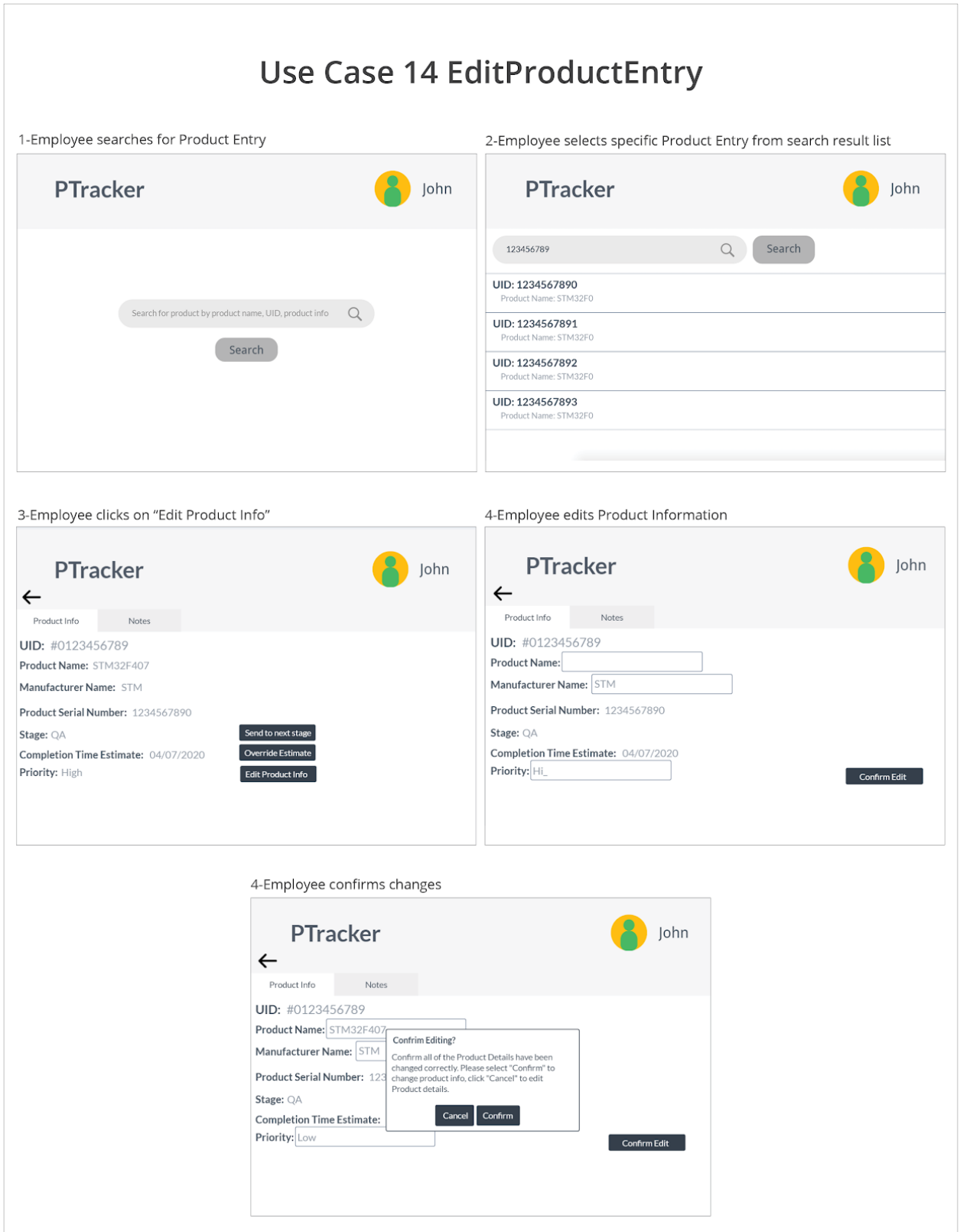


Figure 35. EditProductEntry Storyboard

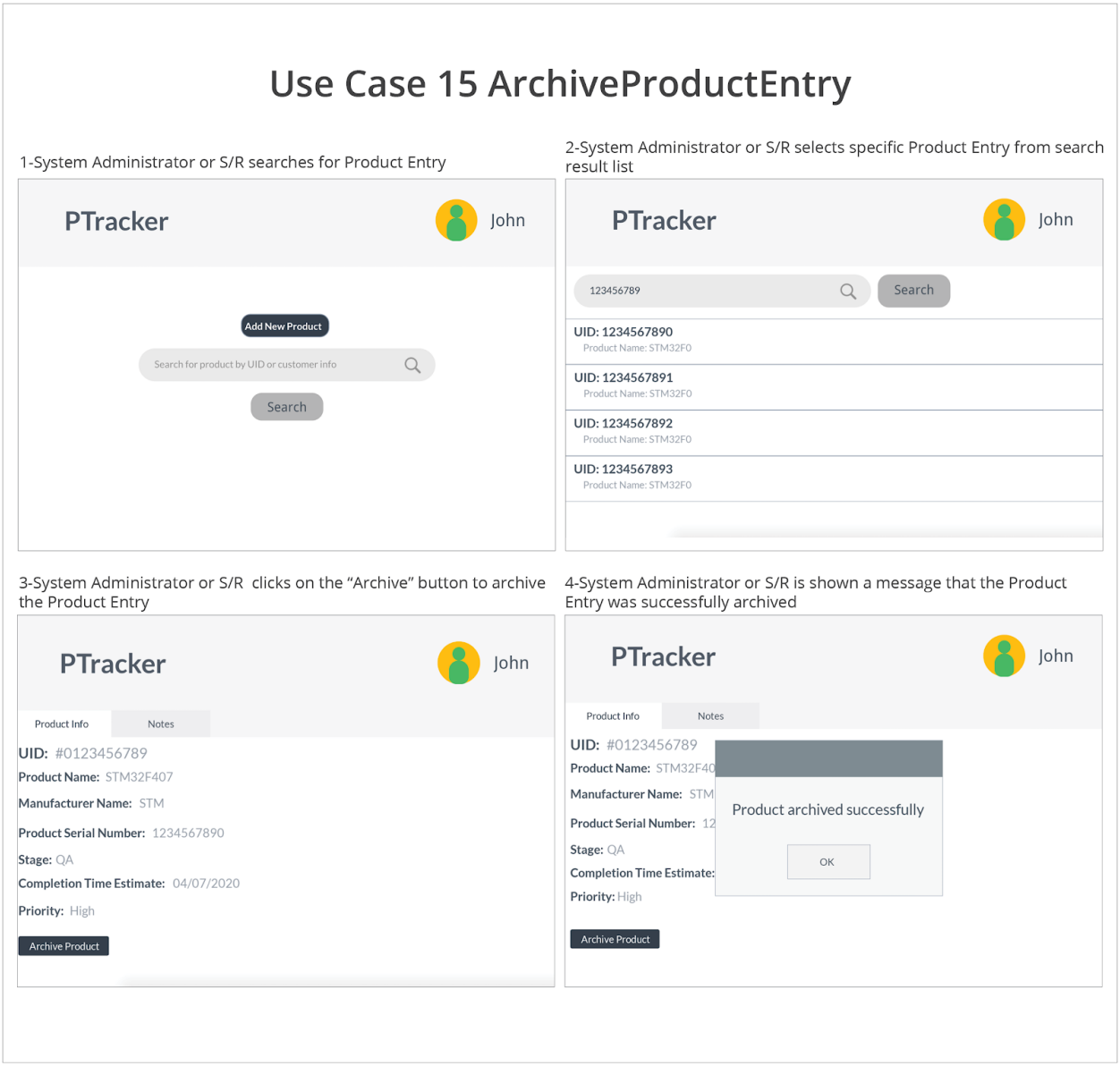


Figure 36. ArchiveProductEntry Storyboard

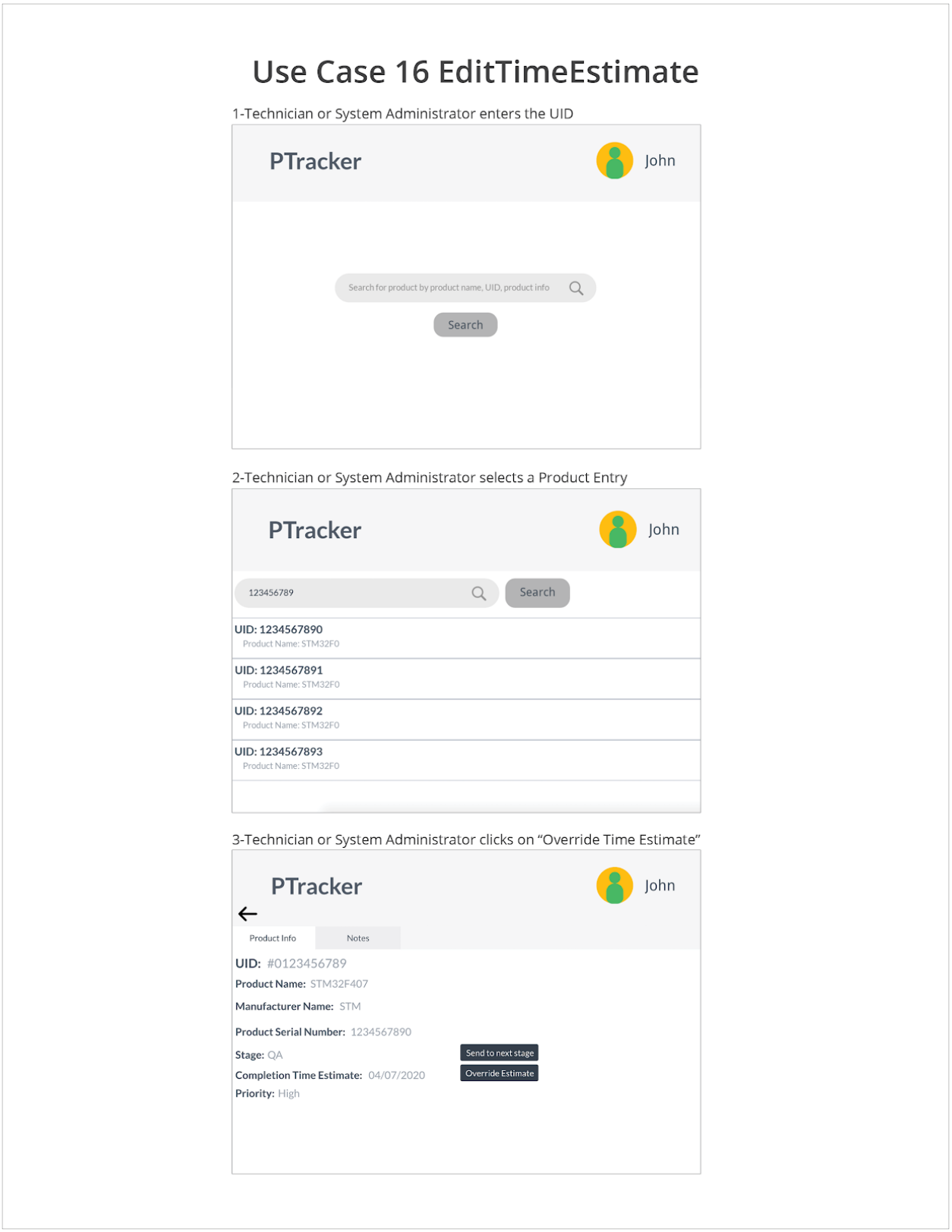
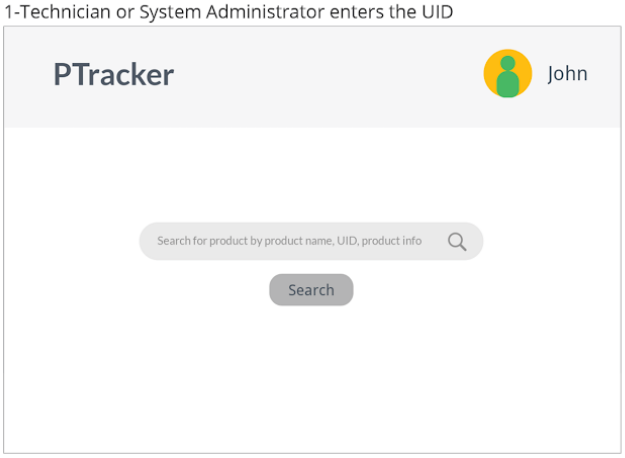


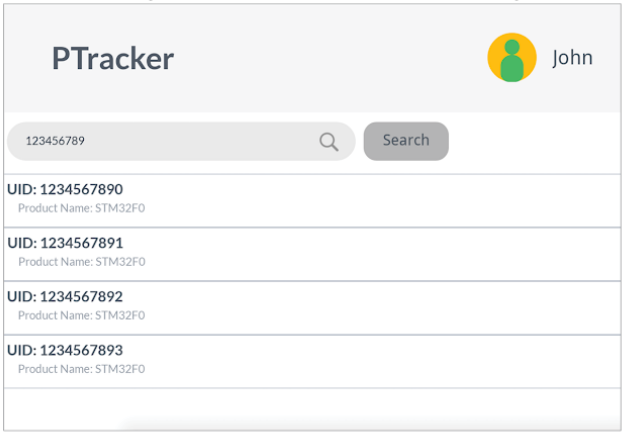
Figure 37. EditTimeEstimate Storyboard

Use Case 17 InitiateStageChange

1-Technician or System Administrator enters the UID



2-Technician or System Administrator selects a Product Entry



3-Technician or System Administrator clicks on “Send to Next Stage”

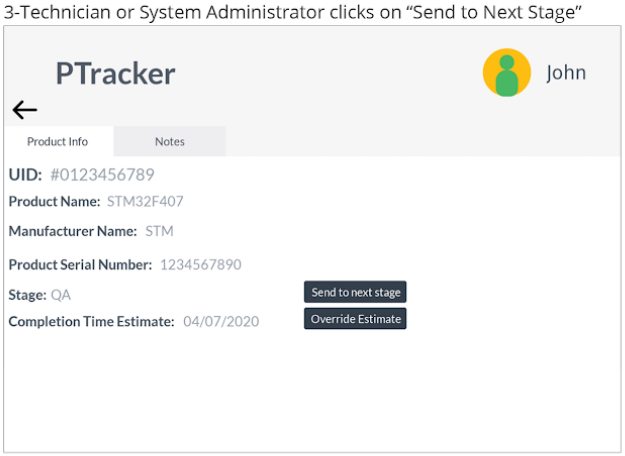


Figure 38. InitiateStageChange Storyboard

Appendix: Issues List

- No outstanding issues are identified at the time this document was written.