

# The Denton Bicycle Rental Information System

## Milestone Two | System Analysis



### The Curran Group

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# Table of Contents

Executive Summary	5	Data Flow Diagrams Level-1	16
Systems Analysis	5	Data Flow Diagrams Level-2-5	18
Baseline Project Plan Report	6	About the Entity Relationship Diagram	19
Introduction	6	The ER Diagram	20
System Description	6	Appendix	21
Feasibility Assessment	6	Gantt Chart	22
Management Issues	10	Network Diagram	25
Project Scope Statement	11	Communication Matrix	26
Structure Requirements for the Denton Bicycle Shop	13		
Rental Information System	13		
About the Context and Data Flow Diagrams	13		
Context Diagram	14		
Data Flow Diagram Level-0	15		



# Executive Summary

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## Systems Analysis

To plan a rental system for the Denton Bicycle Center (DBC), the systems proposal includes the following deliverables:

- a Baseline Project Plan, to overview the project, describe the system, assess feasibility, and organize management procedures, and
- a Project Scope Statement, to define the project mission and expectations.
- Dataflow diagrams and an entity-relationship diagram to analyze the gaps between existing and desired procedures and between the current and new system.

The system analysis for the DBC rental system assesses the information system requirements. Through an analysis of the DBC business, the Curran Group has collected the relevant information necessary to develop process models. The DFDs and ER diagram logically map how data would need to flow for the DBC rental system. With the system analysis using the BPP and process models, the Curran Group foresees the rental program to be a profitable venture for DBC.

# Baseline Project Plan Report

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## Introduction

### Project Overview

The Denton Bicycle Center (DBC) has decided to develop a bicycle rental program to meet their growing business and customer needs. Because there are different requirements inherent to tracking and administering a rental program, the client requires an information system with expanded software capabilities. DBC currently uses Profit Premiere Plus by Edge Technologies, a bicycle-shop specific POS system developed to track inventory and process sales. The company administering the POS system offers a bicycle-rental module; however, the client has estimated that licensing the module would be cost-prohibitive due to the small scale of the rental program.

The client requests a thorough analysis of his current and planned business activities to determine the most cost effective solution to track and administer a bicycle rental system. The DBC rental system will need to be designed and built for up to 30 bicycles and their coordinating accessories; the system should handle all customer billing and contract activity, customer contact information, customer rental history, item rental history and popularity, the display and reporting of critical sales information, and the capability

to assist employees in understanding the increasingly complex and competitive business environment. The client has assessed this system will improve the competitiveness of DBC by providing customers the ability to rent the complete cycling experience.

### Recommendation

The IS development team, The Curran Group is in the process of determining its recommendation to address the bicycle rental system requirements for the Denton Bicycle Center.

## System Description

### Alternatives

- Purchase of a prewritten software module
- Outsource new information system development
- Batch data input from existing database with online retrieval
- Creation of a web-based online system

### Rental System Description

DBC currently uses a POS software system called Profit Premiere Plus by Edge Technologies, a remote-access POS and inventory program that costs \$1,000 per year. Premiere offers a bicycle rental module at a cost of \$400 per month, but DBC is seeking a less costly solution for their small program. The Curran Group continues the process of determining the best information systems solution for the needs of the DBC rental program.

# Feasibility Assessment

## Economic Feasibility

The largest aspect of Denton Bicycle Center’s cost benefit analysis is the inventory aspects of a rental system. Given the expected rental in units we are able, with some assumptions, to see the value of the proposed system and why Denton Bicycle Center should move forward with the system.

### Benefits

Action	Action Type	Description	Value
Rental Fees (Bike)	Benefit (Tangible)	Fees from renting bikes	\$15,080.00
Rental Fees (Accessories)	Benefit (Tangible)	Fees from renting accessories	\$7,800.00
Try and Buy Sales	Benefit (Tangible)	Sales specifically from customers who rented first	\$18,100.00
Flexibility	Benefit (Intangible)	The ability to expand customer base by offering a new service	

### Tangible

The benefits illustrated are the sales based on the rental program (\$15,080) and from try and buy customers (\$18,100).The numbers are based on a percentage of each type of bike for rent being rented out a week and a percentage of the rentals becoming try and buy situations.Also factored is the rental fees from accessories (\$7,800), something the owner hopes to be a part of the rental program, which is a function of an average cost of accessories per rented bike. The assumptions made are all assuming moderate success with the rental program so there is room to grow.

### Intangible

The only major intangible benefit is the added flexibility that comes from offering a new service. The hope with this new service is to expand the customer base, reaching customers they might not have before that only want to use a bike for a weekend and not spend the money to buy an expensive item for limited use.The hope is also that this new service will not cannibalize its existing business. The owner seems confident that this could increase sales of new bikes as well as the revenue of rentals so this is less of a concern.

### Cost

#### One Time Cost

The one time cost to the this project are relatively small which adds a lot of value to the project. The Design and Build cost is marked at \$0.00 because it is being built for free buy the Curran Group. This makes the actual only one time cost of project the training cost (\$120.00).This number is based on the number of employees Denton Bicycle Center has multiplied by the expected hours of training and these employees hourly salary.

Action	Action Type	Description	Value
Design and Build of System	Cost (One Time)	Initial investment for the project	(\$0.00)
Training	Cost (One Time)	Training staff on the system.	(\$120.00)

Recurring Cost

After discussion with the owner the project group learned that the intent with the rental program is to start slowly starting with ten bikes to rent the first year and expanding by roughly ten each year for the next two years topping out around thirty bikes. It should be noted that by the fourth year they will most likely need to replace the initial ten. This is shown with the rental inventory cost (\$3,600) that is recurring acknowledging that he will need to purchase bikes each year to grow his inventory. The owner also hopes to see growth in his business sales with some customers taking a try and buy approach with the rental option. This cost is shown in the replacing inventory cost (\$16,000). It applies to inventory that wouldn't have been sold without the rental program. The inventory must be replenished. The number is much larger than just the rental inventory; this shows the positivity with DBC that the try and buy approach will create more than ten additional sales a year, and hopefully of the more expensive bikes that DBC sells. The positive is this number is tied to directly to sales and as long as product is priced correctly it will never be more than sales from try and buy customers.

Action	Action Type	Description	Value
Rental Inventory	Cost (Recurring)	Acquiring the initial bike to be rented	(\$3,600.00)
Replacing Inventory From Try and Buy	Cost (Recurring)	Restocking inventory purchased by try and by customers	(\$16,000.00)

Return on Investment

Year 1	Year 2	Year 3	Year 4	Year 5
.7573	1.0866	1.2248	1.2750	1.3010

Break-Even

	Year 0	Year 1	Year 2	Year 3
Cash Flow	(3,720)	21,380	46,360	71,340
Discount Rate (12%)		.8929	.7972	.7118
PV	(3,720)	19,090.2	36,958.19	50,779.81

Year 4	Year 5	Total
71,340	71,340	
.6335	.5674	
45,336.57	40,478.32	188,923.09

Analysis

The metrics (ROI and BE) both show the large positives of this project. Although ROI is more considered a comparative stat it should be noted that .7573 is an excellent number to see for a year 1 ROI. The fact that it is shown to increase every year shows that this project is expected to grow. The break-even is also very positive showing that in the first five years the project should net \$188,923.09 which is excellent. Also because of the low startup cost with the average assumed sales the project should break even before the end of the first year, a very impressive feat.



## Recommendation

We at the Curran Group recommend the build of a rental system that allows Denton Bicycle Center to rent bicycles to their customers. Because of the low startup cost (\$3,720) and the fact that the new system is a new revenue source there is almost virtually no reason not to go through with the project. The project is also very low risk because the largest aspects of cost and benefit are tied to together; the Try and Buy Cost and Benefits. If there are no try and buy sales then there is no need to replace the inventory and the cost disappears. As long as the bike are priced correctly this cost should never be larger than benefits.

## Technical Feasibility Analysis

The DBC rental system proposal is small in scope. The rental program is limited to 10–30 bicycles along with related accessories; therefore, the project provides a limited risk to the assembled information systems development team. The requirements of the system are relatively easy to obtain and structure, based on the client's existing knowledge and experience as a bicycle shop owner. DBC requests the development of nonstandard technology, because the standard technology for a bicycle rental program, a module for their existing software POS system, is cost prohibitive. For the Curran Group, the design of a rental system may be challenging, because the system must integrate the sales and inventory data from the client's existing system into the secondary rental system, which includes the challenges of (1) ensuring inventory data is accurate in both systems and (2) that sales data can be analyzed effectively.

## Operational Analysis

Operationally, the project is attainable if approached in the proper manner. The Curran Group goal for the new IS rental system is to first solve the current problems of the business in order to develop DBC's future growth. DBC's day-to-day operations will change slightly and will require training and a period of learning, but DBC's change in

operations will return benefits as the users become more comfortable with the new IS. The Curran Group's goal is to streamline the day-to-day operations by increasing system functionality and simplicity, which will allow the three employees of Denton Bicycle Center to create an enjoyable cycling experience for their customers. By changing the entire IS, operational risk increases; however, due to the small size of the business, operational risk decreases, leaving us with a low-to-medium level of risk for the operational changes. The risk the Curran Group faces is a non-user friendly system that the employees will reject, causing them to revert back to their old system. In order to ensure this does not happen, we will need to design our system based on user feedback and the system functionality found in alternative competitive products. Finally, to mitigate all operational risk, proper training will be required during the system implementation stage.

## Schedules, Time Line, and Resource Analysis

The project team has set the project completion date and system implementation for December 2nd. With the systems analysis completed October 27th, the following two milestones are scheduled: the Systems design on November 17th and the Systems implementation on December 1st.

See the appendix for the current Gantt chart and network diagram.

# Management Issues

## Team Configuration and Management

The project team, The Curran Group, consists of four members:

- Jessica Shumate | **Data Analyst**
- Kevin Curran | **Business Analyst, Project Manager**
- Will Rich | **Accountant, Business Strategist**
- Victor Estrada | **Technical Communicator**

The Curran Group uses the Task Responsibility Matrix to manage the responsibilities of each group member. The team allots the tasks in consideration of expertise and schedule.

Task ID	Task	Jessica	Kevin	Will	Victor
3	Devise Questions	P	S	S	S
4	Email Questions to Joe	P			
5	Distribute and analyze responses	P			S
7	Problem statement	P			S
8	Service Request	P			S
10	Introduction	P			
11	System Description	P			
12	Economic Analysis		P	P	
16	Technical Analysis (3.0 B)		P	S	
17	Operational Analysis (3.0 C)	S		P	
18	Schedules (3.0 F)				P

19	Management Issues (4.0)				P
20	Project Scope Statement				P
23	Determine System Requirements	P	P	P	P
25	Project Management Updates				P
29	Context Diagram	P			
32	Level-0, 1, and 2 Diagrams			P	
35	ER Diagram		P		
38	Milestone One Updates			P	S
46	Deliverable Layout				P

## Communication Plan

The project team is using the following table for a high-level summary of our communication plan. The matrix continues to develop as the tasks for the upcoming milestones are realized and delegated.

In addition to the communication matrix, the Task Responsibility Report and the Project Status Report are updated Wednesdays on the project team’s shared drive. From the updated reports, the project team will be able to assess the weekly progress and the current timeline of the DBC rental project.

See the appendix to review the Communication Matrix.

## Project Standards and Procedures

For submitting and approving project change requests, team members will present their project request changes on Tuesdays at the weekly team meeting, or the team member can email a request to the project team.

# Project Scope Statement

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## General Project Information

Project Name Denton Bicycle Rental System

Sponsor: Joe Holland, Owner

Project Manager: Kevin Curran

## Problem / Opportunity Statement

The Denton Bicycle Center (DBC) plans to develop a bicycle rental program to expand their business and further develop customer relationships. The software company administering the POS system for DBC offers a bicycle-rental module, but the owner of DBC, Joe Holland has estimated that licensing the module is cost-prohibitive due to the scale of the rental program.

## Project Objectives

An analysis of DBC's current and planned business activities will determine the most cost effective solution to track and administer a bicycle rental program. The project will require the design of an information system to help market up to 30 bicycles and coordinating accessories for DBC's customer base.

## Project Description

The system should handle all customer billing and contract activity, customer contact information, customer rental history, item rental history and popularity, support display and reporting of critical sales information, and assist employees in understanding the increasingly complex and competitive business environment.

## Business Benefits

- Improved development of customer relationships
- Improved utilization of inventory
- New potential for revenue

## Project Deliverables

- DBC rental system analysis and design
- DBC rental system programs
- DBC rental system documentation
- Training Procedures

## Estimated Project Duration

4 months



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# Structure Requirements for the Denton Bicycle Shop Rental Information System

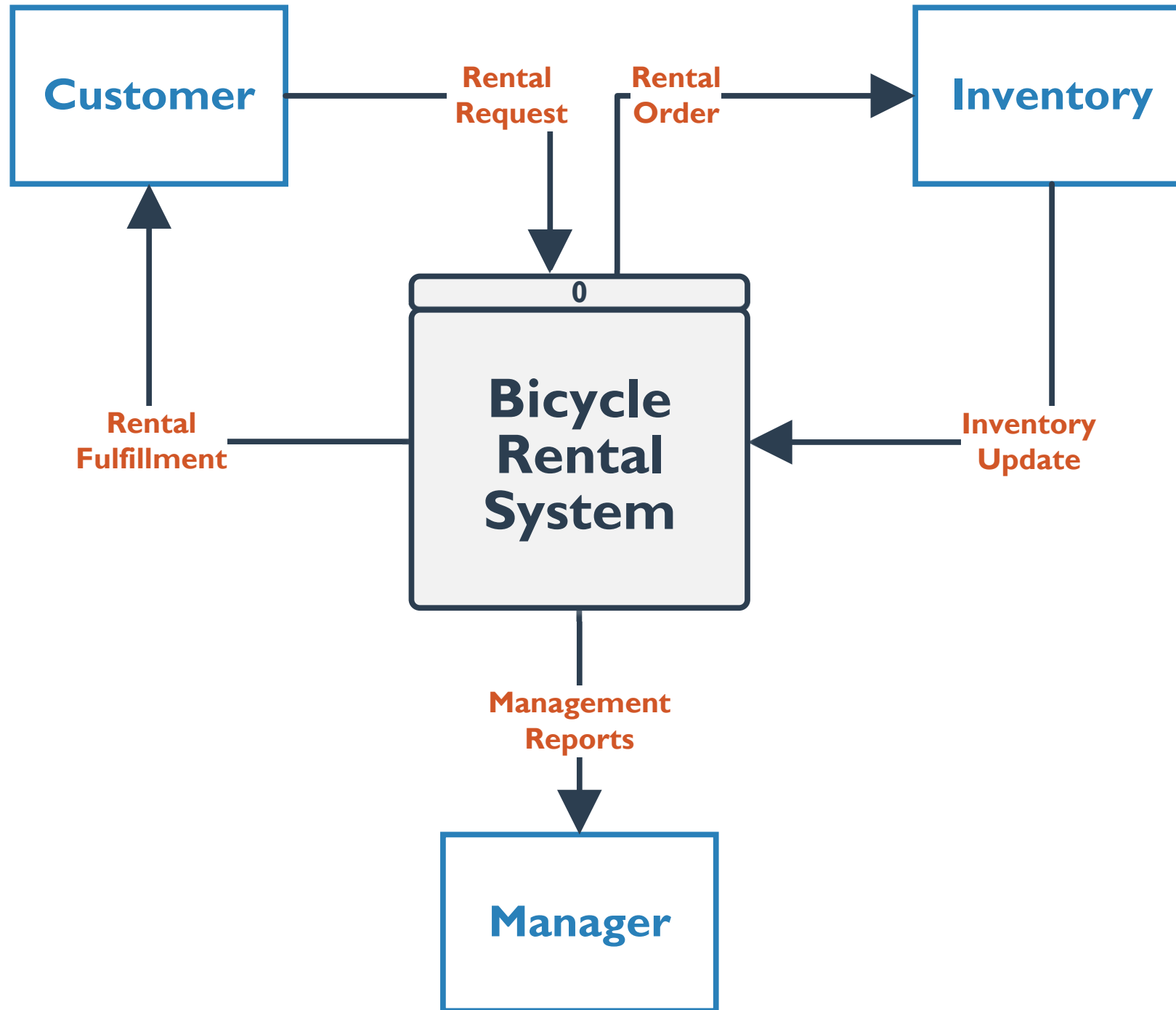
## Data Flow Diagrams and Entity-Relationship Diagram

## About the Context and Data Flow Diagrams

The Context Diagram is a specialized Level-0 DFD (Data Flow Diagram) designed to show the DBC (Denton Bicycle Center) rental system as a single high-level process. This systems analysis tool helps explain the relationship that the DBC rental system has with external entities as a graphical visualization of the movement of data through an information system.

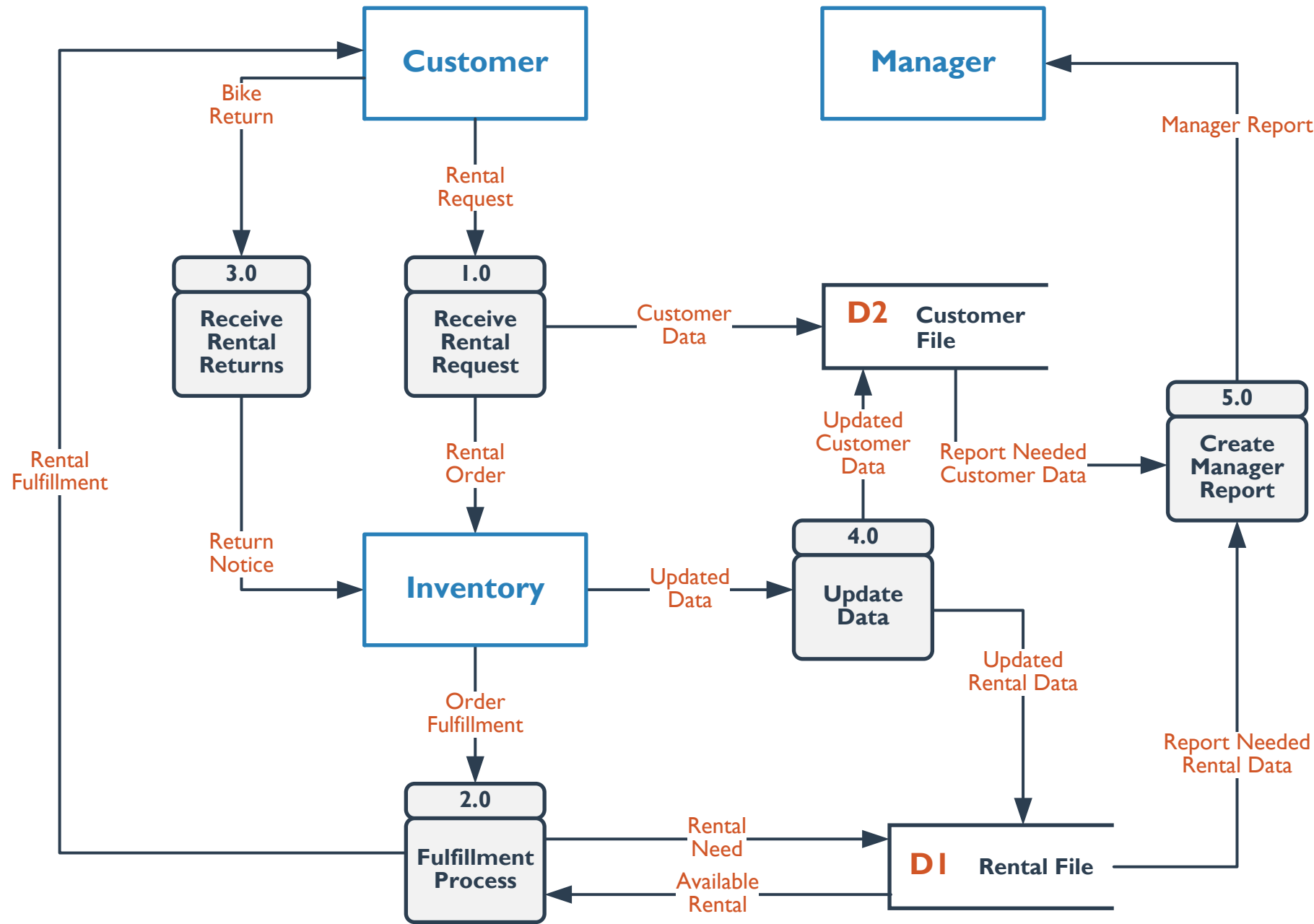
The rental system is independent from the client's existing POS and inventory system. An import/export relationship will exist between the POS system and the rental system in order to facilitate inventory tracking for both system and rental orders. Customers submit rental requests and receive rental fulfillment. While indirect, this relationship is central to the rental process. Finally, the rental system will provide management reports to the client in order to assess the success of the rental program.

This is a high-level process overview that shows the scope and boundaries of the rental system at a glance, including the other systems that interface with it. The subsequent DFDs model these processes and entity relationships in greater detail. In order to show more detail within this process, the process is decomposed into a number of smaller processes in a lower level DFD.



## Denton Bicycle Shop Rental System Context Diagram

The documentation for the system's requirements are shown with data flow diagrams (DFDs). The first DFD is the context level which shows the interaction between the customer, the staff/inventory, and the manger with the new rental system labeled 0. This shows the new system as a single process. There are inputs and outputs; however, there are no data stores in the context level diagram. Throughout the remaining DFDs the inputs and outputs must be balanced. That is, no new inputs or outputs may be included in the higher level diagrams.

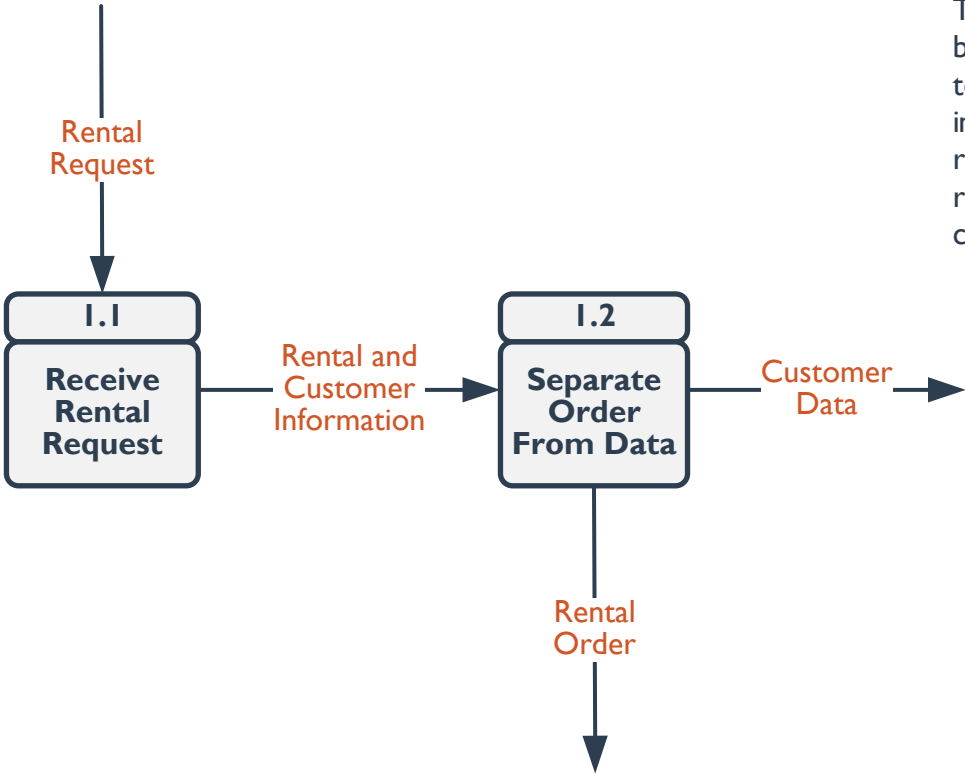


## Data Flow Diagram Level-0

The next DFD is the Level 0 diagram. This diagram reveals the main processes in Denton Bicycle Center's new rental system: 1. Receive Rental Request, 2. Fulfillment Process, 3. Receive Rental Returns, 4. Update Data, and 5. Create Manager Report. These four processes encompass the basic requirements as well as the necessary data stores for the proposed rental system.

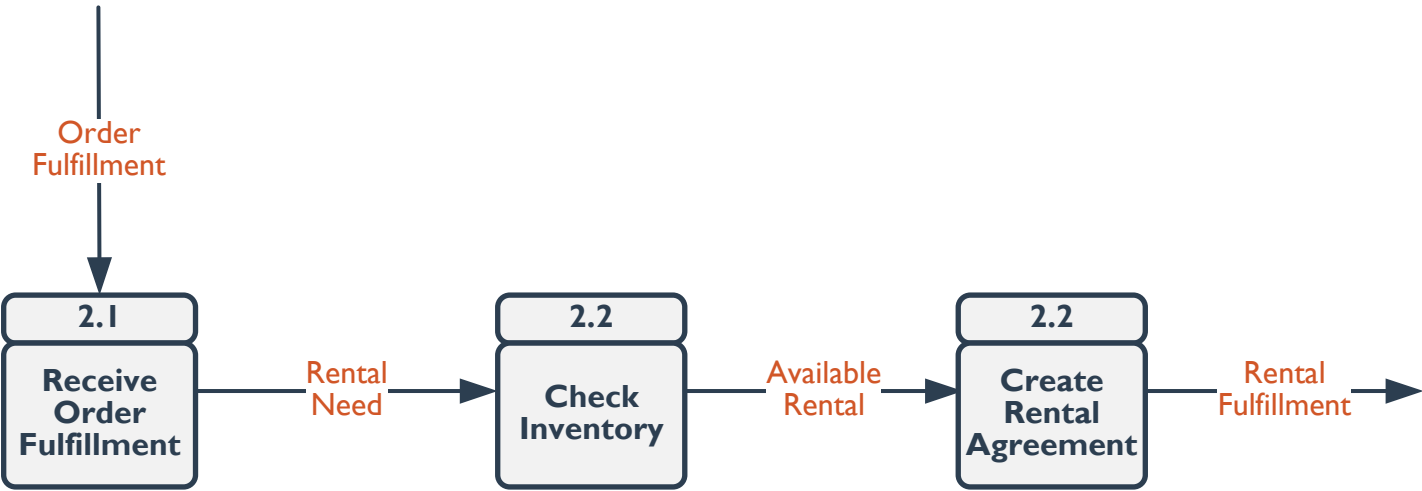
# Data Flow Diagrams Level-I

The following four DFDs are Level I diagrams that decompose individual processes (1., 2., 4., and 5.) as well as a Level 2 diagram for the further decomposition of process 5. These DFDs show how the processes are broken down in to smaller pieces to help make sense of the system. These Level I and level 5 diagrams embody the data flow requirements of the new system.



**Process 1.1 and 1.2**

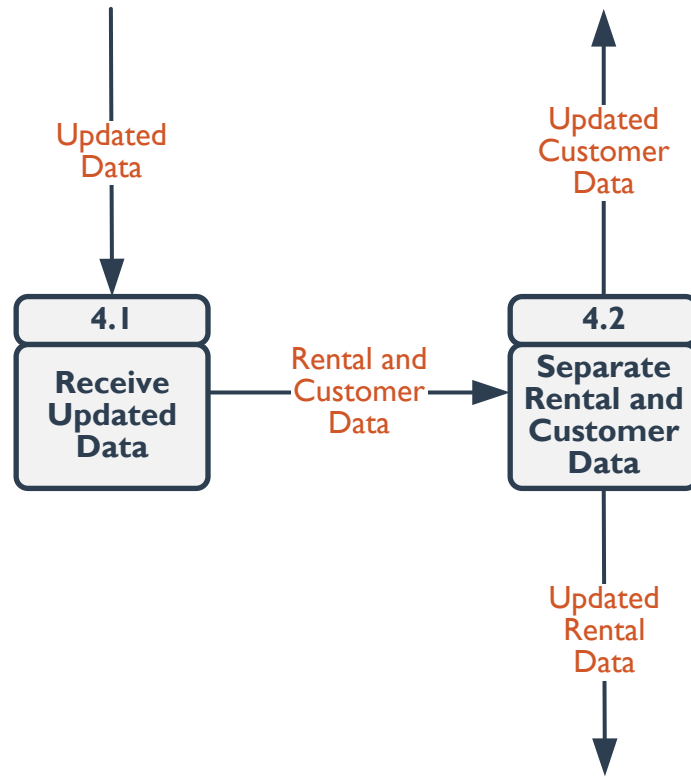
To develop the customer base, the DBC will need to capture customer information from the rental request, and the rental request must be use to create a rental order.



**Process 2.1 and 2.2**

For the rental system to process and fulfill a rental order, the inventory must be checked and a rental agreement must be created to complete the rental fulfillment.



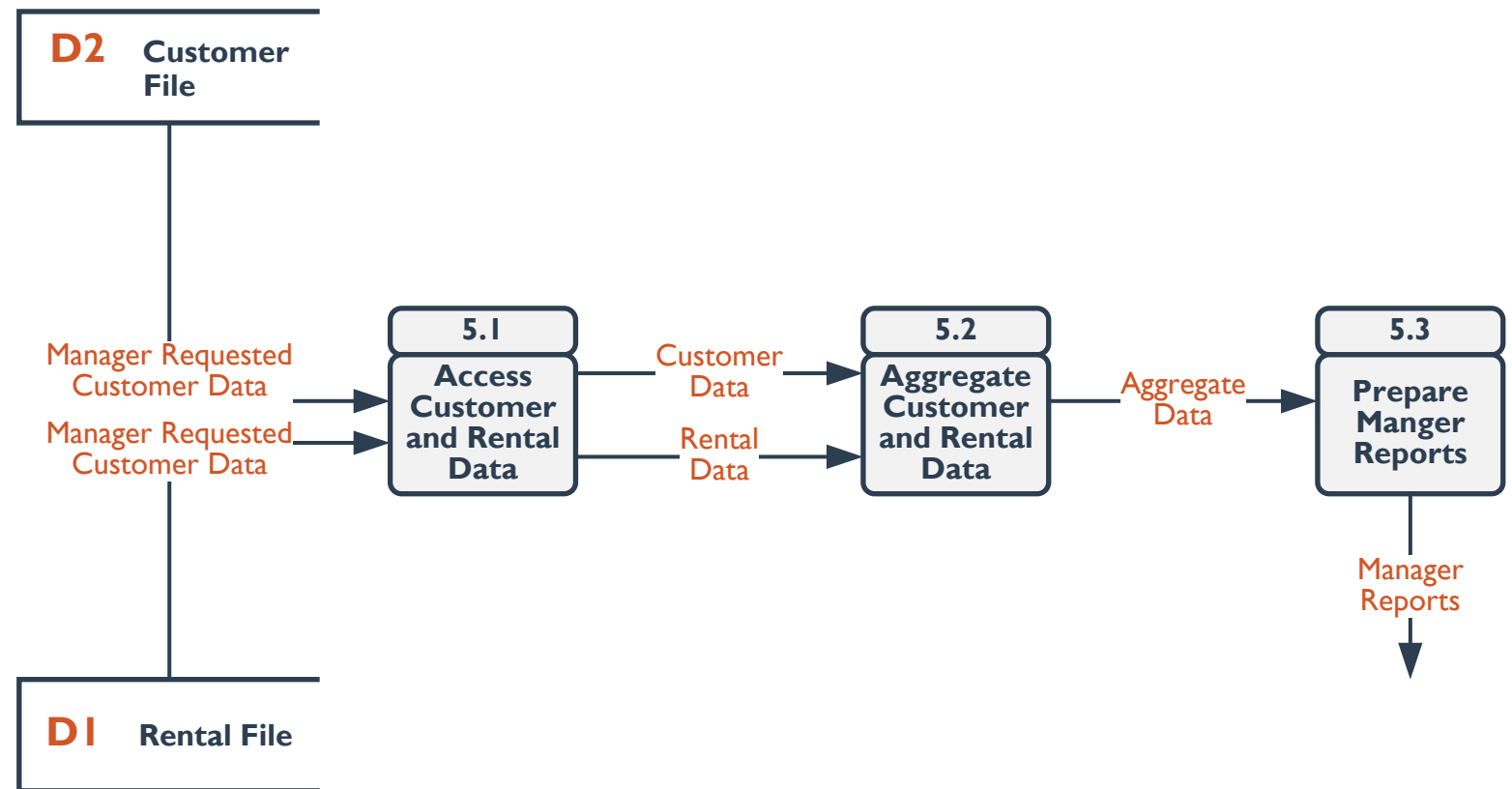


#### Process 4.1 and 4.2

With changes to the inventory, both the rental file and the customer will need to be updated as bikes are rented out and returned by the customer.

#### Process 5.1, 5.2, and 5.3

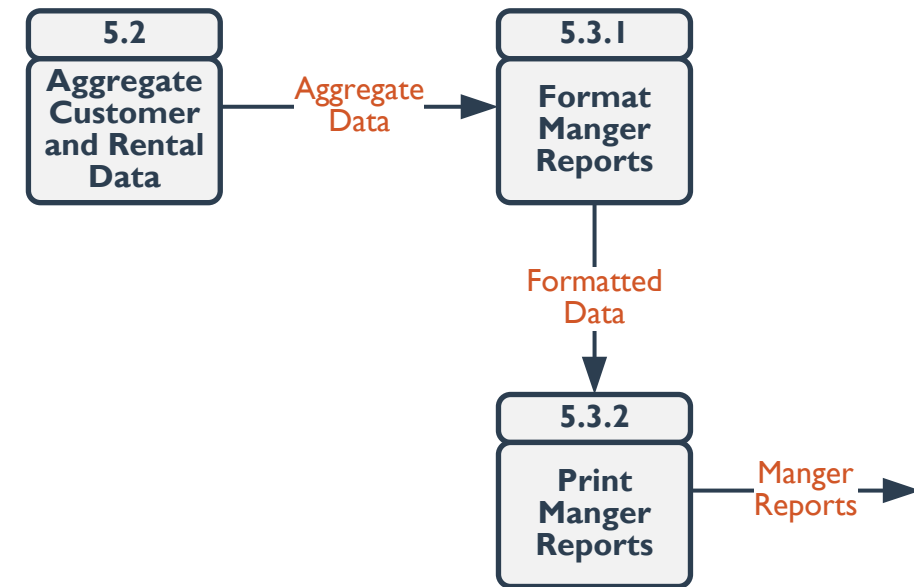
To manage the rental system, DBC requires reports from the customer and rental database files in order to analyze the rental programs changes to the customer base and inventory..



## Data Flow Diagrams

### Level-2-5

The rental system requires a final decomposition of the manager report process, because the owner needs readable documents that can be printed and shared. The rental system will format data into a stylesheet that will create spreadsheets and PDFs with relevant data captures and analysis.



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# About the Entity Relationship Diagram

The following diagram represents the entities of the business. Entities can be described as the items that a business wants to retain data about. The entities of a business have certain attributes that make up the entity as a whole. Each entity has a main attribute that is called the primary key (labeled as “PK”). The primary key is main identifier used when referencing an entity. To describe the entities and relationships among the data they consist of we have created a conceptual data model called the entity-relationship diagram or ERD.

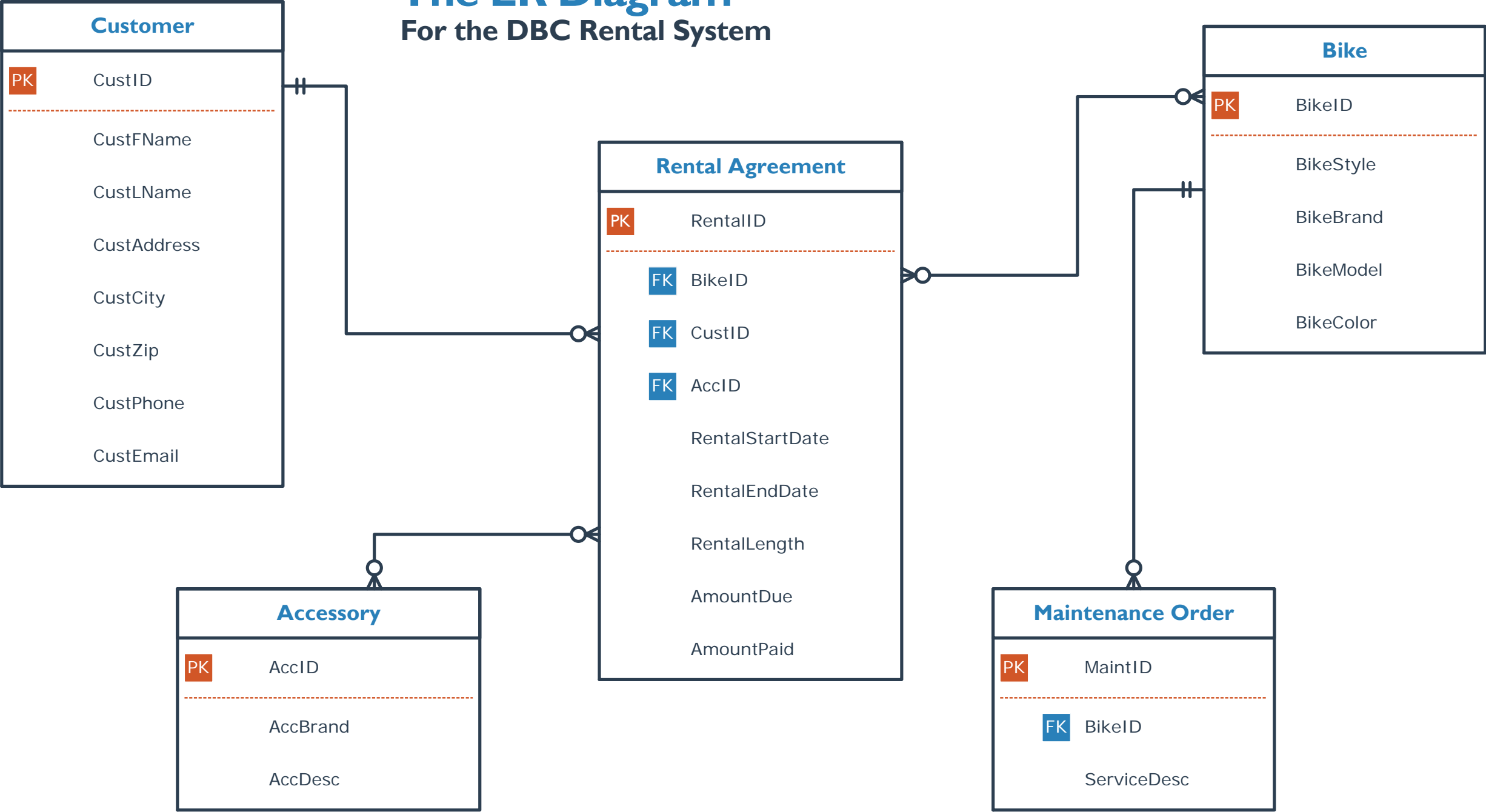
The relationships between the entities in the entity-relationship diagram identify the cardinality. The cardinality refers to the number of instances of one entity that must (or may) be associated with another entity. The cardinality is represented by either two straight lines meaning “one and only one” or a triangle (crow’s foot) with a circle, meaning “zero to many”.

All entities have a primary key and some entities have a foreign key, labeled as “FK”. The foreign key references information pulled in from a separate entity using its primary key.

In the Denton Bicycle Shop ERD a Rental Agreement must have a single customer and can have zero or many bikes and/or accessories as part of the rental agreement. This means that a customer can rent just a bike, just an accessory, or multiple of each under a single rental agreement. A customer can have multiple rental agreements. A specific bike and a specific accessory can be tied to multiple rental agreements, but not at the same time. A Maintenance Order can only have one bike for the order, but a bike can have multiple maintenance orders over time.

# The ER Diagram

## For the DBC Rental System



# Appendix

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**Gantt Chart**

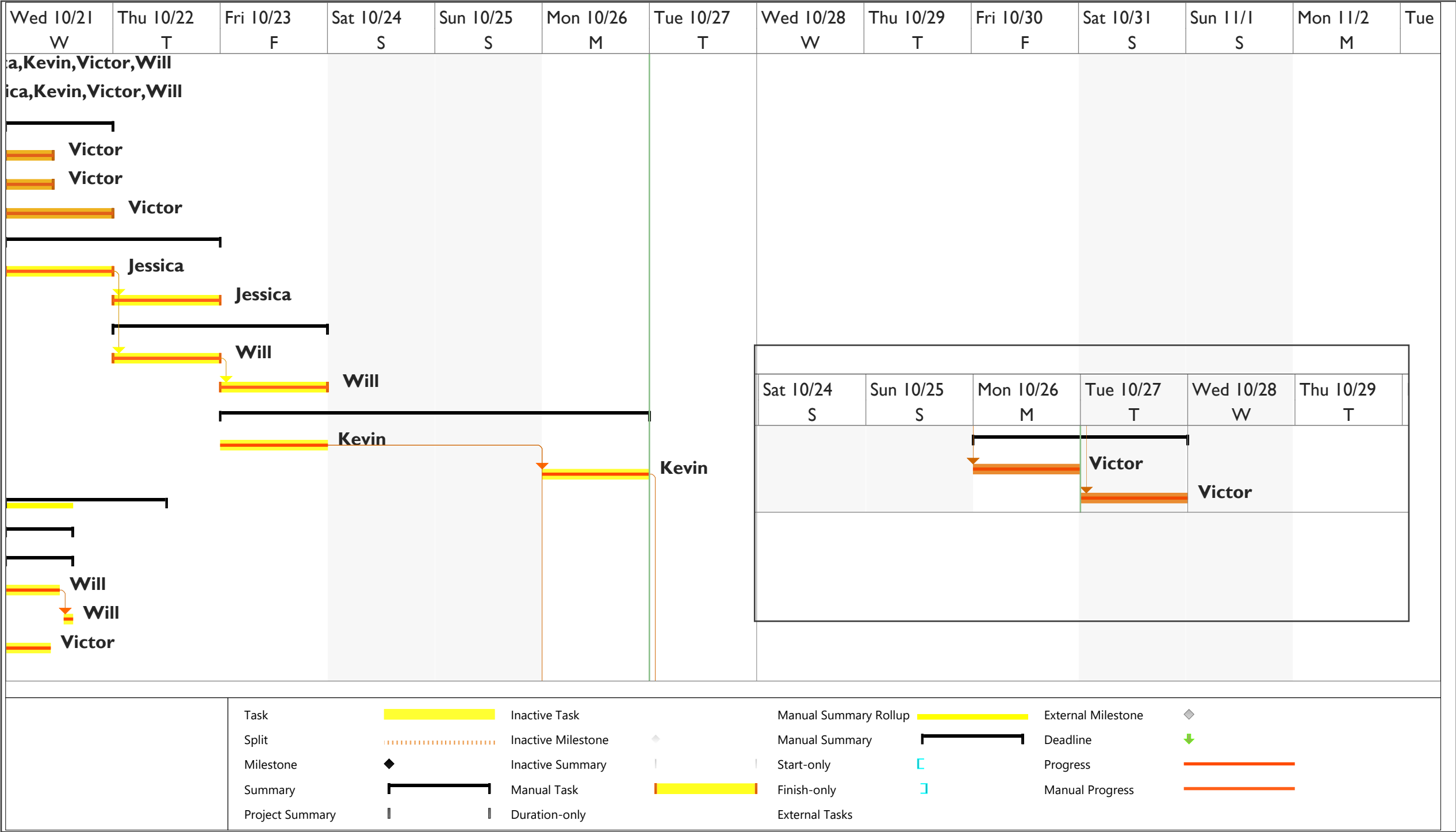
**Network Diagram**

**Project Communication Matrix**

# Gantt Chart

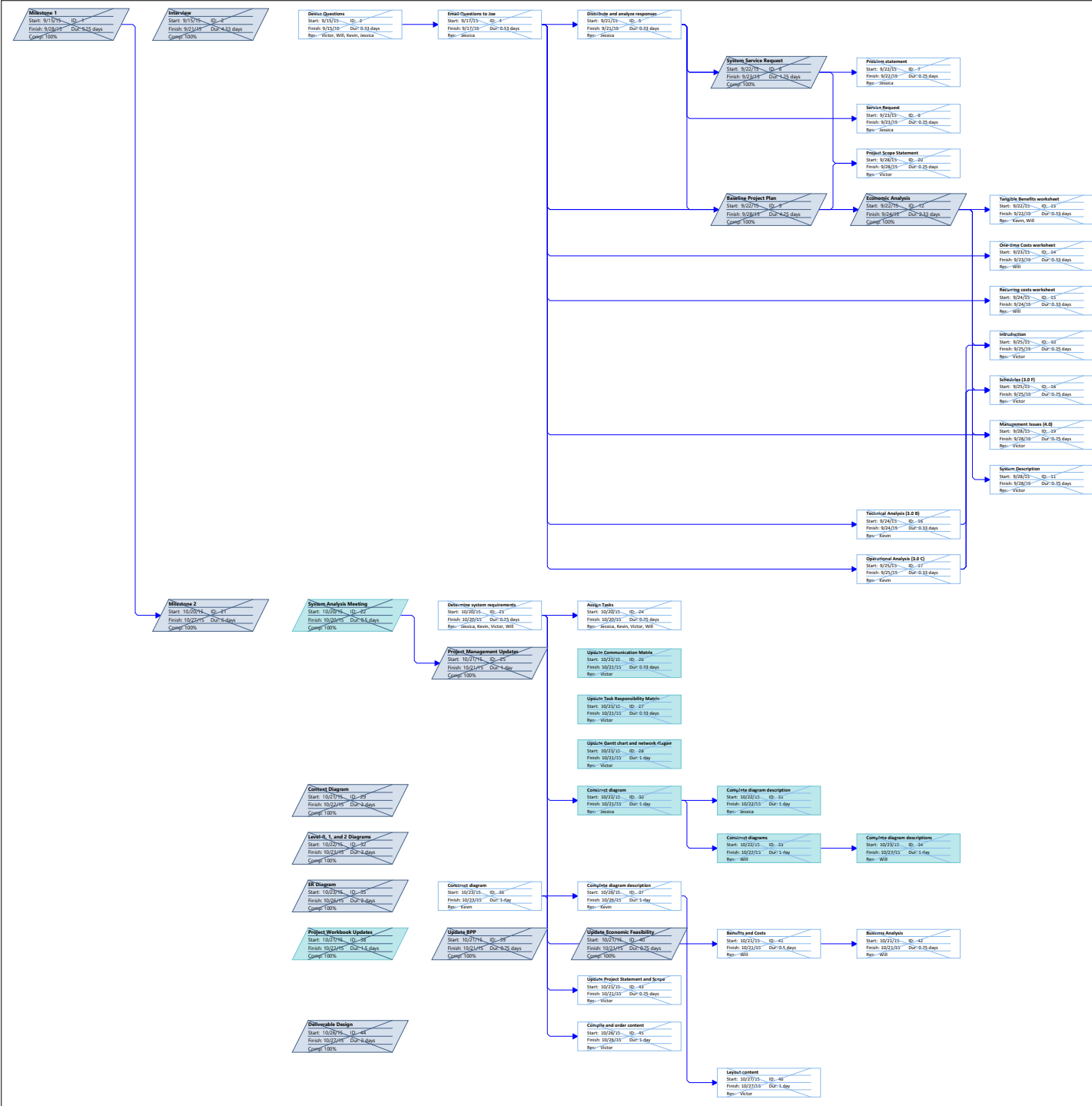
ID		Task Mode	Task Name	Duration	Start	Finish	Predece	Resource Names
1	✓		Milestone 1	9.25 days	Tue 9/15/15	Mon 9/28/15		
2	✓		Interview	4.33 days	Tue 9/15/15	Mon 9/21/15		
3	✓		Devise Questions	0.33 days	Tue 9/15/15	Tue 9/15/15		Victor,Will,Kevin,Jessica
4	✓		Email Questions to Joe	0.33 days	Thu 9/17/15	Thu 9/17/15	3	Jessica
5	✓		Distribute and analyze responses	0.33 days	Mon 9/21/15	Mon 9/21/15	4	Jessica
6	✓		System Service Request	1.25 days	Tue 9/22/15	Wed 9/23/15	5	
7	✓		Problem statement	0.25 days	Tue 9/22/15	Tue 9/22/15	5	Jessica
8	✓		Service Request	0.25 days	Wed 9/23/15	Wed 9/23/15	5	Jessica
9	✓		Baseline Project Plan	4.25 days	Tue 9/22/15	Mon 9/28/15	5	
10	✓		Introduction	0.25 days	Fri 9/25/15	Fri 9/25/15	12,17	Victor
11	✓		System Description	0.25 days	Mon 9/28/15	Mon 9/28/15	12	Victor
12	✓		Economic Analysis	2.33 days	Tue 9/22/15	Thu 9/24/15	4	
13	✓		Tangible Benefits worksheet	0.33 days	Tue 9/22/15	Tue 9/22/15	4	Kevin,Will
14	✓		One-time Costs worksheet	0.33 days	Wed 9/23/15	Wed 9/23/15	4	Will
15	✓		Recurring costs worksheet	0.33 days	Thu 9/24/15	Thu 9/24/15	4	Will
16	✓		Technical Analysis (3.0 B)	0.33 days	Thu 9/24/15	Thu 9/24/15	4	Kevin
17	✓		Operational Analysis (3.0 C)	0.33 days	Fri 9/25/15	Fri 9/25/15	4	Kevin
18	✓		Schedules (3.0 F)	0.25 days	Fri 9/25/15	Fri 9/25/15	12,16,17	Victor
19	✓		Management Issues (4.0)	0.25 days	Mon 9/28/15	Mon 9/28/15	4,12	Victor
20	✓		Project Scope Statement	0.25 days	Mon 9/28/15	Mon 9/28/15	6,9	Victor
21	✓		Milestone 2	6 days	Tue 10/20/15	Tue 10/27/15	1	
22	✓		System Analysis Meeting	0.5 days	Tue 10/20/15	Tue 10/20/15		

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessor	Resource Names
23	✓		Determine system requirements	0.25 days	Tue 10/20/15	Tue 10/20/15		Jessica, Kevin, Victor, Will
24	✓		Assign Tasks	0.25 days	Tue 10/20/15	Tue 10/20/15	23	Jessica, Kevin, Victor, Will
25	✓		<b>Project Management Updates</b>	<b>1 day</b>	<b>Wed 10/21/15</b>	<b>Wed 10/21/15</b>	<b>22</b>	
26	✓		Update Communication Matrix	0.33 days	Wed 10/21/15	Wed 10/21/15		Victor
27	✓		Update Task Responsibility Matrix	0.33 days	Wed 10/21/15	Wed 10/21/15		Victor
28	✓		Update Gantt chart and network diagram	1 day	Wed 10/21/15	Wed 10/21/15		Victor
29	✓		<b>Context Diagram</b>	<b>2 days</b>	<b>Wed 10/21/15</b>	<b>Thu 10/22/15</b>		
30	✓		Construct diagram	1 day	Wed 10/21/15	Wed 10/21/15	23	Jessica
31	✓		Complete diagram description	1 day	Thu 10/22/15	Thu 10/22/15	30	Jessica
32	✓		<b>Level-0, 1, and 2 Diagrams</b>	<b>2 days</b>	<b>Thu 10/22/15</b>	<b>Fri 10/23/15</b>		
33	✓		Construct diagrams	1 day	Thu 10/22/15	Thu 10/22/15	30	Will
34	✓		Complete diagram descriptions	1 day	Fri 10/23/15	Fri 10/23/15	33	Will
35	✓		<b>ER Diagram</b>	<b>2 days</b>	<b>Fri 10/23/15</b>	<b>Mon 10/26/15</b>		
36	✓		Construct diagram	1 day	Fri 10/23/15	Fri 10/23/15		Kevin
37	✓		Complete diagram description	1 day	Mon 10/26/15	Mon 10/26/15	36	Kevin
38	✓		<b>Project Workbook Updates</b>	<b>1.5 days</b>	<b>Wed 10/21/15</b>	<b>Thu 10/22/15</b>		
39	✓		<b>Update BPP</b>	<b>0.75 days</b>	<b>Wed 10/21/15</b>	<b>Wed 10/21/15</b>		
40	✓		Update Economic Feasibility	<b>0.75 days</b>	<b>Wed 10/21/15</b>	<b>Wed 10/21/15</b>		
41	✓		Benefits and Costs	0.5 days	Wed 10/21/15	Wed 10/21/15	23	Will
42	✓		Business Analysis	0.25 days	Wed 10/21/15	Wed 10/21/15	41	Will
43	✓		<b>Update Project Statement and Scope</b>	0.25 days	Wed 10/21/15	Wed 10/21/15	23	Victor
44	✓		<b>Deliverable Design</b>	<b>2 days</b>	<b>Mon 10/26/15</b>	<b>Tue 10/27/15</b>		
45	✓		Compile and order content	1 day	Mon 10/26/15	Mon 10/26/15	36	Victor
46	✓		Layout content	1 day	Tue 10/27/15	Tue 10/27/15	37	Victor





# Network Diagram



# Project Communication Matrix

Stakeholder	Document	Format	Team Contact	Due Date
Team Members	Interview Questions/ Answers	Email / Word	Jessica	Tue 9/22/15
Team Members	System Service Request	Word	Jessica	Fri 9/25/15
Team Members	Baseline Project Plan	Word / Excel	Kevin, Will, Victor	Tue 9/29/15
Team Members	Project Scope Statement	Word	Victor	Mon 9/28/15
Team Members	DFD Diagrams	Visio	Jessica, Will	Fri 10/23/15
Team Members	ER Diagram	Visio	Kevin	Fri 10/23/15
Team Members	BPP Updates	Word	Will, Victor	Fri 10/23/15
Team Members	Milestone 1	PDF	Team	Tue 9/29/15
Team Members	Milestone 2	PDF	Team	Tue 10/27/15
Team Members	Milestone 3	PDF	Team	Tue 11/17/15
Team Members	Milestone 4	PDF	Team	Tue 12/1/15