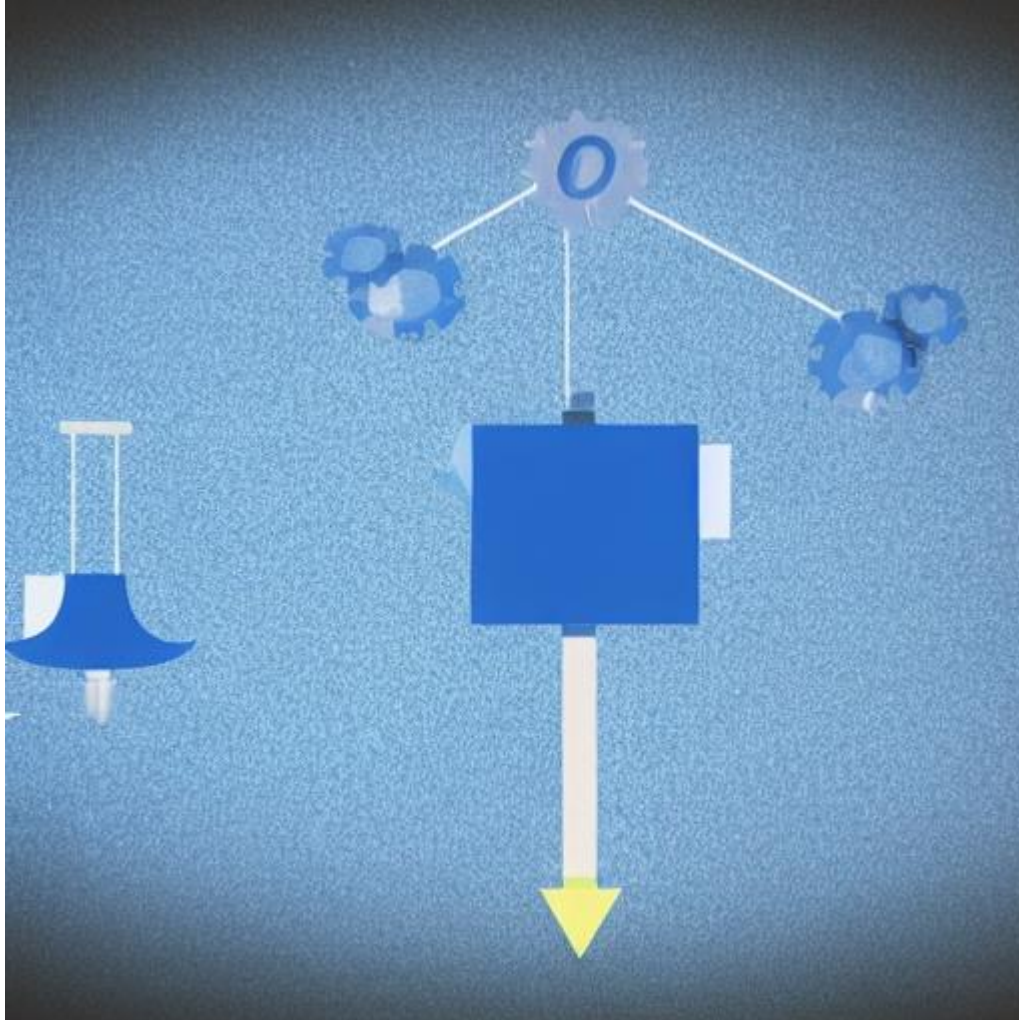


WRS Evolution

Requirements Elicitation



12/11/2022

Table of Contents

Revision History	3
[1] Introduction.....	3
1.1. Purpose	3
1.2. Scope.....	3
1.3. Objectives and Success Criteria	4
1.4. Definitions, Acronyms, and Abbreviations	5
1.5. Overview	5
[2] Preliminary Definition	5
2.1 Preliminary Domain	5
2.3 Preliminary Functional Requirements	5
2.4 Preliminary Non-Functional Requirements	6
[3] Issues with the Preliminary Definition Given	6
3.1 Domain Issues	6
3.2 Functional Requirements Issues	7
3.3 Non-Functional Requirements Issues	11
[4] WRS	14
4.1W	14
4.1.1 Problem.....	14
4.1.2 Goals	15
4.1.3 Improved Understanding of Domain, Stakeholders, Functional, and Non-Functional Objectives	24
4.1.4 Stakeholders	25
4.2. RS	25
4.2.1. Functional Requirements.....	25
4.2.2. Non-Functional Requirements.....	27
4.2.3. Specifications	29
[5] Prototype Interface Mock-ups	32
[6] User Manual	36
[6.1] Overview:	36
[6.2] Hospitality Industry Data Visualization Webpage Quick Start Guide:	36
[6.3] Troubleshooting:	37
[7] References	37

Revision History

Date	Version	Changes	Editor
10/15/2022	1.0	Creating the WRS Document	Vlad Onyshchuk
10/16/2022	1.1	Small edits and grammar changes	Arlo Jones, Kris Koehn
10/17/2022	1.2	Preliminary def. & Issues with Pre. Def.	Vlad, Kris
10/18/2022	1.3	Finishing Preliminary def. & Issues with Pre. Def.	Kris
10/18/2022	1.4	Finished Prototype Interface Mock-ups & User Manual	Vlad
10/18/2022	1.5	Added Improved Subsystems	Jadin
10/18/2022	1.6	Adding Finishing Touches	Arlo, Kris, Jadin, Vlad
12/10/2022	2.0	Started adding new information to the document	Kris, Vlad
12/11/2022	2.1	Added the KAOS model	Arlo, Jadin
12/11/2022	2.2	Final editing pass	Arlo, Kris, Jadin, Vlad

[1] Introduction

1.1. Purpose

The purpose of this project is to create a data ingestion and visualization system for the Washington Hospitality Association. The system will output the aggregate data in a form that is safe for public viewing and will include the ability to create and host dashboards using Power Bi. The overall goal of the project is to provide the Washington Hospitality Association with a comprehensive and user-friendly system for data ingestion, storage, visualization, and will also allow for the ability to visualize the effects of large changes regarding the hospitality industry possible.

1.2. Scope

The scope of this project is to create a data ingestion system that obfuscates and stores data, and outputs the aggregate data safe for public viewing. A server will be created to hold the aggregate data, and the server will be integrated with Power Bi to create dashboards. These dashboards will be hosted on a webpage created by Carson College of Business and have a dashboard PDF exporting system attached. Later in the future the team hopes to get an API running so that other people can use the system on their own website. The project is expected to be completed within 6 months.

1.3. Objectives and Success Criteria

Objectives	Success Criteria
Create a data ingestion system	The system obfuscates and stores the data and outputs the aggregate data safe for public viewing
Create a server that holds the aggregate data	The server is able to hold and manage the aggregate data
Make the server with the aggregate data work with Power Bi	The server and Power Bi are able to work together seamlessly
Create Power Bi dashboards	The dashboards are well-designed and user-friendly
Create a webpage hosted by WSU	The webpage is created and hosted by WSU
Integrate the dashboards onto the webpage	The dashboards are successfully integrated onto the webpage
Create a dashboard PDF exporting system	The system is able to export the dashboards as PDFs
Create an API so others can integrate the tool into their website	The API is successfully created and can be used by others to integrate the tool into their website
The Project is completed on time effectively	The project is done and ready in the next 6 months

The objectives and success criteria of this project are:

1. Create a data ingestion system that:
 - a. Can process raw data
 - b. Apply necessary obfuscation to protect individual data privacy
2. Create a Server that holds the aggregate data
3. Create Power BI dashboards that can access the data from the server
4. Create a webpage hosted on the Carson College of Business website
5. Integrate the BI dashboards on the webpage
6. PDF report exporting system
7. Create an API to allow others to integrate to tools onto their website
8. Users able to access and view dashboards easily and securely
9. Project is completed on time effectively

1.4. Definitions, Acronyms, and Abbreviations

Term	Definition
Power Bi	Power BI is an interactive data visualization software product made by Microsoft
API	Short for Application Programming Interface
AWS	Short for Amazon Web Services
WSU	Washington State University
WHA	Washington Hospitality Association

1.5. Overview

The project overview includes an introduction that provides an overview of the project's purpose, scope, objectives, and success criteria. The preliminary definition section provides a preliminary definition of the project, including subsystems, functional requirements, and non-functional requirements. The Issues with the Preliminary Definition Given section identifies and discusses any issues with the initial definition. The WRS section outlines the revised definition of the project, including the problem being addressed, goals, improved understanding of subsystems, functional and non-functional objectives, and stakeholders. The Prototype Interface Mock-ups section includes mock-ups of the user interface for the prototype, and the User Manual section provides instructions for using the system. Finally, the References section lists any references used in the project.

[2] Preliminary Definition

2.1 Preliminary Domain

PD_ID	Preliminary S1 Description
PD_1	AWS
PD_2	WSU Website Ecosystem

2.3 Preliminary Functional Requirements

PFR_ID	Preliminary Functional Requirements Description
PFR_1	System gets data from Department of Revenue regularly
PFR_2	System stores data within the Obfuscated Database
PFR_3	Data is uploaded to the database by Ingestion system
PFR_4	Graphs displayed by Power BI dashboards
PFR_5	Data can be exported for a user's own purposes using the PDF system
PFR_6	Data retrieved from the Aggregated database
PFR_7	Obfuscated data is provided by WSU IT
PFR_8	Aggregated data is available to create additional projects through API

2.4 Preliminary Non-Functional Requirements

PFR_ID	Preliminary Non-Functional Requirements Description
PNFR_1	Sensitive information is obfuscated by ingestion System
PNFR_2	Data is aggregated by the Aggregation System
PNFR_3	Obfuscated database Access controls are configured
PNFR_4	Data is served through the Aggregated database
PNFR_5	WSU Website presents minimal narrative about the data
PNFR_6	System is accessible whenever needed (WSU website)'
PNFR_7	Power BI dashboards provide relevant visualizations in an easily digestible way
PNFR_8	System is automated, most processes occur sequentially without additional input (AWS)

[3] Issues with the Preliminary Definition Given

3.1 Domain Issues

Domain Issue ID	Domain Issue Description	
DI1	PD_1	AWS
	The development team isn't familiar with AWS	
	Option 1	Move to another system
	Option 2	Work with industry mentors to learn AWS
	Option 3	Attempt to learn AWS solo
	Choice	2
	Rationale	Much work has already been done on AWS and the team can benefit significantly by learning AWS
Satisfied by	NFR_8	

Domain Issue ID	Domain Issue Description	
DI2	PD_2	WSU website ecosystem
	Setting up the WSU website involves significant bureaucratic overhead	
	Option 1	Contact the required individuals to set up the website
	Option 2	Set up an independent website
	Choice	1
	Rationale	Setting up a WSU website will make the data appear more neutral and consistent
Satisfied by	NFR_6, NFR_5	

3.2 Functional Requirements Issues

FR Issue ID	Description	
FRI1	PFR_1	PFR_1. System gets data from Department of Revenue (complicated)
	System is somewhat complicated	
	Option 1	Build a data ingestion system
	Option 2	Manually transfer the data
	Choice	Option 1
	Rationale	Saves on labor and time
	FR_ID	FR_1
Satisfied by	FR_1	

FR Issue ID	Description	
FRI2	PFR_2	PFR_2. Needs to store data within obfuscated database
	Retrieval and aggregation are nontrivial	
	Option 1	Build a system to aggregate the data
	Option 2	Pull directly from the obfuscated database
	Choice	Option 1
	Rationale	This will organize the data for better use
	FR_ID	FR_2
Satisfied by	FR_2	

FR Issue ID	Description	
FRI3	PFR_3	PFR_3. need a way to get data into database
	Need to decide on ingestion	
	Option 1	Data is uploaded to the database by Ingestion system
	Option 2	Processed manually
	Choice	Option 1
	Rationale	Automated solutions are better
	FR_ID	FR_3
Satisfied by	FR_3	

FR Issue ID	Description	
FRI4	PFR_4	PFR_4. Need to display graphs for the user
	Option 1	Graphs displayed by Power BI dashboards
	Option 2	Don't
	Choice	Option 1
	Rationale	This is better
	FR_ID	FR_4
Satisfied by	FR_4	

FR Issue ID	Description	
FRI5	PFR_5	PFR_5. Need a way to export
	Option 1	Data can be exported for a user's own purposes using the PDF system
	Option 2	Csv export
	Choice	Option 1
	Rationale	This will be more user friendly
	FR_ID	FR_5
Satisfied by	FR_5	

FR Issue ID	Description	
FRI6	PFR_6	PFR_6. We need to deliver aggregated data
	Option 1	Data retrieved from the Aggregated database
	Option 2	Calculate aggregation from obfuscation DB on the fly
	Choice	Option 1
	Rationale	Having it pre-calculated is better for AWS stuff
	FR_ID	FR_6
Satisfied by	FR_6	

FR Issue ID	Description	
FRI7	PFR_7	PFR_7. Researchers need a way to get non-aggregated data
	Option 1	Obfuscated data is provided by WSU IT
	Option 2	researchers must go to pullman to get a thumb drive of it
	Choice	Option 1
	Rationale	This will make the data more accessible
	FR_ID	FR_7
Satisfied by	FR_7	

NFR Issue ID	Description	
NFR18	PNFR_8	PNFR_8. Need a way to expand the utility so the data can be used outside this project
	Option 1	Aggregated data is available to create additional projects through API
	Option 2	Don't offer this
	Choice	Option 1
	Rationale	Adds utility to the system
	FR_ID	FR_8
Satisfied by	FR_8	

3.3 Non-Functional Requirements Issues

NFR Issue ID	Description	
NFR11	PNFR_1	PNFR_1: Security is a concern for the stakeholders
	Option 1	Sensitive information is obfuscated by ingestion System
	Option 2	Serve data directly
	Choice	Option 1
	Rationale	Protect the interest of the stakeholders
Satisfied by	NFR_1	

NFR Issue ID	Description	
NFR12	PNFR_2	PNFR_2: the data needs to be organized
	Option 1	Data is aggregated by the Aggregation System
	Option 2	Do it on the fly
	Choice	1
	Rationale	This will keep it organized
Satisfied by	NFR_2	

NFR Issue ID	Description	
NFR13	PNFR_3	PNFR_3: Security is a concern of the stakeholders
	Option 1	Obfuscated database Access controls are configured
	Option 2	Ignore the security risk
	Choice	1
	Rationale	This option will protect the interests of the stakeholders
Satisfied by	NFR_3	

NFR Issue ID	Description	
NFR14	PNFR_4	PNFR_4: Data may not be in the proper format
	Option 1	Data is served through the Aggregated database
	Option 2	Do aggregation on the fly in the queries
	Choice	1
	Rationale	This will be computationally less expensive
Satisfied by	NFR_4	

NFR Issue ID	Description	
NFR15	PNFR_5	PNFR_5: The website must produce a neutral score card for the hospitality industry
	Option 1	WSU Website presents minimal narrative about the data
	Option 2	Write politically motivated hit pieces
	Choice	Option 1
	Rationale	The project shouldn't cause a scene
Satisfied by	NFR_5	

NFR Issue ID	Description	
NFR16	PNFR_6	PNFR_6 website must be accessible
	Option 1	Use the WSU website ecosystem
	Option 2	Use a third-party hosting service
	Choice	Option 1
	Rationale	This will ensure higher uptime
Satisfied by	NFR_6	

NFR Issue ID	Description	
NFR17	PNFR_7	PNFR_7 we must present the data in a relevant way
	Option 1	Power BI dashboards to provide relevant visualizations in an easily digestible way
	Option 2	Raw csv display
	Choice	Option 1
	Rationale	This fits the requirements better
Satisfied by	NFR_7	

NFR Issue ID	Description	
NFR18	PNFR_8	PNFR_8 the system must be easy to maintain
	Option 1	Use AWS for data pipelines
	Option 2	Do everything manually
	Choice	Option 1
	Rationale	This will satisfy requirements better
Satisfied by	NFR_8	

[4] WRS

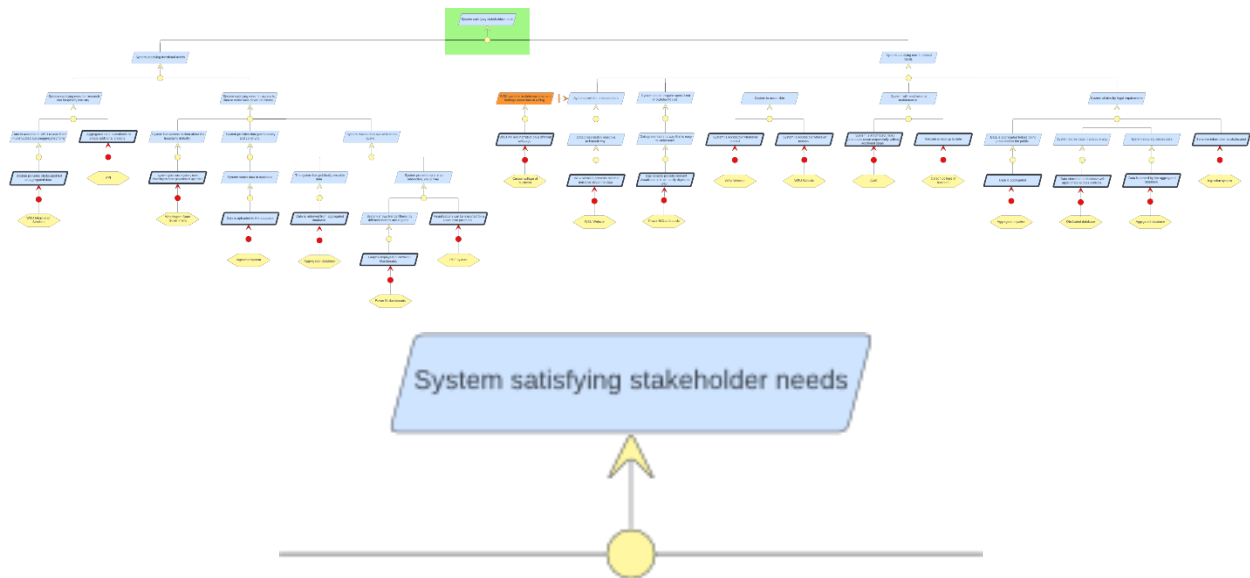
4.1W

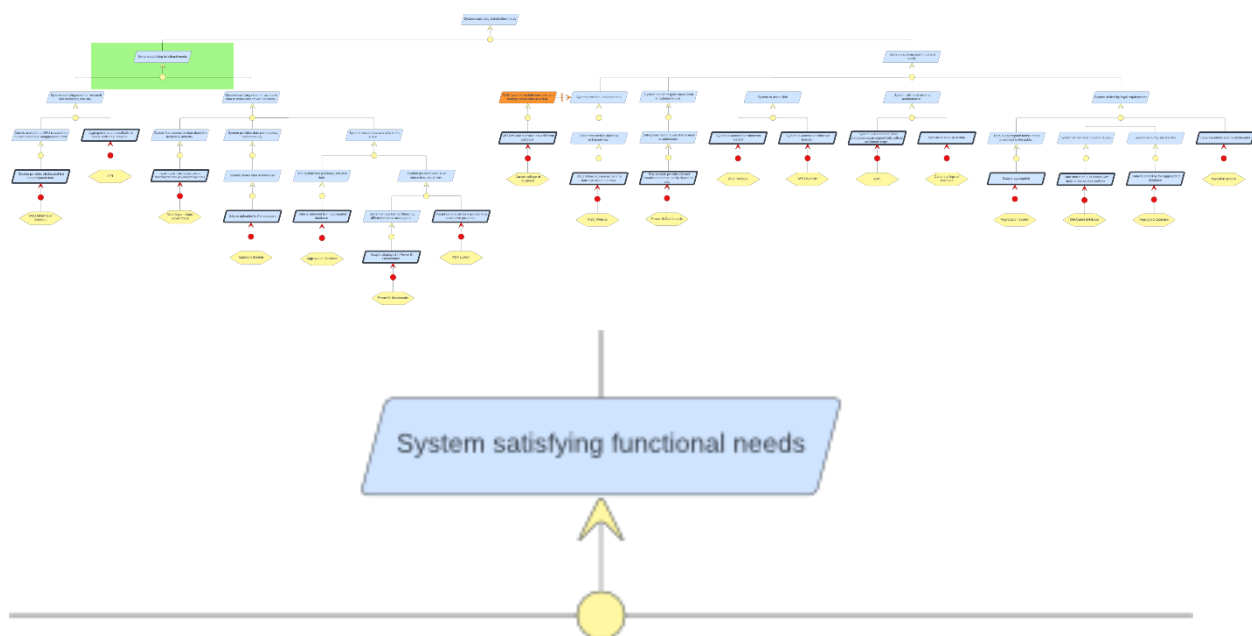
4.1.1 Problem

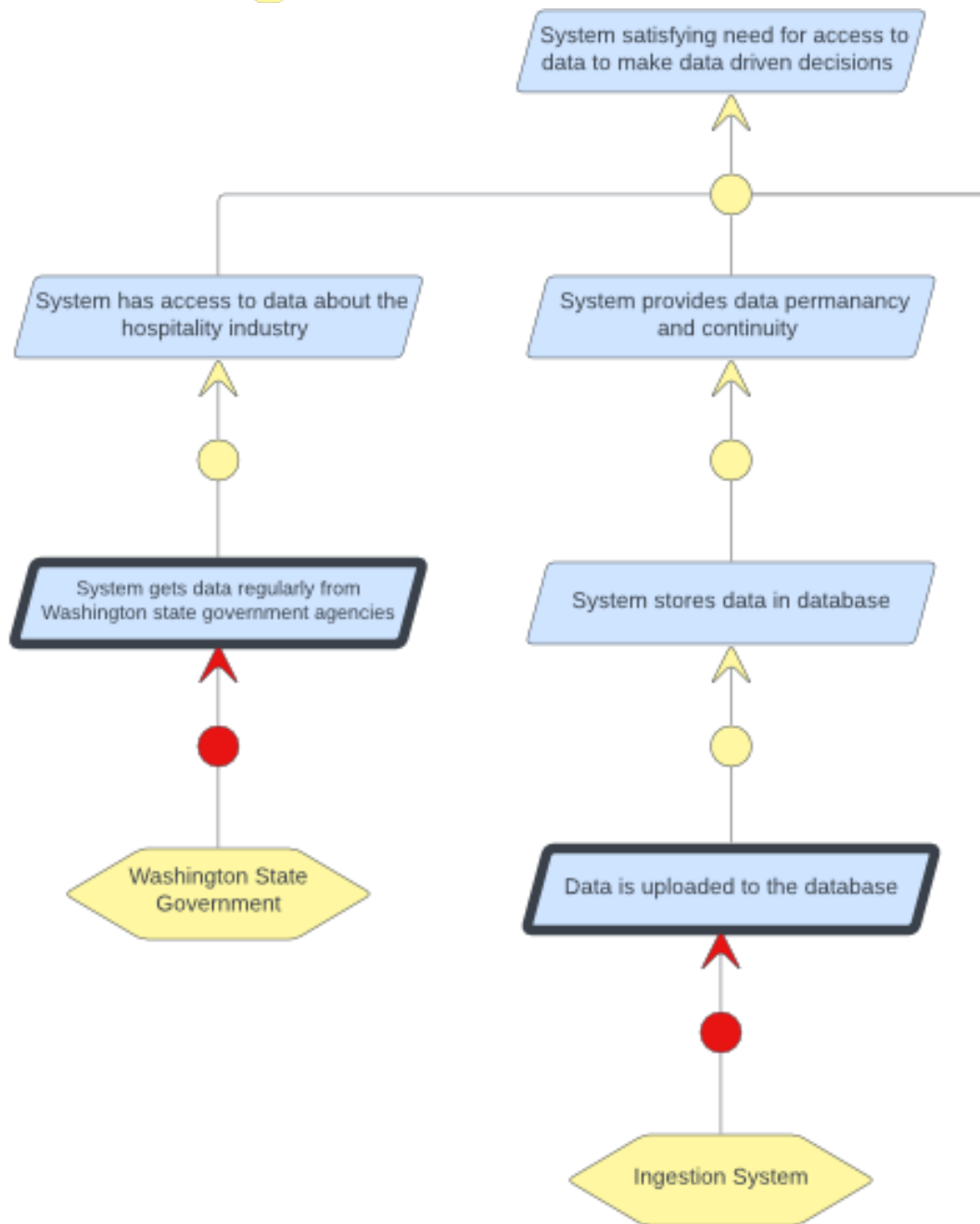
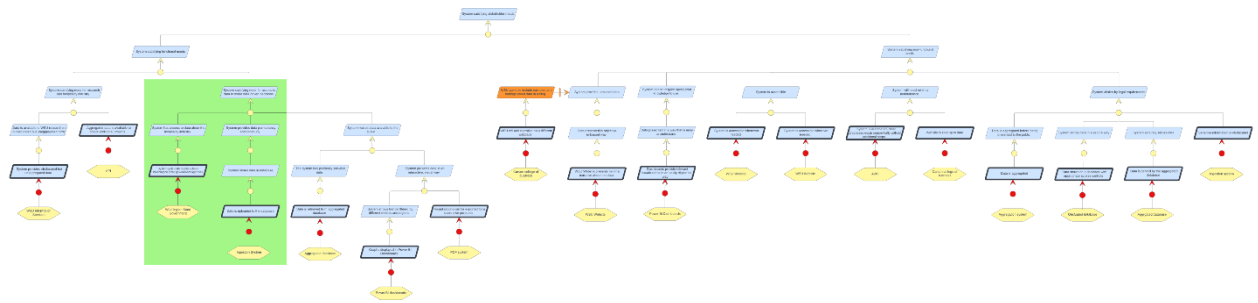
Problem ID	Problem Description	Corresponding Goals
P1	No data from government entities	G1
P2	Don't have access to the AWS servers	G2
P3	Pipeline deprecated	G2
P4	No access to power Bi account	G3
P5	AWS stops receiving data from government quarterly	G1
P6	Can't find technology to properly export data visuals	G3
P7	Access to the system cannot be intermittent	G4
P8	Data is not in the correct format	G2

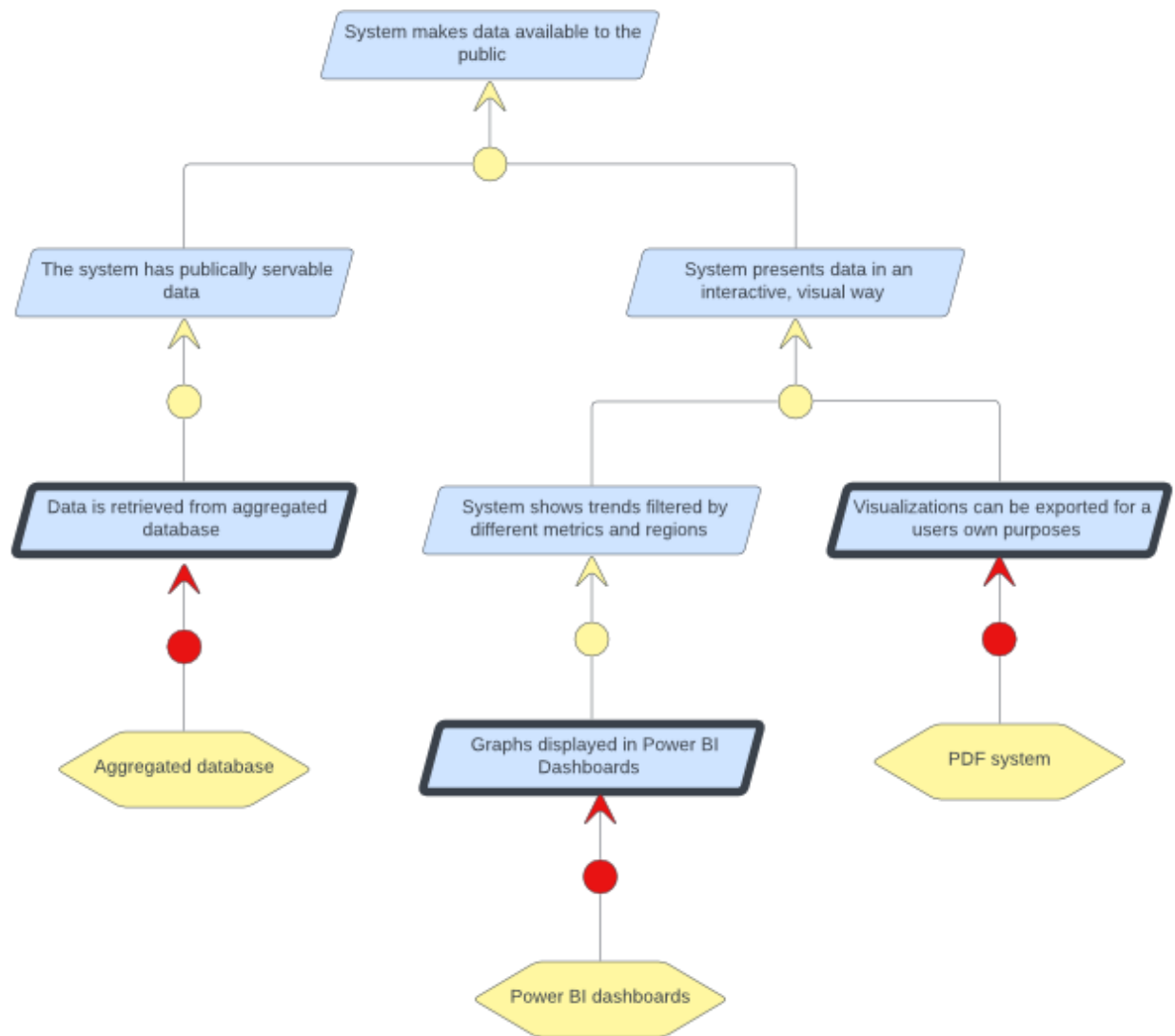
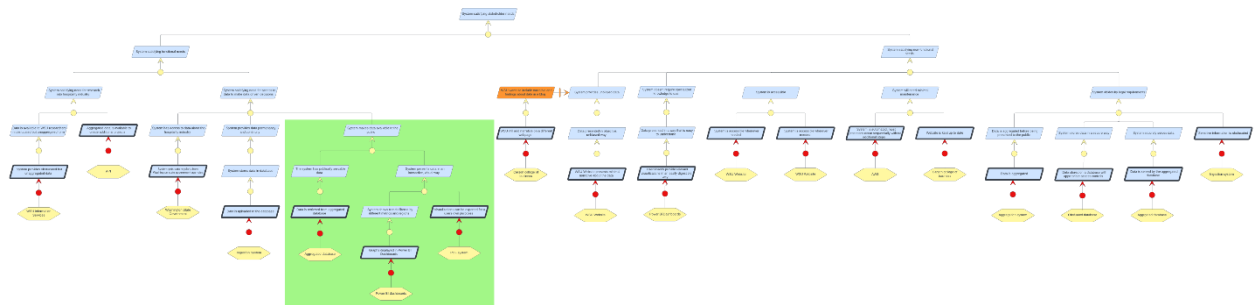
4.1.2 Goals

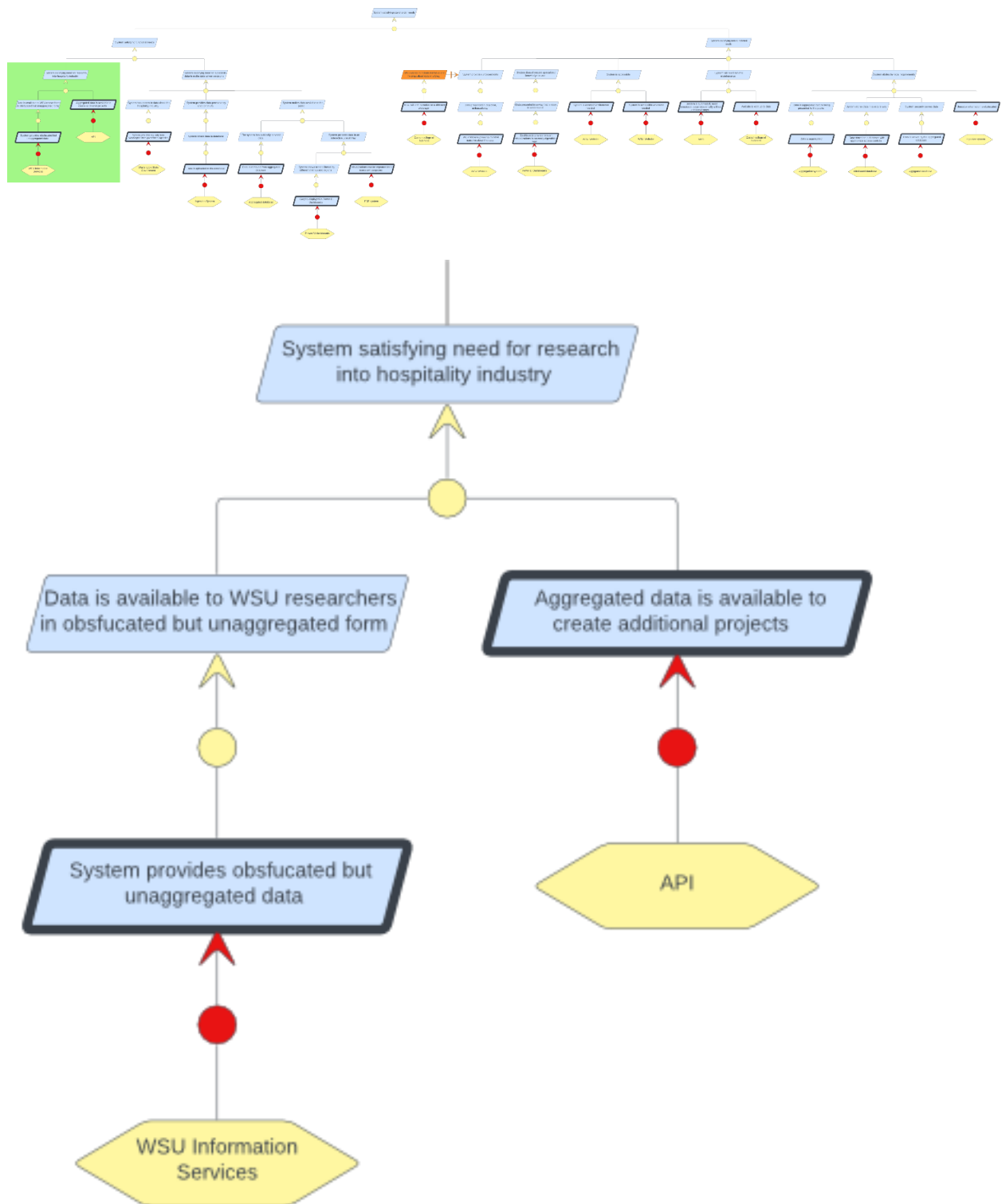
Goal ID	Goal Description	Backward Traceability	Forward Traceability
G1	System gets regular data about the hospitality industry	P1,P5	IFRP1, INFRP3
G2	Have access to AWS ingestion pipeline	P2,P3,P8	IFRP2, IFRP3, IFRP6 IFRP7, IFRP8, INFRP7
G3	Get access to PowerBI paid account	P4,P6	IFRP4, IFRP5, INFRP5, INFRP4, INFRP6 INFRP7, INFRP8
G4	Gain access to WSU Website tools	P7	INFRP4, INFRP6
G5	System gets access to the data		INFRP1, INFRP2, INFRP3, INFRP4, INFRP8
G6			

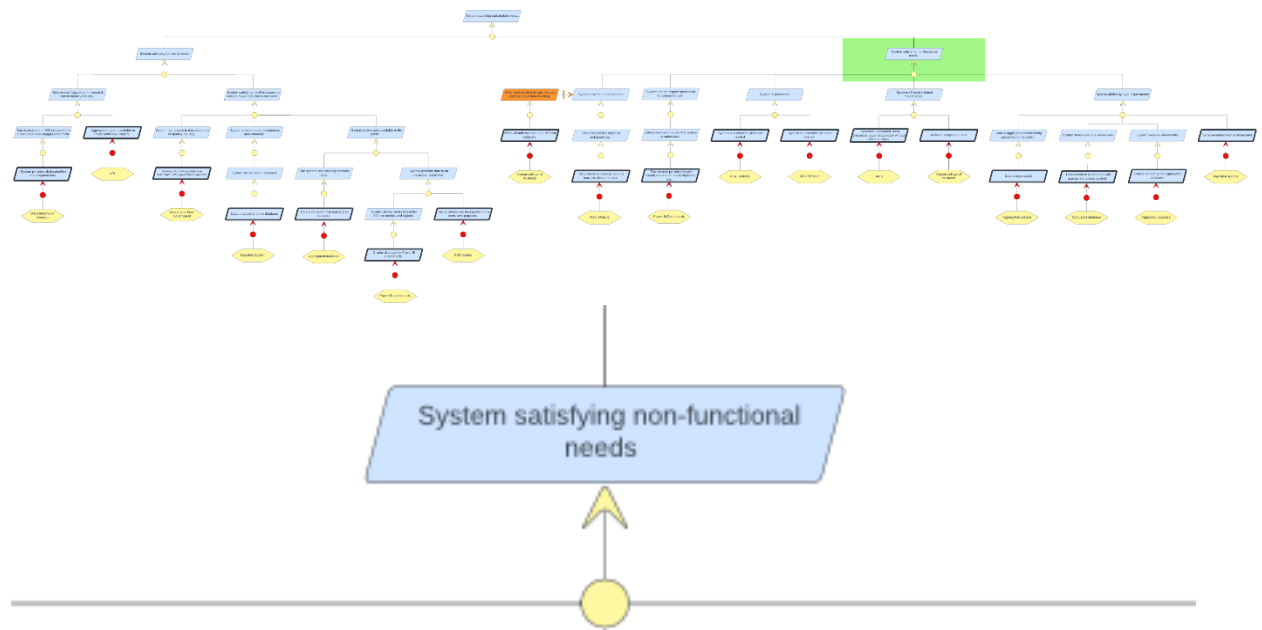


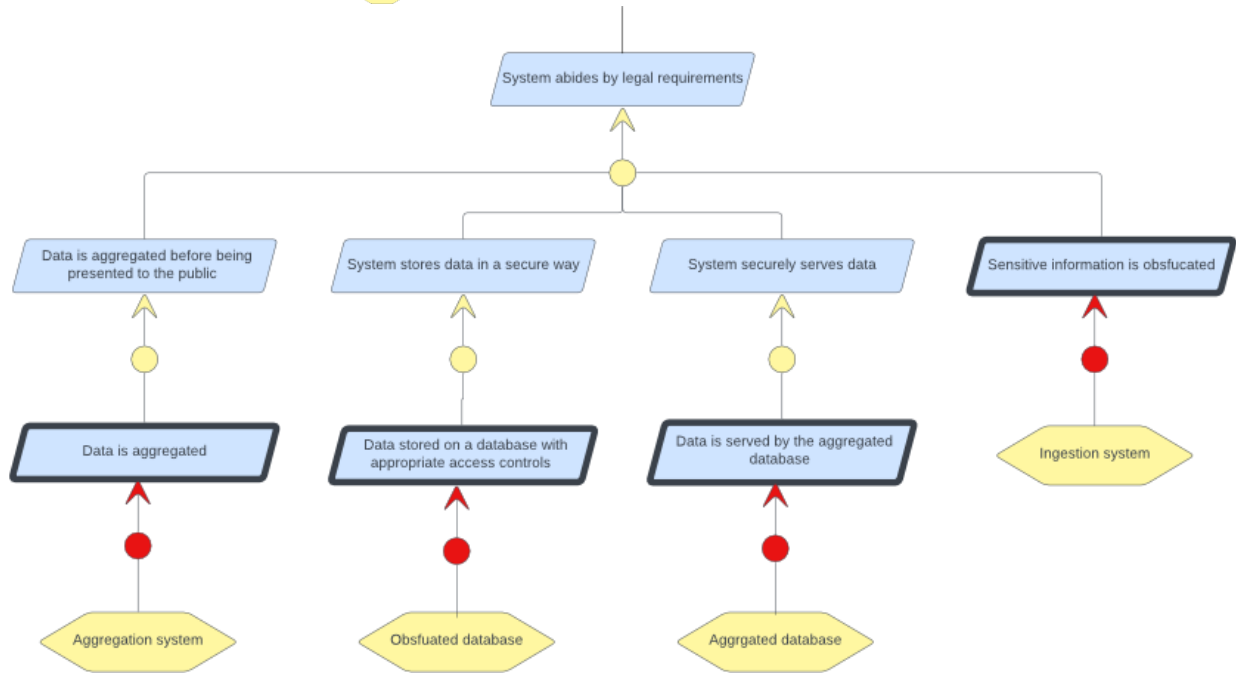
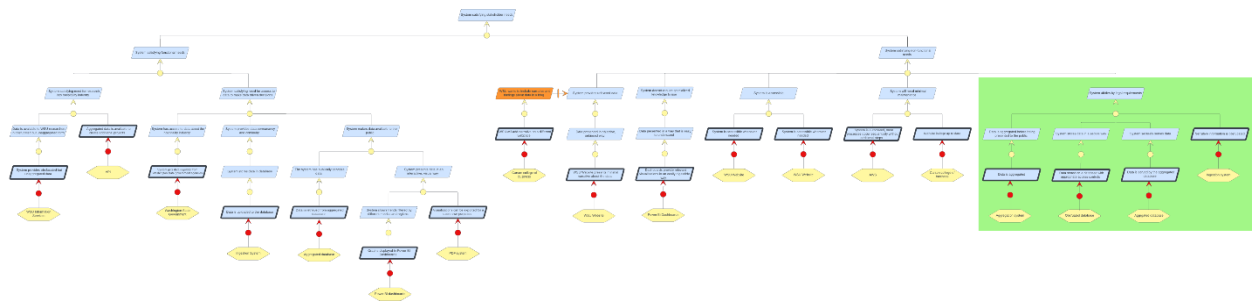


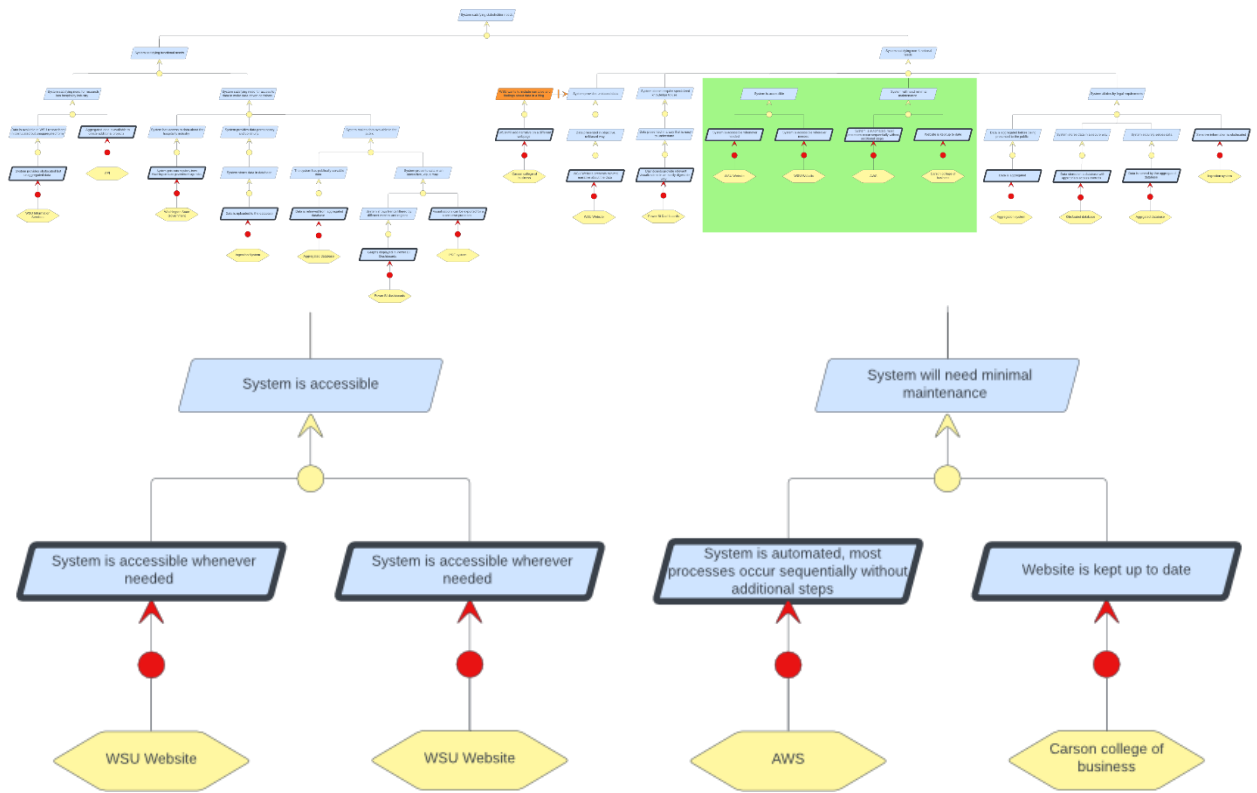


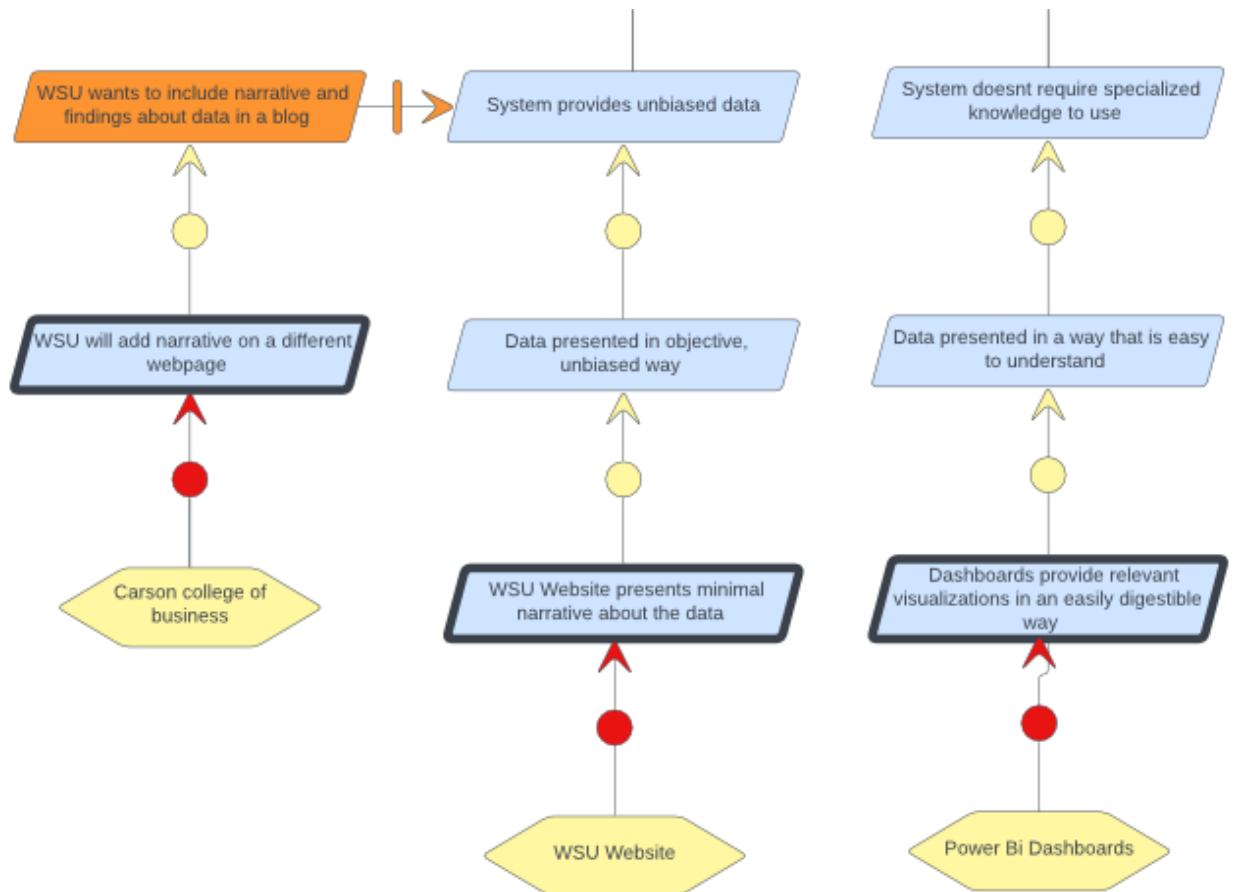
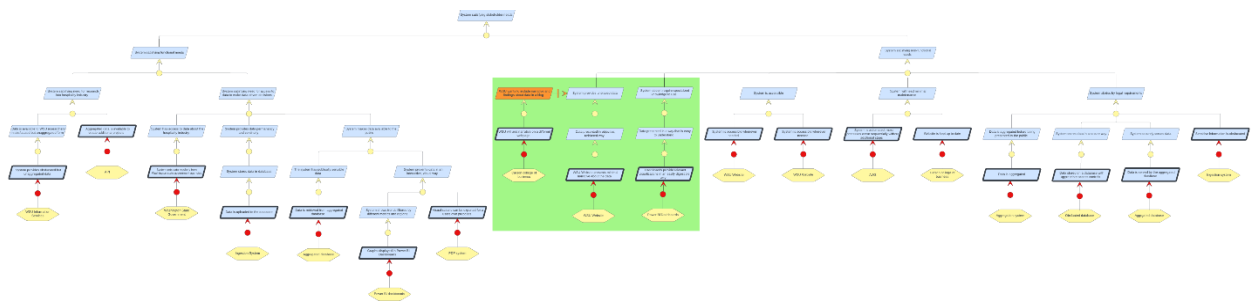












4.1.3 Improved Understanding of Domain, Stakeholders, Functional, and Non-Functional Objectives

4.1.3.1 Improved Domain

Improved Domain ID	Improved Domain Description
ID1	The team will be using amazons provided services to obfuscate and export the data
ID2	The webpage will be hosted and maintained by WSU

4.1.3.4 Improved Functional Objectives

Improved FR Objective ID	Objective Description	Alleviates Problem	Achieves Goal
IFRP_1	System needs regular data about the hospitality industry	P1	G1
IFRP_2	System needs data permanency and continuity	P2	G2
IFRP_3	Data needs to be uploaded to the data base	P2, P3, P8	G2
IFRP_4	System needs to show trends filtered by different metrics and regions	P6	G3
IFRP_5	The user must be able to export visuals for their own purposes	P6	G3
IFRP_6	The system must have publicly servable data	P2, P3, P8	G2
IFRP_7	The system must provide obfuscated but unaggregated data to authorized researchers	P2, P3, P8	G2
IFRP_8	System must be extensible, such that other independent projects can be made using the data.	P2, P3, P8	G2

4.1.3.5 Improved Non-Functional Objectives

Improved NFR Objective ID	Objective Description	Alleviates Problem	Achieves Goal
INFRP_1	System must abide by legal requirements and obfuscate sensitive information	P8	G5
INFRP_2	Data must be aggregated before being presented to the public	P8, P1	G5
INFRP_3	System must store data in a secure way	P8, P2	G1, G5
INFRP_4	System must securely serve aggregated data to the public	P1	G3, G5
INFRP_5	Data must be presented in an unbiased and objective way	P6	G3
INFRP_6	The data must be accessible wherever needed	P3,P5,P7	G3, G4
INFRP_7	The data must be accessible whenever needed	P2, P3, P5, P7	G2, G3
INFRP_8	Data must be presented in a way that is easy to understand	P8	G3, G5

4.1.4 Stakeholders

Stakeholders Name	Role/Association	Needs/Wants
Anthony Anton	President and CEO of the Washington Hospitality Association	A tool to evaluate the state and trends of the hospitality industry
William Bonner	WSU IS Director of Network & Cloud Engineering Services	Stable, easy to maintain system
Greg Neunherz	Director Carson College of Business Office of Technology	Ease of use
Nathan Roberts	Carson College of Business Data Analyst	Project is useful for research
Sarah Druffel	Carson College of Business Public Relations and Communications Manager	Project has successful public release
Brad Gaolach	Director Metropolitan Center for Applied Research and Extension.	Complete the project
Bolong Zeng	Program Coordinator and Scholarly Assistant Professor Software Engineering	Creation of a robust, generic data visualization pipeline
Corrie Wilder	Exec Director for Marketing and Communications WSU Everett	Project has a successful public release
Jacob Murray	Program Coordinator and Scholarly Assoc. Professor Electrical Engineering	That the project satisfies the client, and students met all capstone requirements.
Mark Beattie	Assoc. Vice Chancellor for Academic Affairs.	Creative, highly useable solution.
Kyle Galvin	Software engineer at WHA	A data visualization tool

4.2. RS

4.2.1. Functional Requirements

FR ID	Description
FR1	System needs regular data about the hospitality industry
Satisfies Functional Requirement Issue	FRI1
Satisfies Objectives	IFRO1

FR ID	Description
FR2	System needs data permanency and continuity
Satisfies Functional Requirement Issue	FRI2
Satisfies Objectives	IFRO2

FR ID	Description
FR3	Data needs to be uploaded to the data base
Satisfies Functional Requirement Issue	FRI3
Satisfies Objectives	IFRO3

FR ID	Description
FR4	System needs to show trends filtered by different metrics and regions
Satisfies Functional Requirement Issue	FRI4
Satisfies Objectives	IFRO4

FR ID	Description
FR5	The user must be able to export visuals for their own purposes
Satisfies Functional Requirement Issue	FRI5
Satisfies Objectives	IFRO5

FR ID	Description
FR6	The system must have publicly servable data
Satisfies Functional Requirement Issue	FRI6
Satisfies Objectives	IFRO6

FR ID	Description
FR7	The system must provide obfuscated but unaggregated data to authorized researchers
Satisfies Functional Requirement Issue	FRI7
Satisfies Objectives	IFRO7

FR ID	Description
FR8	System must be extensible, such that other independent projects can be made using the data.
Satisfies Functional Requirement Issue	FRI8
Satisfies Objectives	IFRO8

4.2.2. Non-Functional Requirements

NFR ID	Nonfunctional Requirement 1
NFR1	System must abide by legal requirements and obfuscate sensitive information
Operationalized Functional Requirements	FR7
Satisfies Non-functional Requirement Issue	NFRI1
Satisfies Non-functional Objective	INFRO1
Constrains	P1, P5, P8

NFR ID	Nonfunctional Requirement 2
NFR2	Data must be aggregated before being presented to the public
Operationalized Functional Requirements	FR3
Satisfies Non-functional Requirement Issue	NFRI2
Satisfies Non-functional Objective	INFRO2
Constrains	P8

NFR ID	Nonfunctional Requirement 3
NFR3	System must store data in a secure way
Operationalized Functional Requirements	FR2
Satisfies Non-functional Requirement Issue	NFRI3
Satisfies Non-functional Objective	INFRO3
Constrains	P2

NFR ID	Nonfunctional Requirement 4
NFR4	System must securely serve aggregated data to the public
Operationalized Functional Requirements	FR6
Satisfies Non-functional Requirement Issue	NFRI4
Satisfies Non-functional Objective	INFRO4
Constrains	P2

NFR ID	Nonfunctional Requirement 5
NFR5	Data must be presented in an unbiased and objective way
Operationalized Functional Requirements	FR2
Satisfies Non-functional Requirement Issue	NFRI5
Satisfies Non-functional Objective	INFRO5
Constrains	P8

NFR ID	Nonfunctional Requirement 6
NFR6	The data must be accessible wherever needed
Operationalized Functional Requirements	FR2
Satisfies Non-functional Requirement Issue	NFRI6
Satisfies Non-functional Objective	INFRO6
Constrains	P2, P4, P7

NFR ID	Nonfunctional Requirement 7
NFR7	The data must be accessible whenever needed
Operationalized Functional Requirements	FR2
Satisfies Non-functional Requirement Issue	NFRI7
Satisfies Non-functional Objective	INFRO7
Constrains	P7, P3, P4

NFR ID	Nonfunctional Requirement 1
NFR8	Data must be presented in a way that is easy to understand
Operationalized Functional Requirements	FR4
Satisfies Non-functional Requirement Issue	NFRI8
Satisfies Non-functional Objective	INFRO8
Constrains	P8

4.2.3. Specifications

Functional Specification ID	Functional Requirement
FS1	The Department of Revenue delivers data quarterly
Satisfies Functional Requirement	FR1
Satisfies Objectives	IFRO1

Functional Specification ID	Functional Requirement
FS2	The system stores data on the Obfuscated Database
Satisfies Functional Requirement	FR2
Satisfies Objectives	IFRO2

Functional Specification ID	Functional Requirement
FS3	The system has an automated ingestion pipeline that is configured to upload the data
Satisfies Functional Requirement	FR3
Satisfies Objectives	IFRO3

Functional Specification ID	Functional Requirement
FS4	The system has Power BI dashboard models for different metrics and regions
Satisfies Functional Requirement	FR4
Satisfies Objectives	IFRO4

Functional Specification ID	Functional Requirement
FS5	The system has an integrated summary PDF generation feature
Satisfies Functional Requirement	FR5
Satisfies Objectives	IFRO5

Functional Specification ID	Functional Requirement
FS6	Data will be retrieved from the aggregated database
Satisfies Functional Requirement	FR6
Satisfies Objectives	IFRO6

Functional Specification ID	Functional Requirement
FS7	WSU IT will provide access to the obfuscated but unaggregated data on the database for those
Satisfies Functional Requirement	FR7
Satisfies Objectives	IFRO7

Functional Specification ID	Functional Requirement
FS8	Aggregated data will be available through API.
Satisfies Functional Requirement	FR8
Satisfies Objectives	IFRO8

[5] Prototype Interface Mock-ups

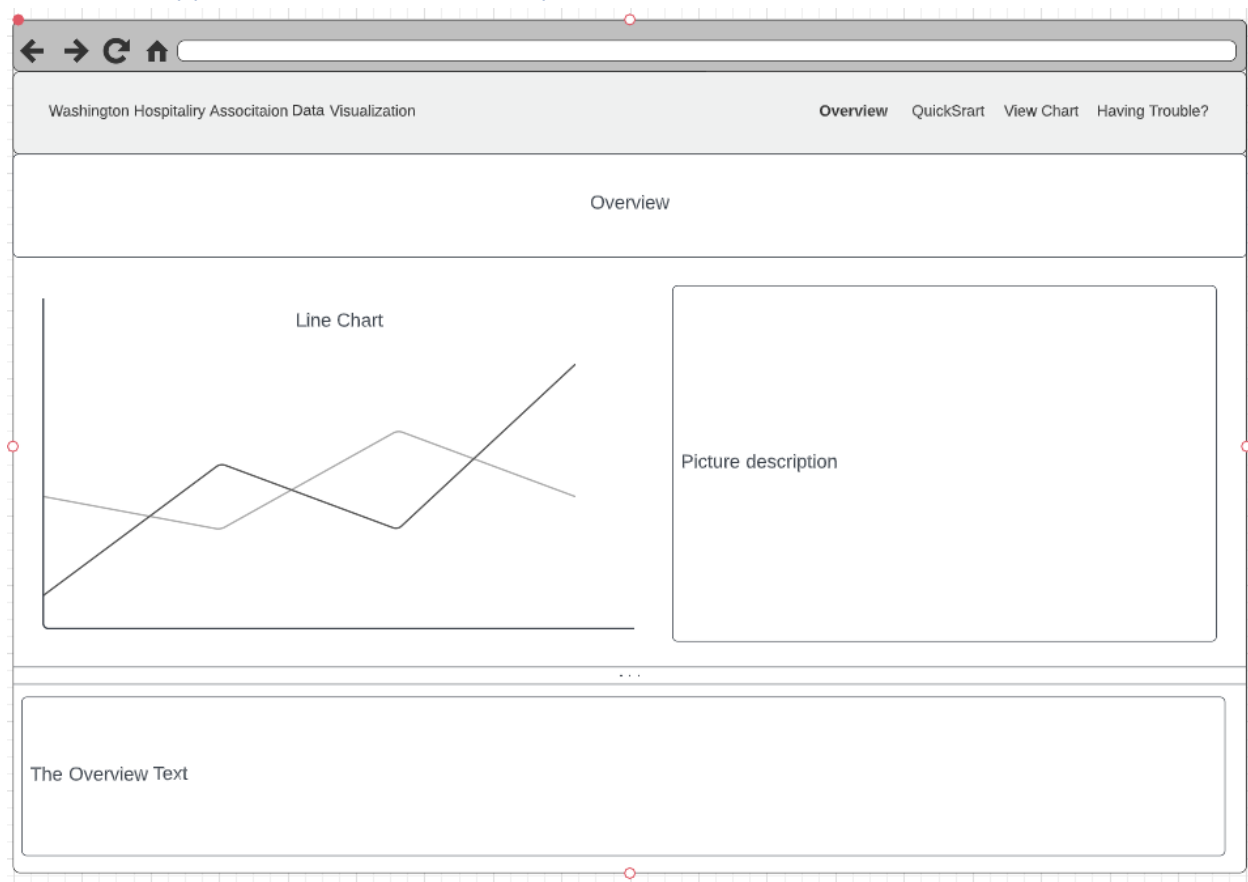


Figure 1: The WSU website overview page for the Washington hospitality industry dashboards is a comprehensive summary of the data and insights available on the site. The page features an introduction to the Washington hospitality industry, as well as links to the various dashboards hosted on the site. The overview page also includes images and videos that showcase the data and insights available on the site. This page is the starting point for anyone interested in learning more about the Washington hospitality industry and the data that drives it.

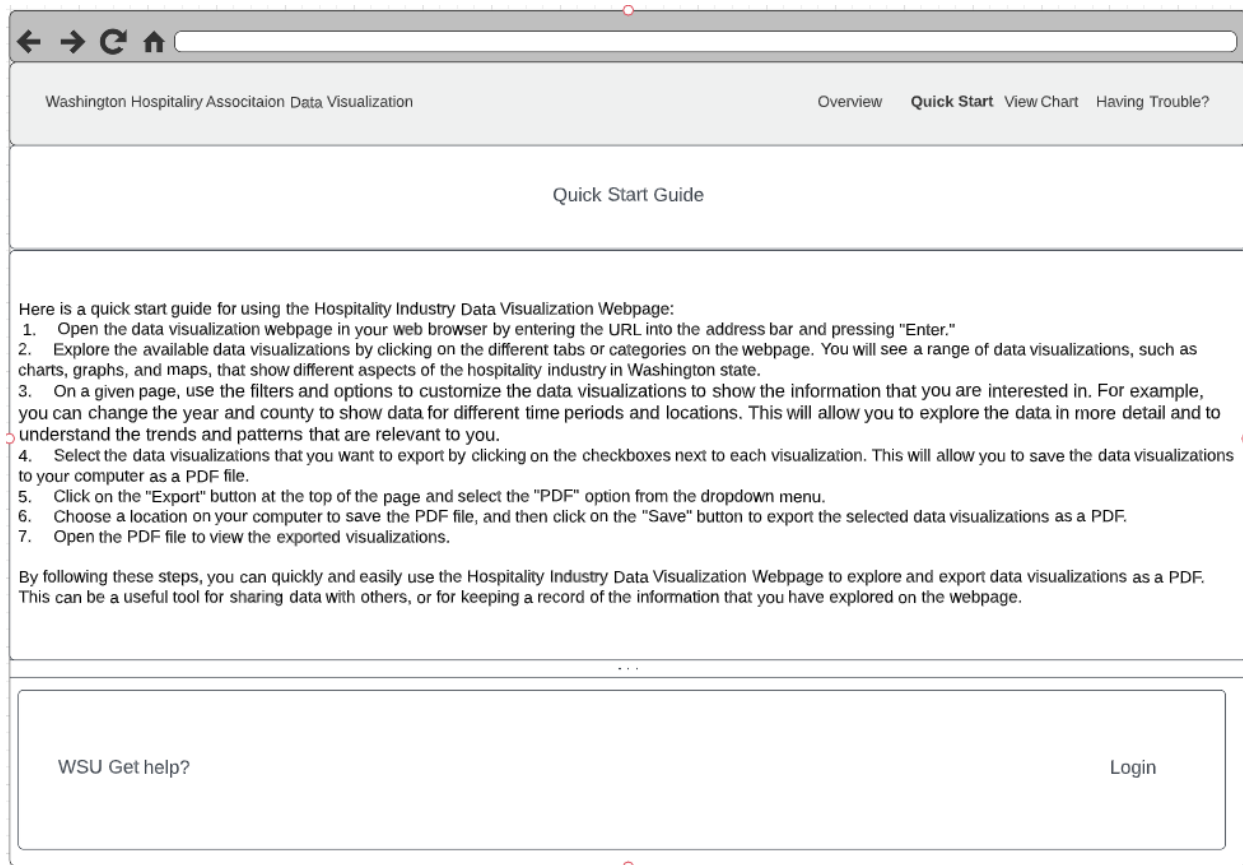


Figure 2: The quick start guide page is designed to help users quickly and easily get up and running with the WSU website and its dashboards. The page provides a step-by-step guide to accessing and using the site, including instructions on how to log in, navigate the various pages and sections, and access the dashboards. The quick start guide also includes helpful tips and tricks for using the site, such as how to filter and customize the data to meet your specific needs. This page is an essential resource for anyone looking to access and use the data and insights available on the WSU website quickly and easily.

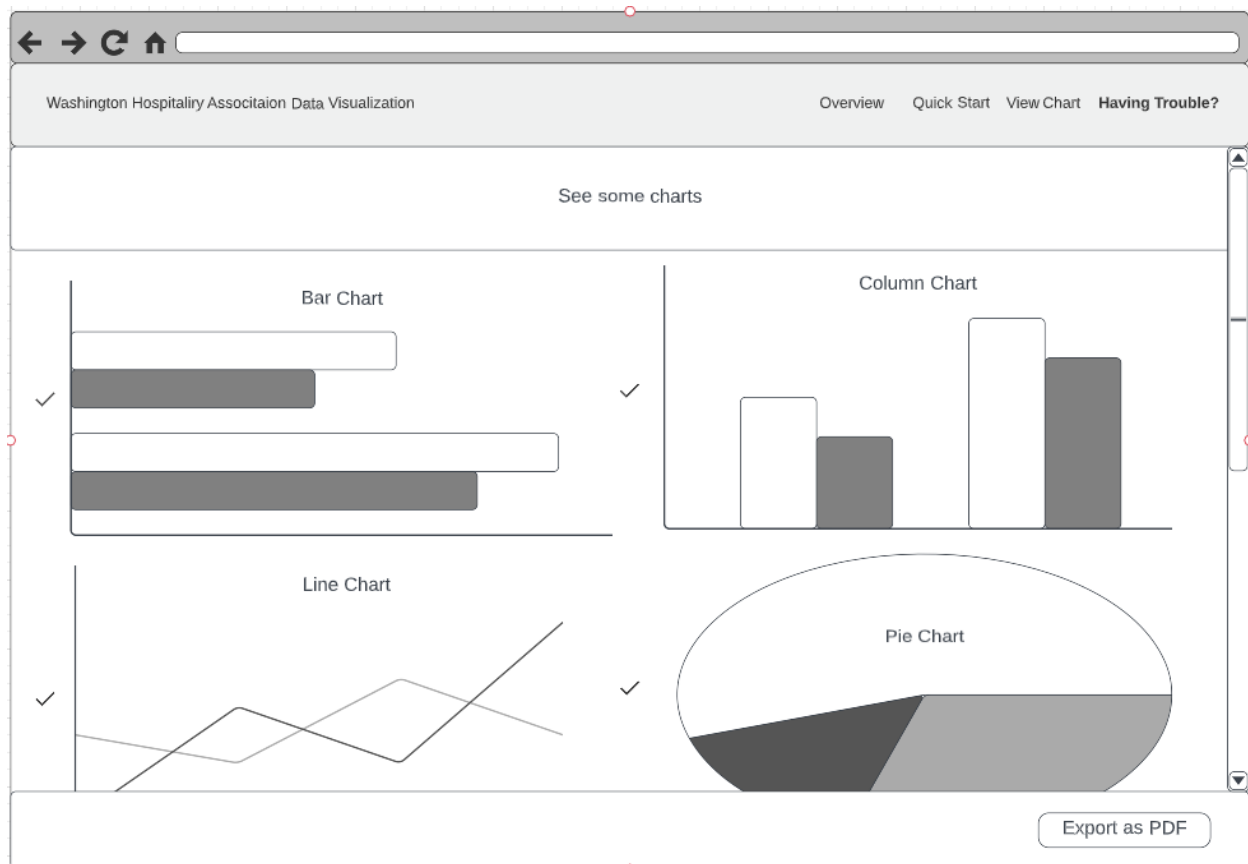


Figure 3: The dashboard page is the central hub for accessing and using the data and insights available on the WSU website. The page features a series of interactive data visualizations and graphs that provide information about the Washington hospitality industry. These visualizations can be filtered and customized to meet the specific needs of the user, and they provide a comprehensive view of the industry, including trends, insights, and key performance indicators. The dashboard page also includes links to additional resources, such as detailed reports and analysis, to help users dig deeper into the data and gain a more in-depth understanding of the industry. Overall, the dashboard page is an essential tool for anyone looking to stay informed and up to date on the latest developments in the Washington hospitality industry.

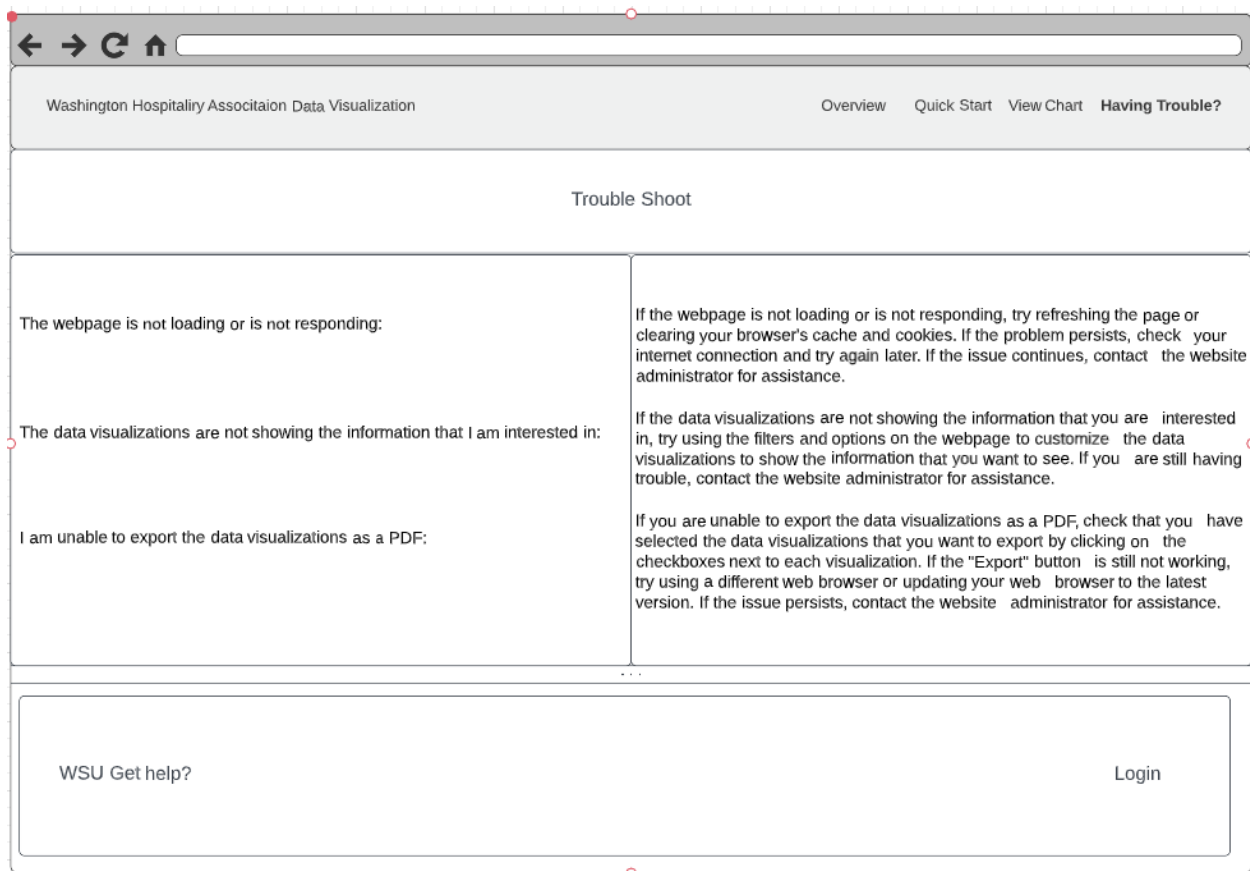


Figure 4: The trouble shoot page is a resource for users who are experiencing issues or difficulties with the WSU website or its dashboards. The page provides solutions to common problems, such as login issues, slow performance, and data errors. It also includes a form for users to submit any additional questions or concerns they may have. The trouble shoot page is designed to help users quickly and easily resolve any issues they may encounter, and to provide them with the support they need to get the most out of the WSU website and its dashboards.

[6] User Manual

[6.1] Overview:

The Hospitality Industry Data Visualization Webpage is a powerful tool that allows users to access, analyze, and share data on the growth and performance of the hospitality industry in Washington state. The webpage provides a range of data visualizations, such as charts, graphs, and maps, that make it easy for users to understand the trends and patterns in the data, and to use this information to make informed decisions about how to support and promote the hospitality industry in Washington state.

The webpage is easy to use, and it allows users to customize the data visualizations to show the information that they are interested in. For example, users can change the year and county to show data for different time periods and locations. The webpage also provides the option to export the data visualizations as a PDF, which can be useful for sharing data with others or for keeping a record of the information that has been explored on the webpage.

[6.2] Hospitality Industry Data Visualization Webpage Quick Start Guide:

Here is a quick start guide for using the Hospitality Industry Data Visualization Webpage:

1. Open the data visualization webpage in a web browser by entering the URL into the address bar and pressing "Enter."
2. Explore the available data visualizations by clicking on the different tabs or categories on the webpage. You will see a range of data visualizations, such as charts, graphs, and maps, that show different aspects of the hospitality industry in Washington state.
3. On a given page, use the filters and options to customize the data visualizations to show the information that you are interested in. For example, you can change the year and county to show data for different time periods and locations. This will allow you to explore the data in more detail and to understand the trends and patterns that are relevant to you.
4. Select the data visualizations that you want to export by clicking on the checkboxes next to each visualization. This will allow you to save the data visualizations to your computer as a PDF file.
5. Click on the "Export" button at the top of the page and select the "PDF" option from the dropdown menu.
6. Choose a location on your computer to save the PDF file, and then click on the "Save" button to export the selected data visualizations as a PDF.
7. Open the PDF file to view the exported visualizations.

By following these steps, you can quickly and easily use the Hospitality Industry Data Visualization Webpage to explore and export data visualizations as a PDF. This can be a useful tool for sharing data with others, or for keeping a record of the information that you have explored on the webpage.

[6.3] Troubleshooting:

Issue	Possible Solution's
The webpage is not loading or is not responding	If the webpage is not loading or is not responding, try refreshing the page or clearing your browser's cache and cookies. If the problem persists, check your internet connection and try again later. If the issue continues, contact the website administrator for assistance.
The data visualizations are not showing the information that I am interested in	If the data visualizations are not showing the information that you are interested in, try using the filters and options on the webpage to customize the data visualizations to show the information that you want to see. If you are still having trouble, contact the website administrator for assistance.
I am unable to export the data visualizations as a PDF	If you are unable to export the data visualizations as a PDF, check that you have selected the data visualizations that you want to export by clicking on the checkboxes next to each visualization. If the "Export" button is still not working, try using a different web browser or updating your web browser to the latest version. If the issue persists, contact the website administrator for assistance.

[7] References

[1] "Lucidchart - Online Diagram Software," Lucidchart, <https://www.lucidchart.com/>, accessed December 12, 2022.