Polytechnic University of Puerto Rico

Electrical & Computer Engineering and Computer Science Department

COE 4002 Sec. 22 – Software Engineering

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Software Requirements Specification

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for

CardinalHealth™

prepared by

REAL STONE SOLUTION

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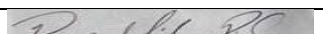
Elian F. Madera Torres	116762	COE	
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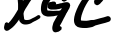
Xaymarie N. Garcia Collazo	102329	CECS	

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1. Introduction

1.1. Purpose

This section specifies the purpose of the Software Requirements Specification (SRS) [1], the potential readers and the standard that the document follows.

The selection of readers for this document is for the client Cardinal Health Inc. They are a company engaged in the field of measurement, distribution service, medical equipment manufacturing, pharmacy service, etc. The developers are also one of the readers of this document. The development team consists of Xaymarie García Collazo, Rubén Méndez Rodríguez, Carlos Samuel Hernández Cabrera, and Elián Madera Torres. The document can also be read by the users who are all the clients that use the beauty field services.

The Software Requirements Specifications (SRS) [1] follow the standard of the Institute of Electrical and Electronics Engineers (IEEE) [2]. This standard is IEEE Std 830-1998.

The purpose of the Software Requirements Specifications or SRS [1] is to collect and analyze all the various ideas that have arisen to define the system, and the requirements with respect to the consumers. In addition, to predict and order how we expect this product to be used to better understand the project, to outline concepts that may be developed further, and to document ideas that are being considered but may be discarded as the product is developed.

1.2. Scope

Cardinal Health is the distributor with the greatest capacity and technology in Puerto Rico of pharmaceutical products and medical-surgical materials. Currently, the Agile team has a problem in the monitoring process of their project since they have different search methods to be able to acquire all the relevant information about the projects, which causes loss of time, and affects

business processes among other things. Our team from the Polytechnic University is collaborating, contributing ideas and solving the problem of the Dashboard Metrics of the agile group. The IT department that is led by Mr. Marcos Rosado has developed different types of applications that have helped the growth of the company, taking advantage of the Agile methodology to achieve, with more ease and deftness, the developing of each project in the company.

The following table shows the current challenges of the Agile team.

Existent Metrics	How metrics are measured	Disadvantage
Project Health	These metrics are measured based on a filter and visualization of graphs with tables.	Waste of time entering different tools to obtain accurate information for the analysis, to make decisions.
Interaction Review	These metrics are measured based on a filter and visualization of graphs with tables.	Waste of time entering different tools to obtain accurate information for the analysis, to make decisions.
Spring Overview	These metrics are measured based on a filter and visualization of graphs with tables.	It was a waste of time entering different tools to obtain accurate information for the analysis, to make decisions.

TABLE 1 HOW METRICS ARE MEASURED

1.3. Definitions, Acronyms and Abbreviations

This section will have the definition of the terms that will be used during the project timeline.

Term	Definition
SRS [1]	It is a document that describes what the software will do ah how it will be expected to perform.
IEEE [2]	The institute of Electrical and Electronics Engineers.
Power BI [3]	It is a data analysis service aimed at providing interactive visualizations and business intelligence capabilities with an interface simple enough for end users to create their own reports and dashboards.

VDI [4]	Virtual desktop infrastructure (VDI) is the hosting of desktop environments on a central server. It is a form of desktop virtualization, as the specific desktop images run within virtual machines (VMs) and are delivered to end clients over a network. Those endpoints may be PCs or other devices, like tablets or thin client terminals.
Agile [5]	Agile is an iterative approach to project management and software development that helps teams deliver value to their customers faster and with fewer headaches. Instead of betting everything on a "big bang" launch, an agile team delivers work in small, but consumable, increments. Requirements, plans, and results are evaluated continuously so teams have a natural mechanism for responding to change quickly
APA [6]	Writing format and style used to reference academic.

TABLE 2 DEFINITIONS

1.4. References

This subsection provides a complete list of all the documents and sources of information referenced in the SPMP. The references were used for the preparation of this document:

[1] vmware, "What is a virtual machine?," vmware, [Online]. Available: https://www.vmware.com/topics/glossary/content/virtual-machine.html. [Accessed 24 October 2022].

[2] Amazon, "Amazon WorkSpaces FAQs," Amazon, [Online]. Available: https://aws.amazon.com/workspaces/faqs/#:~:text=A%3A%20An%20Amazon%20WorkSpace%20is,like%20using%20a%20traditional%20desktop. [Accessed 24 October 2022].

[3] vmware, "What is VDI (Virtual Desktop Infrastructure)?," vmware, [Online]. Available: https://www.vmware.com/topics/glossary/content/virtual-desktop-infrastructure-vdi.html. [Accessed 24 October 2022].

[4] J. Scardina, "Microsoft Power Bi," TechTarget, December 2022. [Online]. Available: https://www.techtarget.com/searchcontentmanagement/definition/Microsoft-Power-BI. [Accessed 24 October 2022].

[5] Techstreet Enterprise, "IEEE 1016-2009," IEEE, 2009 07 20. [Online]. Available: https://subscriptions.techstreet.com/products/545475. [Accessed 20 12 2022].

[6] Real Stone Solutions, "System Requirements Specifications," 2022.

[7] Asmo, "Agile Methodology: An Overview," Zenkit Blog, 18 3 2018. [Online]. Available: https://zenkit.com/en/blog/agile-methodology-an-overview/. [Accessed 17 08 2022].

[8] nvisia, "The Agile Process 101: Understanding the Benefits of Using Agile Methodology," nvisia, 16 9 2020. [Online]. Available: https://www.nvisia.com/insights/agile-methodology. [Accessed 17 08 2022].

[9] vmware, "What is VDI (Virtual Desktop Infrastructure)?," vmware, [Online]. Available: https://www.vmware.com/topics/glossary/content/virtual-desktop-infrastructure-vdi.html. [Accessed 23 October 2022].

2. Overall Description

2.1 Product perspective

The environment will use data from Project SharePoint Site, Service Now Timecards and Jira for the dashboards to be able to function. Power Bi will be used to design the interface of the dashboards that will be made. See details in sections below.

2.1.1. System Interface

With the tools that Power-Bi brings us, we can modify the interface to determine how the virtual machines (VM) will connect to the dashboard and the dashboard to the database of the company. The company already has the database in the server from share-point. Power-Bi will take that data and let us organize it, this way we can create the dashboard. The VM is provided by the company, VM is connected to the virtual desktop infrastructure (VDI) of Amazon Workspace, that we can

search the data and organized in the dashboards. The last interface that is going to be in the system is the one that connects the dashboard with each other. You can see a photo of how the main page is going to be. This page would let the user navigate between the 3 dashboards.

2.1.2. User Interfaces

The user interface design conforms to the dashboard's design. This separates data into metrics which will be used to show the user the information. The user will interact with the dashboards by applying filters from buttons or selecting menus in the dashboard to view the metrics of the filter applied.

The following figures show the graphical user interface for the dashboards for the user and the establishment's owner.

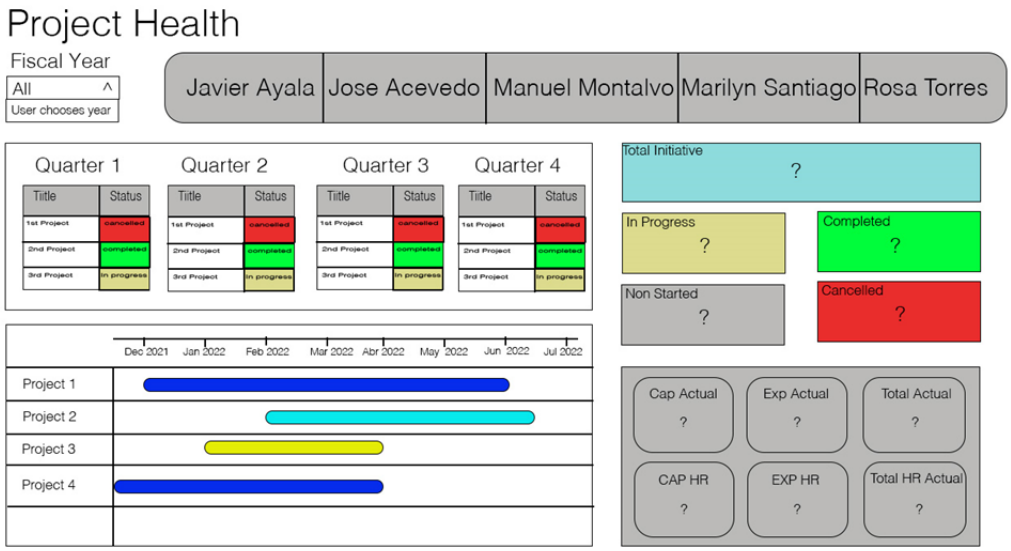

FIGURE 1 PROJECT HEALTH DASHBOARD

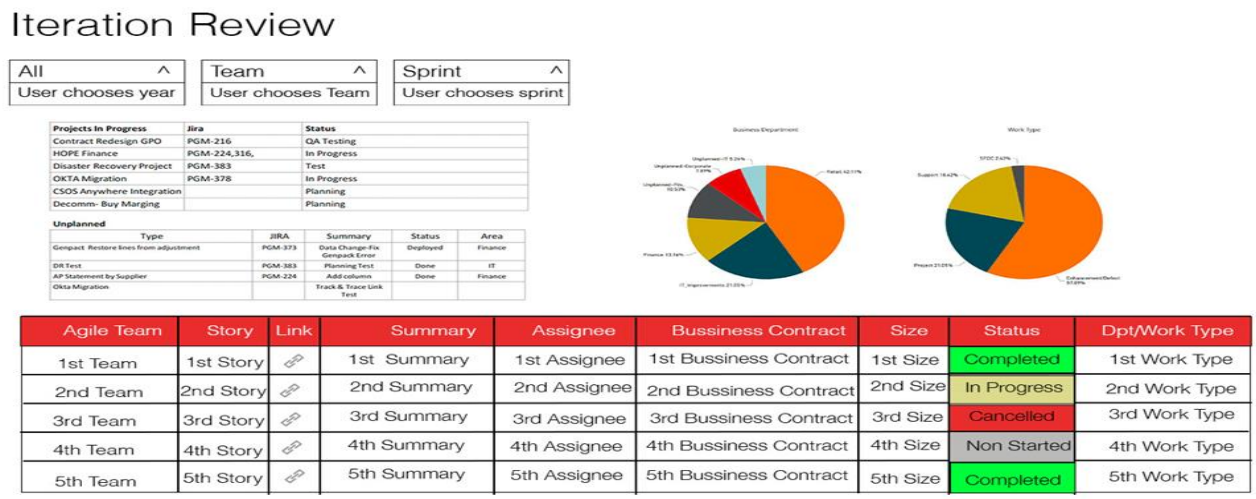

FIGURE 2 ITERATION REVIEW DASHBOARD

FIGURE 3 SPRINT OVERVIEW DASHBOARD

2.1.3. Hardware interfaces system

Personal or Desktop Computer: The device will provide the user with access to the dashboard displays and interface

2.1.4. Software interfaces

Software interfaces focus on the components used for the Dashboard development. This includes software that communicates with the different components (software) and hardware. The software interfaces for the Dashboard:

Software Interface	Description	How it works
Database Cardinal Health	Cardinal Health Database is a multi-model database management system produced and marketed by the company. It is a database commonly used for running online transaction processing, data warehousing and mixed database workloads.	For storing data purposes. When a user creates a profile, log in information will be stored for authentication purposes. Also, it will hold all the information in regards of the users as clients and the users as business. This will separate both and will permit each type of user to have a different amount of accessibility to the information.
Framework Power BI	Power BI is a cloud-based business analytics solution that allows you to bring together different data sources, analyze them, and present data analysis through reports and dashboards. With Power BI, you have easy access to data inside and outside your organization on almost any device.	Microsoft Power BI works by connecting data sources and providing a dashboard of business intelligence to the users. It can connect with just an Excel spreadsheet or bring together cloud-based and on-premises data warehouses. Data pulled from cloud-based sources, such as Salesforce CRM, is automatically refreshed.

OS **Virtual Machine**	A virtual machine is a computer resource that uses software instead of a physical computer to run programs and deploy apps.	A virtual machine is a computer file, typically called an image, that behaves like an actual computer. It can run in a window as a separate computing environment, often to run a different operating system or even to function as the user's entire computer experience as is common on many people's works on computers

TABLE 3 SOFTWARE INTERFACES

2.1.5. Communications interfaces

To the Cardinal Health dashboard to start working the team needs a connection to the internet, with that we can connect to the VDI/VM that the company has provided us. The most important connection is the one that Power-Bi would have with the Database of the company.

2.1.6. Memory

The dashboards are designed to use data from several data sources. The memory usage may vary from one dashboard to another depending on which database the dashboard is using and the server specifications that we don’t need or have.

2.1.7. Operations

The first operation that the user will do will be to enter the virtual machine provided by Cardinal Health, in which he will obtain the platforms established by the client. A link will be added so that the user can enter it and be redirected to the main dashboard page.

2.1.8. Site adaptation requirements

The Site Adaptation Requirements for using the Dashboard are:

- Using any computer that can run a virtual machine. The Dashboard is only available through an account with the company Cardinal Health.
- Users must create an account with Cardinal Health and provide their credentials, which will be used in Dashboard. Every time a user tries to open the Dashboard; they are required to login into their account.

2.2. User Characteristics

This segment lists the expected background and type of users.

Type of users:

Manager / Administrator / Employee – can access data from projects regarding past, current, and future. Can manage states of the projects and view different metrics of the filter applied.

Education Level:

1. Little education is required; basic computer knowledge is necessary

Experience:

The only experience needed is knowing how to enter a site and how to apply different filters.

2.3. Constraints

2.3.1. Regulatory Policies

Viewing the dashboard interface is limited by the Cardinal Health client, as it has established different security policies to determine access to the information provided in the interface. The

access policy is defined by the Cardinal Health client, through authentication and authorization of the users.

2.3.2. Hardware Limitation

The limitation is that we need to be connected to the internet 24/7 to do this project and sadly PR is passing by a crisis that the whole Island is suffering blackouts. That's why the internet is a Hardware limitation but having the VM gives us all the tools that the team needs to take control of the project.

2.3.3. Audit Function

The Dashboard will show the 3 metrics in 1 the agile group of the company Cardinal Health in real time.

2.3.4. Control Function

The control function that is implemented in our project is that the only people who can modify the data are the IT department and people that already have access to the data of the company Cardinal Health. The people that are going to be using the dashboard are the team that oversees the projects.

2.3.5. Signal Handshake Protocol

The following picture shows the handshake protocol.

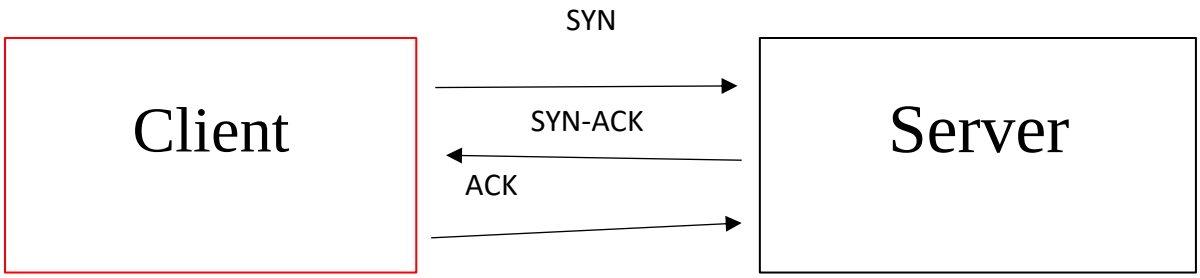

FIGURE 4 HANDSHAKE PROTOCOL

2.3.6. Reliability Requirements

At its core, the Dashboard displays the metrics of the agile group. The dashboard shows the user the efficiency of the equipment graphically and simply. The user will only be able to enter the dashboard with the credentials of the Cardinal Health company to see the information they need. The user will be able to filter the information, if necessary, since there are basically 3 dashboards in 1. In case of a system outage, information will be saved automatically to a backup server to prevent data loss.

2.3.7. Critically of the application

The client can choose from 3 main dashboards on the main page. The client will have the power to navigate between each dashboard and inside the dashboards, they are going to have menus to choose the different projects and the leaders of each project.

2.3.8. Safety and security Considerations

These are the safety and security considerations for the dashboards:

All users must be employees of Cardinal Health and have the credentials to view the data

2.4. Assumptions and Dependencies

These assumptions and dependencies have been placed in this table with what each action this software must do. Each purpose is the functions and principles the software must utilize when operating. Then we create assumptions and verify the dependencies that these actions require to operate. As shown in the table below:

The following table contains the *assumptions* and dependencies.

Purposes		Assumptions		Dependencies	
1	Organize Project Health dashboard information	1-1	Provide information by Fiscal Year	1-2	Requires connection to customer's database, Cardinal Health
2	Organize Iteration Review dashboard information	2-1	Provide information by Fiscal Year	2-2	Requires connection to customer's database, Cardinal Health
3	Organize Sprint Overview dashboard information	3.1	Provide information by Fiscal Year	3.2	Requires connection to customer's database, Cardinal Health

TABLE 4 ASSUMPTIONS AND DEPENDENCIES

2.5. Apportioning of Requirements

For the final version, the Dashboard will show a real-time visualization of the metrics of the Cardinal Health Agile group, since in this version we developed the 3-in-1 design with test data. For the final version, the Dashboard must work in real time, to show the metrics of the Agile group in a graphic and friendly way using the Power BI tool. This project will make it easy for the user to visualize the metrics of the Cardinal Health Agile group.

3. Specific Requirements

3.1. External Interfaces

The following table contains the hardware interfaces.

Hardware	Description
Name of the Item	Computer
Mouse and keyboards	The user is going to use this to navigate and chose the options
Computer	This is used to enter to the VDI of the company and that way they can enter to the Power-Bi and use the Dashboards

TABLE 5 EXTERNAL INTERFACE

3.2. Function

In this section you can see the different scenarios of the product functions.

View Metrics
Actors: Principal - Manager / Administrator / Employee Secondary - Database
Pre-Conditions: Databases need to be up and running Manager / Administrator / Employee need to be logged in and have credentials Manager / Administrator / Employee applies different filters
Post-Conditions: There are no post-conditions for viewing the metrics.
Scenarios
Principal: - Manager / Administrator / Employee enters the dashboard. - Manager / Administrator / Employee applies a filter.
Secondary: There is no secondary scenario for viewing the metrics.
Exception: If the Manager / Administrator / Employee doesn't have valid credentials, the metrics will not show.

TABLE 6 FUNCTIONS A

3.3. Performances

The interface will only be compatible with Cardinal Health's platform and will be displayed by administrative personnel determined by the client. The interface will have a set of dashboards such as Project Health, Iteration Review, and Spring Overview, to support the analysis processes and facilitate the decision-making process of the Cardinal Health company

3.3.1. Logical Database

Type of information used by various functions

User	
Attribute	**Type**
User ID	Int (6)
Email	Varchar (125)
Password	Varchar (50)

TABLE 7 TIME OF DATA

3.3.2. Frequency of User

The dashboards are going to be available 24/7 if the servers of the company are still working and up.

3.3.3. Accessing Capabilities

Function	Access	Comment
View Metrics	Manager / Administrator / Employee	Allowed to view the metrics and apply filters to see important information

TABLE 8 CAPABILITIES

3.3.4. Integrity Constraints

Each user's data is a unique member. Your username, email, and employee number would be used to correctly identify your customer or user. The id will be the primary key in the user database. If a user types a username that is already in the database, an error will be displayed and prompted to type a different one since the type is already in the database.

3.3.5. Data Retention Requirements

This application would not Retain any data of the users; the data is already provided by Cardinal Health.

3.4. Attributes

3.4.1. Reliability

Factors required to have the desired final product:

• Few or no errors in the system

• user-friendly

• Keep user information safe.

Able to repel any type of cyber attacks

To ensure a minimum uptime of 98% (no more than 7 days of failure per year) a maintenance team will be assigned to monitor, backup the databases, and control the Internet connection. Redundant systems will be in place in case the main Internet connection fails, or the database becomes corrupted

3.4.2. Availability

In case of failure or system crash, a message will be provided to notify the user that the service is under maintenance, showing a waiting time. Depending on the error, the waiting time will increase or decrease. At the same time, the reason for the failure will be investigated and if it cannot be repaired with the current version of the system, the latest backup will be loaded where the error is not found. The backup copies are created every 12 hours and their objective is to store all the information on external hard drives. Backup copies will be deleted after one month of their creation. At times when an update needs to be performed that requires a system reboot, the user will be notified and told how long to wait before being able to clock in and out.

3.4.3. Security

The Security is going to be in the hands of Cardinal Health

3.4.4. Portability

The interfaces will work with connections to the internal database of Cardinal Health clients and with Internet access, it can be accessed through the virtual machine assigned by Cardinal Health.

4. Verification

4.1. Functions

On these sections you can see how the process of how the dashboards are going to work.

View Metrics
Actors: Principal - Manager / Administrator / Employee Secondary - Database

Pre-Conditions: Databases need to be up and running Manager / Administrator / Employee need to be logged in and have credentials Manager / Administrator / Employee applies different filters
Post-Conditions: There are no post-conditions for viewing the metrics.
Scenarios
Principal: - Manager / Administrator / Employee enters the dashboard. - Manager / Administrator / Employee applies a filter.
Secondary: There is no secondary scenario for viewing the metrics.
Exception: If the Manager / Administrator / Employee doesn't have valid credentials, the metrics will not show.

TABLE 9 FUNCTIONS B

4.2. Performance requirements

Through a virtualization platform, the environment will be able to run on any computer. If the computer has sufficient memory the environment will be able to run perfectly.

4.3. Usability requirements

The hardware constraints for the host machine are the minimum hardware requirements

for running the virtualized environment on each operating system: MacOS, Windows, Linux.

● MacOS System Requirements:

Memory: 4 GB Ram available

Storage: 50 GB available space

Network: Network Manager or Local Area Network

● Windows System Requirements:

Memory: 4 GB Ram available

Storage: 50 GB available space

Network: Network Manager or Local Area Network

● Linux System Requirements:

Memory: 4 GB Ram available

Storage: 50 GB available space

Network: Network Manager or Local Area Network

4.4. Interface requirements

The following user interfaces will be necessary for the operation of the panel by any enterprise user who has access: OS Terminal, OS GUI, and Internet Browser. Terminal and GUI will be provided by the operating system used in the virtual machine. The Internet browser can be installed at the discretion of the users, or they can use the default browser provided by the Virtual Machine.

5. Logical Database Requirements

5.1. Design constraints

This section specifies the design constraints that may be produced due to hardware,

software, and standard compliances.\

5.2. Software system attributes

This section specifies the attributes of the system.

A. Reliability

To ensure that the system doesn’t fail more than 1 time per month (in case there’s an error), a maintenance team that will focus on avoiding this kind of situation.

B. Availability

The Dashboard will be always up and running. The only particular cases which the system will not be available are the following:

● The environment loses connection to the LAN.

● The environment loses power.

● Host does not meet the hardware requirements

C. Maintainability

The virtual environment will not be affected by any type of maintenance, because This is open-source software. All maintenance will be up to the user; they will decide whether or not they want to contribute.

Future updates which include new features based on the user's own assessment to make the Dashboard even better.

D. Portability

The environment is designed to run on any type of computer capable of virtualizing, the environment is distributed as an image file, allowing users to distribute and install said environment on any computer compliant with the hardware limitations.

6. Supporting information

6.1. Appendices

6.1.1. Assumptions and dependencies

During our progression of designing the Dashboard, a couple things came up. These assumptions and dependencies have been placed in this table with what each action this Dashboard must do. Each purpose is the functions and principles the Dashboard must utilize when operating. Then we create assumptions and verify the dependencies that these actions require to operate. As shown in the table below:

Purpose		Assumptions	Dependencies
1	Enter company data.	You will use Excel data to work.	Requirement of Virtual Machine/Power BI.
2	The owner can enter the data he needs.	The Dashboard will make the chart.	The owner can have the system to organize your data.
3	Whoever has access to the data can make the dashboard.	The Dashboard will make graphs in an organized and understandable way.	The dashboard can be made or edited in a simple way with Power BI
4	The owner can add or remove data.	The Dashboard will create a series of graphs intertwined with the data of the company.	The owner can use feedback on what to improve.

TABLE 10 DEPENDENCIES

To work in Dashboard, a virtual machine provided by the company is required, since Cardinal Health data is needed to use Power BI. It is necessary to log in with personal credentials to use the virtual machine, then to get to the Cardinal Health Dashboard project.