
Chalk Mountain Services

**Chalk Mountain Asset Management Tool
Software Requirements Specification**

Version 2.0

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Software Requirements Specification	Date: 30/04/2023

Revision History

Date	Version	Description	Author
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30/04/2023	2.0	Final Draft	Matthew Bolding, Joey Flores, Emma Sanders, Zylar Niece

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Software Requirements Specification

1. Introduction

1.1 The Purpose of CMSAMS

For all Chalk Mountain truck drivers, mechanics, safety personnel, coordinators, and administrators who need an asset management dashboard, the Chalk Mountain Asset Management System is a web-based application that ensures the correct updating of tractors and trailers by all target customers by restricting their operations based on their logistics role. Unlike their current system, which allows any user to perform an action—either moving an asset into or out of service, this new application will ensure data integrity and log user activity. The impact of which is that currently there’s uncertainty as to which assets—tractors and trailers—are either in or out of service can disrupt the flow of sand to fracking sites. A successful solution would be to design a new system which restricts the capabilities various users have on an asset management tool to ensure data integrity and accuracy.

1.2 The Purpose of this Document

The purpose of this document is to describe the functional and nonfunctional requirements for software release 1.0 of the Chalk Mountain Services Asset Management. Its role is to describe the problem to be solved, not the solution: what the system must do, not how. This document is intended to be used by the members of the project team who will implement and verify the correct functioning of the system.

1.3 Product Scope

Chalk Mountain Solutions is a transportation and logistic company that handles and organizes the transportation of hundreds of trailers and tractors throughout Texas. The treacherous desert areas that they use as mode of transportation for their trailers are harsh dirt paths that can and do cause severe damages to their equipment. The need for efficient and constant communication is vital to their success and longevity of their assets. If equipment that is damaged is not properly accounted for in the system, then it will lead to equipment being inefficiently used and severe miscommunication between administration, mechanics, and drivers. Therefore, the Chalk Mountain Service Asset Management tool will allow the proper privileges to individuals across the company—increasing data integrity and accuracy, contributing to the success and growth of Chalk Mountain Services.

1.4 Definitions, Acronyms, and Abbreviations

The Glossary contains all information relevant to terms, acronyms, and abbreviations, but in particular note that CMSAMS stands for Chalk Mountain Services Asset Management System, as it’s used extensively throughout this document for brevity.

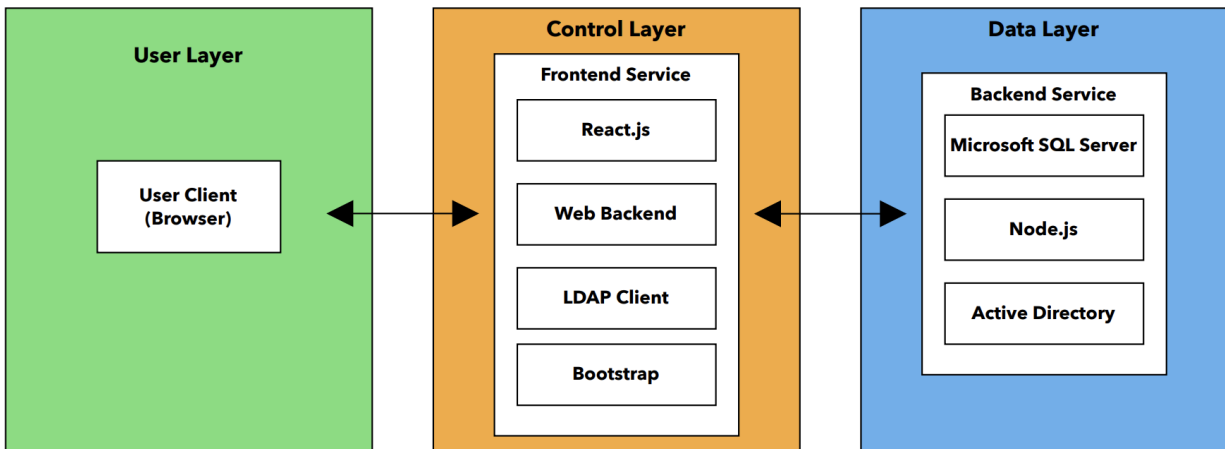
1.5 References

1. Chalk Mountain Services Asset Management Glossary [1 Glossary](#)
2. Chalk Mountain Services Asset Management Vision and Scope Document [2 Vision](#)
3. Chalk Mountain Services Asset Management Use Cases and Business Rules [3 Use Cases](#)
4. Chalk Mountain Services Asset Management User Interface Wireframe [CMSWireframe.bmp](#)

2. Overall Description

2.1 Product Perspective

The Chalk Mountain Services Asset Management is a new software that replaces the current asset management system that lacks the necessary separation of privileges, which contributes to data accuracy across the company's tractors and trailers. The context diagram in Figure C-2 illustrates the external entities and system interfaces for release 1.0. Note that CMSAMS is denoted as a circle in the middle.



2.2 User Classes and Characteristics

User Class	Description
Yard Coordinators	Yard Coordinators are employees who survey the tractors and trailers within a designated area and identify mechanical issues before the assets leave their respective yard. Following a sighting of a failed asset, the Yard Coordinator will update the asset's respective entry on the Asset Management Tool to show the asset as out-of-service. As part of the update, the Yard Coordinator must enter notes or a justification for the movement.
Mechanics	Following a Yard Coordinator's modification to an asset, mechanics then repair it. Following the repair, the mechanic will update the asset's respective entry on the Asset Management Tool to show the asset as in-service.
Shop Admin	The Shop Admin may move any asset in- or out-of-service.
Other Users	Other users, including those that are not signed in, may have read-only access of the CMSAMS application.

2.3 Operating Environment

OE-1: CMSAMS shall be usable from both mobile and desktop-based browsers across all operating systems.

OE-2: CMSAMS shall be accessed from within the office by planners; CMSAMS shall be accessed from the tractor-trailer yards by the yard coordinators and mechanics.

OE-3: CMSAMS shall operate in a production environment from two Windows Server 2019 virtual machines: TCU-DC01.ManBearPig.com which will function as the domain controller and TCU-SQL01.ManBearPig.com which will exclusively host the database.

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2.4 Design and Implementation Constraints

CO-1: The system shall use Microsoft SQL Server as its database.

CO-2: Node.js will be used as the backend programming language.

CO-3: React will be used as the front-end programming language.

CO-4: The front-end must be reactive to function with both mobile- and desktop-based operating environments.

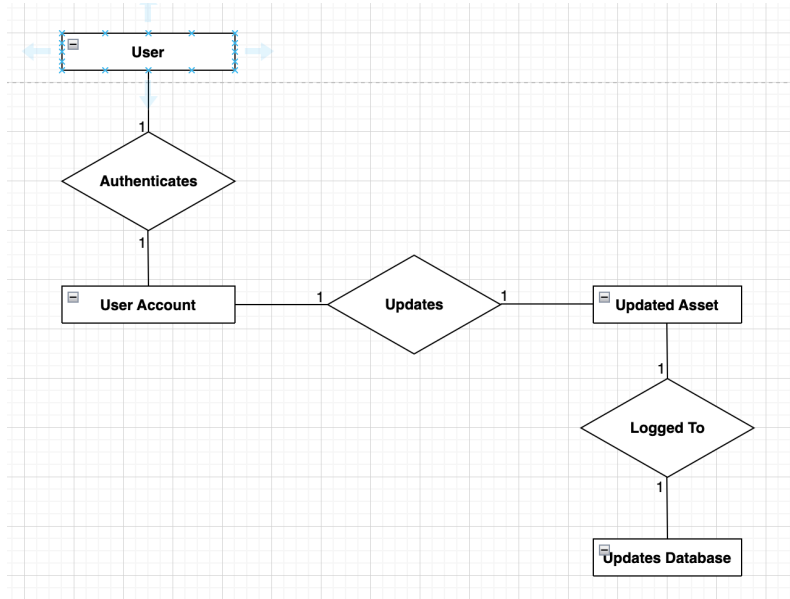
2.5 Assumptions and Dependencies

AS-1: Yard Coordinators and Mechanics will have mobile devices or access to a desktop web browser with which to interact with the system.

DE-1: The system relies on the schema of the asset database remaining as is.

3. Data Requirements

3.1 Logical Data Model



3.2 Data Dictionary

The Request table logs all user interactions with CMSAMS, limited to recording the moving in and out of service of any asset. The table is defined with the below matrix.

Row	Description	Composition or Data Type	Values
REQUEST_ID	The ID of the request, automatically generated.	uniqueidentifier	SQL Server-generated UUIDs
USER	The user making the request	nvarchar(50)	MBolding, ESanders, other active directory names
TIME	The time of the request in a standardized format	nvarchar(50)	GETSYSTEMTIME()
UNITNUMBER	The ID of the asset being updated	nvarchar(10)	S211, ...
STATUS	A flag to denote whether the update moved the asset in-service (1) or out-of-service (0).	bit	0, 1

The Note table collects all the reasons why assets were taken out of service.

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Row	Description	Composition or Data Type	Values
NOTE_ID	The ID of the note, automatically generated.	uniqueidentifier	SQL Server-generated UUIDs
UNITNUMBER	The ID of the asset being updated	nvarchar(15)	S211, ...
NOTES	The current notes relating to an asset	nvarchar(max)	A string of any length
TIME	The time of the note in a standardized format	nvarchar(50)	GETSYSTEMTIME()

The Equipment table represents the database the system intends to interact with after development.

Row	Description	Composition or Data Type	Values
UNITID	An incremented ID that every time we buy a new tractor/trailer that number increases.	smallint	431, 432, etc.
UNITNUMBER	The numbers of the trucks/trailers and what we refer to them in the field.	nvarchar(15)	S211, S212, etc.
COSTCTCODE	Designated code we have for each location where these equipment are/will be stored.	smallint	430
LOCATION	Actual name of those locations	nvarchar(20)	Pleasanton, ZT, Kermit
TYPE	The different types of equipment: there are TRACTORS, and the rest are different types of TRAILERS (CEMENT, DRY BULK, HOPPER, SPOTTER these are all different types of trailers)	nvarchar(20)	CEMENT, DRY BULK

3.3 Reports

CMSAMS itself does not produce reports, but the Requests table is intended to be used in such a way to create reports, but such a task does not fall into the scope of the project.

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3.4 Data Acquisition, Integrity, Retention, and Disposal

DI-1: When a user updates an asset's state, CMSAMS shall log relevant information in the Requests database.

DA-1: The SQL Server has multiple stored procedures to streamline the retrieval of data.

DA-1.0: A list of assets contains information about the asset's type, unit number, location, status, notes and the user who last modified it.

DA-1.1: dbProvViewAssets returns a list of assets based on a sort column, sort order, page size, page number, status filter, and search text.

DA-1.2: dbProvViewTractors returns a list of tractors based on a sort column, sort order, page size, page number, status filter, and search text.

DA-1.3: dbProvViewTrailers returns a list of trailers based on a sort column, sort order, page size, page number, status filter, and search text.

DA-1.4: dbProvViewAssetsCount returns total number of assets that fit status and search text criteria.

DA-1.5: dbProvViewTractorsCount returns total number of tractors that fit status and search text criteria.

DA-1.6: dbProvViewTrailersCount returns total number of trailers that fit status and search text criteria.

DA-1.7: dbProcGetAssetStatus returns the status of an asset based on its unit number.

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4. External Interface Requirements

4.1 User Interfaces

UI-1: The Asset Management tool homepage shall present a table with at least an asset, its status, notes, and an option to modify the entry.

UI-2: Options to modify assets will be restricted based on a role-based control paradigm.

4.2 Software Interfaces

SI-1: DataEquipment Table

SI-1.1: The Asset Management Tool shall pull data from the DataEquipment table's UNITNUMBER and TYPE columns to get the all assets's identification numbers and the type of asset.

SI-2: Active Directory

SI-2.1: The Asset Management Tool shall utilize the pre-existing Active Directory to manage user login and the role-based control design.

4.3 Hardware Interfaces

No Hardware Interfaces are defined.

4.4 Communications Interfaces

CI-1: CMSAMS shall provide a variety of REST API endpoints, some of which could be implemented in other applications.

- GET /api/assets
 - Returns all assets.
 - Query parameters:
 - pageSize - the number of assets per page returned.
 - Not required; default 50.
 - pageNumber - the page number.
 - Not required; default 1.
 - sortColumn - the column on which to sort the assets.
 - Not required; values must match a column name; defaults to UNITNUMBER; maximum of 50 characters.
 - sortOrder - the order in which to sort the assets.
 - Not required; defaults to ASC; maximum of 4 characters.
 - statusBit - to denote whether only in service or out of service assets are returned.
 - Not required; values 0 or 1 determine to return out of service or in service assets respectively.
 - searchText - the text with which to perform a search over all columns
 - Not required; used in conjunction with the search bar; maximum of 128 characters.
 - Return codes:
 - 200 - Assets returned ok.
 - 500 - Internal Server Error
- GET /api/assets/tractors
 - Returns all tractors.
 - Same query parameters and return codes as GET /api/assets.

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- GET /api/assets/trailers
 - Returns all trailers.
 - Same query parameters and return codes as GET /api/assets.

- POST /api/assets/sendInService
 - Sends an asset in service.
 - Headers:
 - sessionId - the user's sessionId, found in the cookie set after the user logs with the /api/ldap endpoint.
 - Body:
 - assetId - the UNITNUMBER of the asset..
 - Required.
 - Return codes:
 - 200 - Asset successfully moved in service.
 - 208 - Asset already in service.
 - 400 - One or more parameters not provided.
 - 404 - Invalid assetId.
 - 500 - Internal Server Error

- POST /api/assets/sendOutOfService
 - Sends an asset out of service.
 - Headers:
 - sessionId - the user's sessionId, found in the cookie set after the user logs with the /api/ldap endpoint.
 - Body:
 - assetId - the UNITNUMBER of the asset..
 - Required.
 - notes - the notes behind sending an asset out of service.
 - Required.
 - Return codes:
 - 200 - Asset successfully moved in service.
 - 208 - Asset already out of service.
 - 400 - One or more parameters not provided.
 - 404 - Invalid assetId.
 - 500 - Internal Server Error

- POST /api/ldap
 - Login a user.
 - Body:
 - Username - the username
 - Password - the user's password
 - Return codes:
 - 200 - User successfully logged in.
 - 500 - Internal Server Error, failed to connect to server.

- POST /api/ldap/logout
 - Logouts a user based on their sessionId.
 - Header:

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- sessionId - the user's sessionId.
 - Return codes:
 - 200 - either the sessionId was found and the user was logged out in the middleware or the sessionId was not found in which case there was no change.

- GET /api/ldap/getGroups
 - Returns the security groups to which a user belongs.
 - Header:
 - sessionId - the user's sessionId.
 - Return codes:
 - 200 - either an empty list or the security groups correspond to the user signed in with the given sessionId.

- GET /api/ldap/getName
 - Returns the username corresponding to a sessionId.
 - Header:
 - sessionId - the user's sessionId.
 - Return codes:
 - 200 - either an empty list or the username corresponding to the user signed in with the given sessionId.

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5. Quality Attributes

5.1 Usability

USE-1: The CMSAMS shall allow a user to update an asset management within 1-minute, depending on the length of the 'Notes' section.

USE-2: CMSAMS shall provide a mechanism for users to perform batch operations on assets.

USE-3: CMSAMS shall provide a user an option to undo their request within a certain time frame.

5.2 Performance

PER-1: CMSAMS shall accommodate a maximum of 50 concurrent users during the peak usage.

PER-2: CMSAMS shall display confirmation messages to users within an average of 3 seconds and a maximum of 5 seconds after the user submits information to the system.

5.3 Security

SEC-1: CMSAMS shall use LDAP (Lightweight Directory Access Protocol) to interface with the AD system to log in users.

SEC 2: CMSAMS shall allow only users belonging to the Mechanic security group to move assets into service.

SEC-3: CMSAMS shall allow only users belonging to the Yard Coordinator security group to move assets out-of-service

SEC-4: CMSAMS shall allow only users belonging to the Admin security group to move assets both into and out-of-service.

5.4 Safety

SAF-1: The system shall ensure that the proper assets are in and out-of-service so that damaged assets are not in-use.

5.5 Availability

AVL-1: The system shall be available 24 hours a day, 7 days a week.

5.6 Robustness

ROB-1: If the connection between the user and the CMSAMS is disrupted before completing a request, the system shall not

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6. Internationalization and Localization Requirements

ILR-1: No relevant information.