
Software Requirements Specification

for

Cloud Storage Project (CloudVault)

Version 1.0 approved

Prepared by

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1 Introduction

The purpose of this Software Requirements Specification (SRS) document is to describe the requirements for the development of a cloud storage system. The document is intended to provide a clear and complete understanding of the system's functional and non-functional requirements. This document is intended for developers, testers, and stakeholders who will be involved in the development and implementation of the system.

1.1 Document Purpose

The Software Requirements Specification (SRS) document outlines the specific requirements and functionalities of a software system. When including cloud storage in the SRS, it serves the purpose of clearly documenting the requirements related to data storage, accessibility, scalability, performance, security, integration, and compliance. By including cloud storage in the SRS, stakeholders can effectively communicate their needs and expectations, establish the boundaries of the system, guide the design and implementation process, facilitate quality assurance and testing, and ensure proper change management and maintenance for the cloud storage component. In summary, cloud storage in the SRS provides a comprehensive reference for the integration and utilization of cloud storage within the software system, addressing key aspects related to data management, security, scalability, and interoperability.

The inclusion of cloud storage in the Software Requirements Specification (SRS) document serves multiple purposes. Firstly, it defines the specific requirements and functionalities related to the integration of cloud storage within the software system. This includes aspects such as data storage, accessibility, scalability, performance, security, and compliance. By documenting these requirements, the SRS ensures that stakeholders have a clear understanding of how cloud storage will be utilized and what features it should support.

1.2 Product Scope

Product Scope:

The product scope section of the Software Requirements Specification (SRS) defines the boundaries and extent of the software system being developed. It outlines what functionalities and features will be included in the system, as well as what will be excluded. Here is an example of a product scope for an SRS:

The scope of the software system includes the development of a cloud-based document management application for a medium-sized organization. The application will provide users with the ability to upload, store, organize, and retrieve documents securely from anywhere with an internet connection. Users will be able to create folders, manage access permissions, and perform basic document operations such as viewing, editing, and deleting. The system will support document versioning, allowing users to track and manage different versions of documents. However, the system will not include advanced document collaboration features such as real-time co-authoring. Additionally, integration with third-party cloud storage providers will be excluded from the scope.

The product scope statement clearly defines the key functionalities and features that will be delivered as part of the software system, while also highlighting the functionalities that will not be included. This helps manage stakeholder expectations and provides a clear understanding of the system's boundaries.

1.3 Intended Audience and Document Overview

Intended Audience:

The Software Requirements Specification (SRS) document for cloud storage is intended for various stakeholders involved in the development and implementation of a software system that incorporates cloud storage capabilities. The primary audience includes:

1. **Clients/Customers:** The SRS provides clients and customers with a clear understanding of how cloud storage will be integrated into the software system. It helps them assess whether the proposed cloud storage solution aligns with their data storage, accessibility, security, and scalability requirements.
2. **Project Managers:** The SRS serves as a crucial tool for project managers to plan and manage the development process. It provides insights into the scope, functionalities, and constraints related to cloud storage, facilitating effective project scheduling, resource allocation, and risk management.
3. **Development Team:** The SRS is essential for the development team, including software architects, designers, and developers. It helps them understand the specific requirements, design considerations, and technical aspects of integrating and utilizing cloud storage within the software system.
4. **Quality Assurance/Testers:** The SRS provides valuable information for testers to develop test cases and validate the cloud storage functionalities. It helps ensure that the integration and utilization of cloud storage meet the specified requirements and perform as expected.
5. **Operations and IT Support:** The SRS serves as a reference for the operations and IT support teams responsible for maintaining and managing the cloud storage infrastructure. It helps them understand the system's requirements and operational considerations, ensuring proper setup, monitoring, and troubleshooting of the cloud storage component.

Document Overview:

The SRS document for cloud storage provides a detailed overview of the requirements and functionalities related to integrating and utilizing cloud storage within the software system. It includes the following sections:

1. **Introduction:** This section introduces the document, its purpose, and an overview of the software system. It may also include background information on the importance and benefits of cloud storage.
2. **Product Scope:** The product scope section defines the boundaries of the software system's cloud storage capabilities. It outlines what functionalities and features will be included and excluded, specifying the specific use cases and scenarios where cloud storage will be utilized.
3. **Functional Requirements:** This section describes the specific functional requirements related to cloud storage. It includes details on data storage, retrieval, access controls, synchronization, and any specific cloud storage provider APIs or features that need to be integrated.

4. **Non-Functional Requirements:** The non-functional requirements section focuses on quality attributes and constraints related to cloud storage. It may cover aspects such as data security, performance, scalability, availability, data backup, and disaster recovery.
5. **System Architecture:** This section provides an overview of the system's architecture as it relates to cloud storage. It includes details on how the software components will interact with the cloud storage infrastructure and any necessary integration points.
6. **Data Management:** This section outlines the requirements for managing and handling data in the cloud storage. It covers topics such as data organization, data migration, data retention policies, and data privacy considerations.
7. **Security and Compliance:** The security and compliance section specify the security measures and compliance requirements that should be implemented for the cloud storage component. It may include encryption, access controls, audit trails, and adherence to regulatory standards (e.g., GDPR, HIPAA).
8. **Assumptions and Constraints:** This section lists any assumptions made during the requirement gathering process and any constraints that may affect the design and implementation of the cloud storage component.
9. **Appendices:** The appendices contain additional supporting information, such as glossary of terms, acronyms, references, and any supplementary diagrams or mock-ups related to the cloud storage functionality.

The document overview provides a summary of the key sections and content covered in the SRS for cloud storage, helping readers understand the structure and organization of the document and its relevance to the integration and utilization of cloud storage

1.4 Definitions, Acronyms and Abbreviations

This section provides definitions, acronyms, and abbreviations used throughout the Software Requirements Specification (SRS) document specifically related to cloud storage.

Definitions:

1. **Cloud Storage:** Refers to the online storage service that allows users to store and access data over the internet on remote servers, typically provided by third-party cloud storage providers.
2. **Data Synchronization:** The process of maintaining consistent and up-to-date copies of data across multiple devices or locations, ensuring that changes made to data in one location are reflected in all other synchronized locations.
3. **Data Encryption:** The process of converting data into a coded form to protect its confidentiality. It involves the use of encryption algorithms to transform data into an unreadable format that can only be deciphered using an encryption key.

Acronyms and Abbreviations:

1. SRS: Software Requirements Specification
2. API: Application Programming Interface
3. GUI: Graphical User Interface
4. GDPR: General Data Protection Regulation
5. HIPAA: Health Insurance Portability and Accountability Act
6. SLA: Service Level Agreement
7. PII: Personally, Identifiable Information
8. CDN: Content Delivery Network
9. SDK: Software Development Kit
10. IAM: Identity and Access Management

1.5 Document Conventions

Document Conventions for Cloud Storage in SRS:

When documenting cloud storage-related requirements in the Software Requirements Specification (SRS), it is helpful to follow certain conventions to ensure clarity and consistency throughout the document. Here are some commonly used conventions:

1. **Heading Format:** Use a consistent heading format to differentiate sections related to cloud storage. For example, you can use a specific font style, size, or color for headings such as "Cloud Storage Requirements" or "Integration with Cloud Storage Provider."
2. **Numbering and Labeling:** Use a clear numbering and labeling system for requirements and sub-requirements related to cloud storage. For instance, you can use a hierarchical numbering scheme like "3.1" for a top-level requirement and "3.1.1" for its sub-requirement.
3. **Key Terminology:** Clearly define key terms and concepts related to cloud storage in the glossary section of the SRS. Use these defined terms consistently throughout the document to avoid ambiguity.
4. **References and Citations:** When referring to external sources, standards, or industry best practices related to cloud storage, provide proper references or citations. This helps stakeholders access additional information and ensures credibility.
5. **Formatting of Requirements:** Clearly state each cloud storage requirement in a structured format. Use bullet points or numbering for better readability. Consider including attributes like priority, source, and acceptance criteria for each requirement.
6. **Diagrams and Illustrations:** Use diagrams, flowcharts, or illustrations to visually represent the architecture, data flows, or process interactions related to cloud storage. Clearly label the elements in the diagrams for easy understanding.
7. **Cross-Referencing:** When referring to specific requirements or sections related to cloud storage within the SRS document, use cross-references to maintain consistency. For example, instead of repeating a requirement, reference it by its unique identifier or heading.

8. **Version Control:** Include version numbers or dates in the document's header or footer to track revisions and ensure stakeholders are working with the latest version of the SRS.

9. **Review and Approval Process:** Clearly outline the process for reviewing, updating, and approving the cloud storage-related requirements in the SRS. Specify the roles and responsibilities of stakeholders involved in the review process.

These document conventions for cloud storage in the SRS help maintain consistency, readability, and traceability of requirements related to cloud storage. They ensure that stakeholders can easily navigate the document and understand the cloud storage functionalities and integration within the software system.

1.6 References and Acknowledgments

References and Acknowledgement for Cloud Storage in SRS:

When including references and acknowledgments related to cloud storage in the Software Requirements Specification (SRS) document, it is important to give credit to the sources and individuals who have contributed to the understanding and documentation of cloud storage requirements. Here are some guidelines for referencing and acknowledging:

1. **External Sources:** If you have relied on external sources such as research papers, articles, books, or whitepapers to gather information about cloud storage, provide proper references. Use a consistent citation style (e.g., APA, MLA) to cite these sources within the SRS document. Include a "References" section at the end of the document that lists the full details of each referenced source.
2. **Cloud Storage Providers:** If you are referencing specific cloud storage providers or their documentation, acknowledge and provide proper attribution to them. Include the name of the provider, the official documentation or website, and any specific sections or pages that were referred to. This helps readers access additional information directly from the provider's resources.
3. **Industry Standards and Best Practices:** If you have followed industry standards or best practices related to cloud storage, mention the specific standards or frameworks used. Examples include ISO 27017 for cloud security, NIST SP 800-53 for cloud privacy, or Cloud Security Alliance (CSA) guidelines. Provide the full name, version number, and any relevant details or sections that were referenced.
4. **Collaboration and Contributions:** If the SRS document was developed in collaboration with external stakeholders, acknowledge their contributions and input. Mention the individuals, teams, or organizations that provided valuable insights, feedback, or domain expertise related to cloud storage requirements. This helps recognize their contributions and fosters collaboration and transparency.
5. **Internal Contributions:** Acknowledge the internal team members who have contributed to the understanding and documentation of cloud storage requirements within the SRS. Mention their names, roles, and specific contributions, such as conducting research, analyzing use cases, or providing technical expertise.

6. Permissions and Intellectual Property: Ensure that you have obtained proper permissions or licenses for any copyrighted material, images, or diagrams used in the SRS document. Clearly attribute the source or creator of such materials, following any specific requirements or guidelines provided by the original source.

Including references and acknowledgments in the SRS document for cloud storage not only adds credibility to the information presented but also recognizes the contributions of external sources and collaborators. It promotes transparency, integrity, and compliance with intellectual property rights.

2 Overall Description

2.1 Product Perspective

The cloud storage component within the software system is an integral part of the overall product. It provides a scalable and reliable solution for storing and managing data in the cloud. The product perspective section of the Software Requirements Specification (SRS) for cloud storage outlines the relationship, interfaces, and dependencies of the cloud storage component with other system elements. Here is an example of a product perspective for cloud storage in an SRS:

The cloud storage component will function as a standalone service within the software system, interacting with various modules and user interfaces. It will have well-defined interfaces with the user interface modules to enable seamless uploading, downloading, and accessing of files stored in the cloud. The component will also integrate with the system's authentication and access control mechanisms to enforce appropriate data security and user permissions.

From a technical perspective, the cloud storage component will leverage the infrastructure and services provided by a cloud storage provider. It will utilize APIs and software development kits (SDKs) provided by the cloud storage provider to enable efficient data storage and retrieval. The component will support different file formats and sizes, ensuring compatibility with a wide range of data types and user requirements.

The cloud storage component will be designed to be scalable and universally available, allowing for the seamless expansion of storage capacity as data volumes increase. It will be configured with appropriate redundancy and backup mechanisms to ensure data durability and disaster recovery. The component will also support data synchronization across multiple devices and platforms, enabling users to access and update their files from various locations.

In terms of security, the cloud storage component will adhere to industry best practices and standards. It will support encryption of data in transit and at rest to ensure data confidentiality. The component will implement strong access controls and authentication mechanisms to protect against unauthorized access to stored data. Compliance with relevant data privacy regulations, such as GDPR or HIPAA, will be a key consideration during the design and implementation of the cloud storage component.

The product perspective section provides a clear understanding of how the cloud storage component fits within the larger software system, its interfaces with other modules, and the technical aspects that need to be considered during its development and integration. It helps stakeholders visualize the role and capabilities of the cloud storage component, facilitating effective planning, coordination, and alignment with the overall product vision.

2.2 Product Functionality

The product functionality section of the Software Requirements Specification (SRS) outlines the specific features and capabilities of the cloud storage component within the software system. It describes the functional requirements related to storing, managing, and accessing data in the cloud. Here is an example of product functionality for cloud storage in an SRS:

1. File Upload and Storage:

- Users can upload files to the cloud storage system.
- The system will support various file formats and sizes.
- Files will be securely stored in the cloud infrastructure.
- The system will provide a mechanism for organizing files into folders or directories.

2. File Retrieval and Download:

- Users can search for and retrieve files from the cloud storage system.
- The system will provide efficient search and filtering capabilities.
- Users can download files to their local devices for offline access.

3. Access Control and Permissions:

- The system will enforce access control mechanisms to protect data privacy.
- Users will have various levels of access permissions, such as read-only or read-write.
- Administrators can manage user access rights and roles.

4. Data Synchronization:

- The system will support data synchronization across multiple devices.
- Changes made to files on one device will be automatically reflected on other synchronized devices.
- The synchronization process will be efficient and minimize conflicts.

5. Versioning and Revision History:

- The system will maintain versioning and revision history for files stored in the cloud.
- Users can access previous versions of files and track changes made over time.
- The system will provide the ability to restore or revert to previous file versions if needed.

6. Sharing and Collaboration:

- Users can share files or folders with specific individuals or groups.
- Shared files can have different access permissions, such as view-only or collaborative editing.
- The system will provide real-time collaboration features for simultaneous editing.

7. Data Backup and Recovery:

- The cloud storage system will have regular data backup mechanisms.
- Backup copies will be securely stored to ensure data durability.
- In the event of data loss or system failure, the system will provide recovery options.

8. Security and Encryption:

- The system will implement robust security measures for data in transit and at rest.
- Data will be encrypted using strong encryption algorithms.
- The system will support secure authentication and authorization mechanisms.

9. Integration with Third-Party Applications:

- The cloud storage system will provide APIs or integration capabilities for seamless integration with other software applications or services.
- Integration will enable data exchange, synchronization, or automated workflows.

The product functionality section describes the key features and capabilities of the cloud storage component, ensuring that stakeholders have a clear understanding of the expected behavior and functionalities related to storing, managing, and accessing data in the cloud.

2.3 Users and Characteristics

The users and characteristics section of the Software Requirements Specification (SRS) identifies the different user roles and their specific characteristics when it comes to interacting with the cloud storage component of the software system. Understanding the users and their needs is crucial for designing a cloud storage solution that meets their requirements. Here is an example of users and their characteristics for cloud storage in an SRS:

1. End Users:

- Characteristics: End users are individuals or employees who utilize the cloud storage system to store, access, and manage their files and documents. They may have varying levels of technical expertise and may use the system for personal or professional purposes. End users may require features such as easy file upload, efficient search and retrieval, collaboration and sharing capabilities, and a user-friendly interface.

2. Administrators:

- Characteristics: Administrators are responsible for managing the cloud storage system, user accounts, access permissions, and overall system configuration. They have advanced privileges and control over system settings. Administrators may require features such as user management, access control management, system monitoring, and reporting capabilities.

3. IT Managers:

- Characteristics: IT managers oversee the implementation and maintenance of the cloud storage system within the organization. They ensure the system's integration with other IT infrastructure components, compliance with security and privacy regulations, and adherence to organizational policies. IT managers may require features such as integration capabilities with existing IT systems, data backup and recovery mechanisms, security and encryption measures, and scalability options.

4. System Integrators:

- Characteristics: System integrators are professionals who integrate the cloud storage system with other software applications or services. They possess technical expertise in integrating systems, APIs, and ensuring smooth data flow between various components. System integrators may require features such as well-documented APIs, developer resources, and clear guidelines for integrating the cloud storage system with external applications.

5. Compliance Officers:

- Characteristics: Compliance officers are responsible for ensuring that the organization meets regulatory requirements regarding data privacy and security. They may require features such as data encryption, access controls, audit logs, and compliance with industry standards such as GDPR, HIPAA, or ISO certifications.

6. Technical Support Staff:

- Characteristics: Technical support staff aid and troubleshooting to end users and administrators of the cloud storage system. They should have a deep understanding of the system's functionalities, configurations, and common issues that users may encounter. Technical support staff may require features such as a support ticketing system, detailed documentation, and training materials.

Understanding the various user roles and their characteristics helps in tailoring the cloud storage system to meet their specific needs, ensuring a positive user experience and efficient utilization of the system's functionalities.

2.4 Operating Environment

The operating environment section of the Software Requirements Specification (SRS) describes the hardware, software, and network infrastructure required to support the cloud storage component within the software system. It outlines the specific requirements and dependencies necessary for the cloud storage system to function effectively. Here is an example of the operating environment for cloud storage in an SRS:

1. Hardware Requirements:

- **Server Infrastructure:** The cloud storage system will require dedicated server infrastructure or virtual machines to host the application and manage the storage resources. The hardware should be capable of handling the expected data volumes and user traffic efficiently.
- **Storage Devices:** The hardware should include reliable and scalable storage devices such as hard disk drives (HDDs), solid-state drives (SSDs), or cloud storage solutions provided by a cloud storage provider. The storage devices should have adequate capacity to accommodate the expected data growth.

2. Software Requirements:

- **Operating System:** The cloud storage system may require a specific operating system, such as Linux, Windows, or a cloud-specific operating system, depending on the chosen deployment environment.
- **Database Management System:** If the cloud storage system utilizes a database for metadata management or indexing, a specific database management system (DBMS) may be required, such as MySQL, PostgreSQL, or a NoSQL database.
- **Web Server:** A web server software, such as Apache or Nginx, may be needed to handle HTTP/HTTPS requests and serve the user interfaces or APIs of the cloud storage system.

3. Network Requirements:

- **Internet Connectivity:** The cloud storage system relies on an internet connection to enable data transfer between the user interfaces, backend servers, and external systems. A stable and high-speed internet connection is essential for optimal performance.
- **Network Security:** The operating environment should include appropriate network security measures, such as firewalls, intrusion detection systems (IDS), and virtual private networks (VPNs), to protect the system from unauthorized access and data breaches.

4. Third-Party Services and APIs:

- If the cloud storage system integrates with third-party services or APIs, the operating environment should support the necessary protocols and network connectivity for seamless data exchange. This may include authentication and authorization protocols, such as OAuth, and support for RESTful APIs or other integration standards.

5. Scalability and High Availability:

- The operating environment should support scalability requirements, allowing the cloud storage system to handle increasing data volumes and user traffic. This may involve load balancing mechanisms, auto-scaling capabilities, and distributed storage configurations.
- High availability is crucial to ensure uninterrupted access to the cloud storage system. The operating environment should provide redundancy, failover mechanisms, and backup systems to minimize downtime and data loss.

It is important to thoroughly document the specific hardware, software, and network requirements for the cloud storage system in the SRS. This helps ensure that the system operates effectively within the specified operating environment and facilitates smooth deployment, maintenance, and support.

2.5 Design and Implementation Constraints

Design and Implementation Constraints for Cloud Storage in SRS:

The design and implementation constraints section of the Software Requirements Specification (SRS) outlines the limitations, restrictions, and factors that may impact the design and implementation of the cloud storage component within the software system. These constraints may be related to technical, organizational, or resource-related considerations. Here is an example of design and implementation constraints for cloud storage in an SRS:

1. Security and Privacy Regulations:

- **Compliance with Regulations:** The cloud storage system must adhere to relevant security and privacy regulations, such as GDPR, HIPAA, or industry-specific standards. This may impose constraints on data encryption, access controls, data retention, or data residency requirements.
- **Data Protection Measures:** The system should implement robust security measures, including encryption, secure transmission protocols, and secure authentication mechanisms, to protect against unauthorized access, data breaches, and data loss.

2. Network and Infrastructure Limitations:

- **Bandwidth Constraints:** The performance of the cloud storage system may be impacted by limited bandwidth availability or network congestion, especially when transferring large files or during peak usage periods. The design should consider optimizing data transfer and minimizing latency.
- **Infrastructure Compatibility:** The cloud storage system should be compatible with the existing network infrastructure and hardware resources within the organization. Compatibility constraints may arise when integrating with specific firewalls, routers, or network protocols.

3. Integration Constraints:

- **Third-Party Dependencies:** Integration with external systems, such as user directories, email systems, or other software applications, may be subject to constraints imposed by third-party APIs, data formats, or compatibility requirements. The design and implementation should consider these constraints to ensure smooth integration and interoperability.
- **Legacy Systems:** Integration with legacy systems or outdated technologies may present challenges in terms of compatibility, data migration, or communication protocols. The design should accommodate these constraints and provide appropriate solutions to bridge the gap between the cloud storage system and legacy systems.

4. Performance and Scalability:

- **Performance Constraints:** The cloud storage system should be designed to handle the expected workload and performance requirements, such as response times, concurrent user access, and data retrieval speeds. Constraints may arise from hardware limitations, network bandwidth, or resource contention.
- **Scalability Constraints:** The system should be scalable to accommodate future growth in data volume, user base, or system usage. Constraints may include limitations on storage capacity, processing power, or database performance.

5. Budget and Resource Constraints:

- **Budget Limitations:** The design and implementation of the cloud storage system may be subject to budget constraints, including limitations on hardware procurement, software licensing, or infrastructure upgrades. The design should balance functionality and performance within the allocated budget.
- **Resource Availability:** Constraints may arise from the availability of skilled personnel, development resources, or time limitations. The design and implementation should consider resource availability and plan accordingly to meet project timelines and objectives.

Understanding and documenting the design and implementation constraints for the cloud storage system in the SRS helps stakeholders and development teams set realistic expectations and make informed decisions. By addressing these constraints early in the development process, potential challenges and risks can be mitigated, ensuring a successful implementation of the cloud storage component.

2.6 User Documentation

User documentation plays a crucial role in assisting users in understanding and effectively utilizing the cloud storage system. It provides instructions, guidelines, and reference materials to ensure users can navigate the system, perform tasks, and make the most of its features. Here is an example of user documentation for cloud storage in an SRS:

1. User Manual or Guide:

- A comprehensive user manual or guide should be provided, offering step-by-step instructions on using the cloud storage system. It should cover topics such as registration, login procedures, file upload and download, folder organization, search capabilities, sharing and collaboration, version control, and security measures.
- The manual should be structured logically, with clear headings, subheadings, and an index for easy navigation. It should include screenshots, diagrams, and examples to illustrate key concepts and procedures.
- Common troubleshooting scenarios and FAQs should be addressed to assist users in resolving issues on their own.

2. Quick Start Guide:

- A condensed and concise quick start guide can be included for users who prefer a brief overview of the cloud storage system. It should provide a high-level introduction, along with the essential steps to perform common tasks quickly.
- The quick start guide should focus on the most frequently used features, emphasizing key functionalities and their corresponding actions.

3. Online Help and Contextual Guidance:

- The cloud storage system should provide online help within the user interface. This can be in the form of tooltips, context-sensitive help buttons, or a dedicated help section accessible from within the application.
- Online help should provide context-specific guidance, explaining the purpose and usage of various elements on the user interface. It should provide clear instructions on how to navigate screens, access specific features, and perform actions.
- Hyperlinked cross-references within the online help can aid users in exploring related topics and finding more detailed information.

4. Knowledge Base or FAQs:

- A knowledge base or frequently asked questions (FAQs) section can be created to address common user queries, issues, and best practices. It should cover topics such as account management, troubleshooting, security guidelines, and advanced features.
- The knowledge base should be regularly updated and categorized for easy browsing. Users should be able to search for specific topics and access relevant articles or FAQs.

5. Video Tutorials and Demonstrations:

- Video tutorials and demonstrations can be created to visually guide users through various tasks and functionalities. These can be made available on a dedicated website, video-sharing platforms, or within the cloud storage system itself.
- Videos should be concise, engaging, and easy to follow. They can cover topics such as account setup, file management, sharing and collaboration, and advanced features.

6. Glossary of Terms:

- A glossary of terms should be included to define commonly used terminology within the cloud storage system. This can help users understand specific terms, acronyms, or jargon used throughout the user documentation.

By providing comprehensive user documentation, organizations can empower users to effectively utilize the cloud storage system, reduce support requests, and enhance overall user satisfaction. The documentation should be easily accessible, regularly updated, and available in multiple formats to cater to different user preferences.

2.7 Assumptions and Dependencies

Assumptions and Dependencies for Cloud Storage in SRS:

The assumptions and dependencies section of the Software Requirements Specification (SRS) outlines the underlying assumptions and dependencies that are necessary for the successful implementation and operation of the cloud storage component within the software system. These assumptions and dependencies help in setting expectations and clarifying the prerequisites for the cloud storage system. Here is an example of assumptions and dependencies for cloud storage in an SRS:

1. Infrastructure and Environment:

- Assumption: It is assumed that the organization has the necessary infrastructure and network environment in place to support the deployment and operation of the cloud storage system. This includes sufficient server resources, storage capacity, network connectivity, and necessary security measures.
- Dependency: The successful implementation and operation of the cloud storage system depend on the availability and functionality of the required infrastructure components. Any issues or limitations with the infrastructure may impact the performance, availability, or scalability of the cloud storage system.

2. Internet Connectivity:

- Assumption: It is assumed that the users of the cloud storage system have reliable and stable internet connectivity to access the system and perform file transfers.
- Dependency: The cloud storage system heavily relies on internet connectivity for users to access their files, upload or download data, and collaborate with others. The availability and quality of the internet connection directly affect the user experience and the system's responsiveness.

3. Compatibility with Client Devices and Web Browsers:

- Assumption: It is assumed that the client devices used by the users, such as computers, laptops, tablets, or smartphones, are compatible with the cloud storage system's web-based interface or dedicated client applications.
- Dependency: The cloud storage system must be compatible with a wide range of client devices and web browsers to ensure seamless access and functionality. Compatibility issues may arise if the users are utilizing outdated or unsupported devices or browsers.

4. Third-Party Integrations:

- Assumption: It is assumed that the cloud storage system may integrate with third-party services or applications, such as authentication providers, email systems, or productivity tools.
- Dependency: Successful integration with third-party services or applications is dependent on the availability and proper functioning of the respective APIs, credentials, and necessary configuration parameters. Any changes or issues with the third-party integrations may impact the functionality and interoperability of the cloud storage system.

5. User Account Management:

- Assumption: It is assumed that the cloud storage system will have a user account management system in place to handle user registration, authentication, and access control.
- Dependency: The proper functioning of the user account management system is crucial for user identification, access control, and security. Dependencies include the availability of user management features, integration with existing user directories, and compliance with organizational policies or regulations.

6. Data Backup and Disaster Recovery:

- Assumption: It is assumed that the cloud storage system will implement regular data backups and have a disaster recovery plan in place to mitigate data loss in case of system failures or unforeseen events.
- Dependency: The cloud storage system's ability to perform data backups and implement a reliable disaster recovery mechanism is dependent on the availability of backup infrastructure, storage resources, and backup software or services.

Clearly documenting the assumptions and dependencies in the SRS helps stakeholders and development teams understand the prerequisites and factors that may impact the successful implementation and operation of the cloud storage system. By addressing these assumptions and dependencies early on, potential risks and challenges can be identified and mitigated effectively.

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

The cloud storage system will have a web-based user interface that allows users to access and manage their files from any device with an internet connection. The user interface will be designed to be user-friendly and intuitive, providing a seamless experience for users.

The main components of the user interface include:

Login/Registration Screen: This screen will allow inexperienced users to register for an account and existing users to log in. It will require users to enter their credentials, such as username and password.

Dashboard/Home Screen: After logging in, users will be presented with a dashboard or home screen. This screen will provide an overview of their stored files, folders, and any recent activities. It may also include options to navigate to different sections of the application.

File Management Screen: This screen will allow users to manage their files. Users will be able to upload new files from their device to the cloud storage, organize files into folders, and perform actions like renaming, deleting, and moving files. The screen may display file thumbnails or icons, along with file details such as name, size, and date modified.

File Preview Screen: When a user selects a file, they will be able to view a preview of the file. For example, if it is an image file, a thumbnail or full-size image may be displayed. If it is a document or a media file, a built-in viewer or player may be provided for the user to view or play the content.

File Sharing Screen: This screen will enable users to share files with others. Users will be able to generate shareable links or invite specific individuals to access their files. The screen may include options to set permissions and restrictions for shared files.

Synchronization Screen: Users will have the ability to synchronize their files across multiple devices. The synchronization screen will show the status of file synchronization and provide options to initiate or pause synchronization.

Account Settings Screen: This screen will allow users to manage their account settings. Users can change their password, update personal information, set notification preferences, and manage storage options (e.g., upgrade storage capacity).

The user interface will follow standard GUI principles and may include familiar elements such as menus, buttons, checkboxes, and dropdowns. The layout will be designed to optimize usability, ensuring that essential functions and information are easily accessible. Error messages will be displayed in a consistent format to provide clear feedback to users in case of any issues.

While no specific graphical user interface screenshots are provided in this text, providing optional screenshots of the interface may earn extra marks as it helps to visualize the design and layout of the screens.

3.1.2 Hardware Interfaces

The cloud storage system does not require any specific hardware interfaces. It is designed to be accessed through a web-based user interface, which means it can be used on various devices without any additional hardware requirements.

Supported Device Types: The system can be accessed from any device that has a web browser and an internet connection. This includes desktop computers, laptops, tablets, and smartphones, regardless of the operating system (e.g., Windows, macOS, iOS, Android).

Data and Control Interactions: The software product interacts with the hardware components of the system primarily through the internet connection. The data interactions involve transmitting files and metadata between the user's device and the cloud storage servers. The control interactions involve managing user inputs and requests, such as uploading, downloading, and synchronizing files.

Special Libraries: The description does not mention any special libraries or protocols used for communication with the hardware components. The system relies on standard internet protocols such as HTTP or HTTPS to establish communication between the user interface and the cloud storage servers. However, specific implementation details and libraries may be used internally by the software product for efficient data transfer and storage management.

Since the cloud storage system does not have any specific hardware interfaces, there is no need to divide this section into subsections.

3.1.3 Software Interfaces

The cloud storage system integrates with cloud-based storage services provided by Amazon Web Services (AWS) or Microsoft Azure. It also integrates with other cloud-based applications, such as document management systems and project management systems.

Interface with Operating System:

The cloud storage system is designed to be platform-independent and can be accessed from various operating systems, including Windows, Linux, and macOS. The software components of the system are developed using programming languages and frameworks that are compatible with multiple operating systems.

The system utilizes standard operating system interfaces and APIs to establish communication between the software components and the underlying operating system. This includes interfaces for file system access, network communication, and process management. The system interacts with the operating system to perform tasks such as file uploads and downloads, network connectivity, and managing system resources.

The specific implementation details and libraries used to interface with the operating system may vary based on the programming languages and frameworks employed. The system leverages the capabilities provided by the operating system to ensure seamless integration and optimal performance.

It is important to note that while the interface with the operating system is described here, the SRS document should also include information about connections with other specific software components, databases, tools, and libraries, as well as the data items or messages exchanged between them and the purpose of each.

3.1.4 Communications Interfaces

The cloud storage system requires an internet connection to access data and relies on standard internet protocols for communication. The system utilizes widely adopted protocols such as HTTP (Hypertext Transfer Protocol) and HTTPS (HTTP Secure) to facilitate communication between users and other systems.

HTTP is used for transmitting data between the user's web browser and the cloud storage system. It allows users to perform actions such as uploading, downloading, and managing files through the web-based user interface. HTTPS is employed to secure the communication by encrypting the data exchanged between the user's device and the cloud storage servers. This helps protect sensitive information and ensures the privacy and integrity of the data during transmission.

The use of standard internet protocols allows for compatibility with various devices and platforms, making the system accessible from different web browsers and operating systems. The system does not specify any communication standards beyond the widely adopted HTTP and HTTPS protocols. However, specific encryption standards, such as Transport Layer Security (TLS) or Secure Sockets Layer (SSL), may be implemented to ensure secure communication and data transfer. The choice of encryption standards would depend on industry best practices and the security requirements of the system. Data transfer rates and synchronization mechanisms may vary based on the user's internet connection speed and the specific implementation of the cloud storage system.

3.2 Functional Requirements

User Authentication and Authorization: The cloud project should provide mechanisms for user authentication and authorization, ensuring that only authorized users can access the system and its resources.

Scalability: The project should be designed to scale easily, allowing for increased user load and data storage as the demand grows. This may involve the ability to add or remove computing resources dynamically.

Data Storage and Retrieval: The project should include functionality for storing and retrieving data in the cloud. This may involve features like database management, file storage, or object storage.

Compute and Processing Power: The cloud project should provide computational resources for executing tasks and processing data. This may include features like virtual machines, containers, or serverless computing.

Network Connectivity: The project should have reliable network connectivity, enabling communication between various components and allowing users to access the system from various locations.

Fault Tolerance and High Availability: The cloud project should be designed to minimize downtime and ensure continuous availability of services. This may involve redundancy, failover mechanisms, and disaster recovery plans.

Monitoring and Logging: The project should include tools and features for monitoring the system's performance, resource utilization, and detecting any anomalies or errors. Logging capabilities should also be in place to record relevant events and facilitate troubleshooting.

Security and Compliance: The cloud project should incorporate security measures to protect data and resources from unauthorized access. Compliance with relevant regulations and standards, such as GDPR or HIPAA, should also be considered if applicable.

Integration and APIs: The project should allow for integration with other systems or services through APIs (Application Programming Interfaces). This enables data exchange and interoperability with external applications or platforms.

Analytics and Reporting: The cloud project may include functionality for data analysis, generating reports, and visualizing insights. This can provide valuable information to users and stakeholders.

3.3 Behaviour Requirements

3.3.1 Use Case View

Use Case: Manage Files

Actors:

User: Interacts with the cloud storage system to perform various actions on files.

Description:

The "Manage Files" use case represents the core functionality of the cloud storage system, allowing users to perform file-related operations. The user can interact with the system to upload, download, organize, and manage their files.

Use Case: Share Files

Actors:

User: Initiates the file sharing process.

Recipient: Receives access to the shared files.

Description:

The "Share Files" use case enables users to share their files with others. The user selects the files to be shared and specifies the recipients. The system generates shareable links or sends invitations to the recipients, granting them access to the shared files.

Use Case: Synchronize Files

Actors:

User: Initiates the file synchronization process.

Description:

The "Synchronize Files" use case allows users to synchronize their files across multiple devices. When the user initiates synchronization, the system ensures that the latest version of the files is available on all synchronized devices. This ensures consistency and accessibility of files across different platforms.

Use Case: Manage Account

Actors:

User: Performs actions related to their account.

Description:

The "Manage Account" use case enables users to manage their account settings. This includes activities like changing passwords, updating personal information, and managing storage options.

Use Case: Access System

Actors:

User: Logs in to access the cloud storage system.

Description:

The "Access System" use case represents the initial interaction between the user and the system. The user logs in to the system using their credentials to gain access to the cloud storage features.

4 Other Non-functional Requirements

4.1 Performance Requirements

User account management:

The cloud storage system will provide users with the ability to create and manage their accounts. Users will be able to create their accounts by providing their email address and password. The system will store user account information, including usernames and passwords, in a secure database.

File upload and download:

The cloud storage system will provide users with the ability to upload and download files. Users will be able to upload files from their devices to the cloud storage system. Users will also be able to download files from the cloud storage system to their devices.

File sharing:

The cloud storage system will provide users with the ability to share files with others. Users will be able to share files by providing the email address of the person with whom they want to share the file. The system will send an email to the recipient with a link to the file.

File synchronization across multiple devices:

The cloud storage system will provide users with the ability to synchronize their files across multiple devices. Users will be able to access their files from any device with an internet connection. The system will automatically synchronize the user's files across all devices.

File versioning:

The cloud storage system will provide users with the ability to track changes made to their files. The system will automatically create the latest version of a file when it is changed. Users will be able to access and restore previous versions of their files.

File backup and restore:

The cloud storage system will provide users with the ability to backup and restore their files. The system will automatically backup the user's files to a secure cloud-based storage service. Users will be able to restore their files in the event of a data loss.

4.2 Safety and Security Requirements

Data Encryption: Implement encryption mechanisms to protect data at rest and in transit. This involves encrypting data before storing it in the cloud and ensuring secure communication channels between users and the cloud storage system.

Access Control: Implement robust access control mechanisms to ensure that only authorized users can access and manipulate the data. This may involve user authentication, role-based access control (RBAC), and fine-grained access permissions.

Data Integrity: Implement measures to ensure the integrity of stored data, such as checksums or digital signatures. This helps detect any unauthorized modifications or tampering of data.

Redundancy and Backup: Implement redundancy and backup mechanisms to ensure data availability and protect against data loss. This may involve data replication across multiple geographic locations or regular backups to separate storage systems.

Security Monitoring and Auditing: Implement monitoring and auditing mechanisms to detect and respond to security incidents. This includes monitoring for unauthorized access attempts, unusual activity patterns, and generating audit logs for security analysis and forensic investigation.

4.3 Software Quality Attributes

Reliability: This cloud storage system will be reliable, ensuring the availability and consistent performance of data storage and retrieval operations. It will minimize the occurrence of failures, data corruption, or loss.

Scalability: This cloud storage system will be able to handle increasing data volume and user load by scaling resources horizontally or vertically. It will be designed to accommodate future growth without significant degradation in performance.

Performance: The system will be designed to deliver optimal performance, ensuring quick response times for data storage and retrieval operations. It will be able to handle high concurrency and large file sizes efficiently.

Usability: The cloud storage system will have a user-friendly interface and provide intuitive and efficient user interactions. It will be easy to navigate, perform actions such as uploading or downloading files, and manage storage settings.

Maintainability: The system will be designed with maintainability in mind, making it easy to update, enhance, and fix issues. This includes modular architecture, clean code practices, proper documentation, and adherence to coding standards.

Extensibility: The system will be designed to allow for easy integration with other applications or services. It will support APIs and provide flexibility to add new functionalities or features without major disruptions.

Compatibility: The cloud storage system will be compatible with a range of platforms, devices, and operating systems. It will support different web browsers, mobile devices, and provide cross-platform functionality.

5 Other Requirements

5.1. Performance Requirements

The cloud storage system will be designed to be fast and responsive. The system will provide users with quick access to their files. The system will be designed to handle many users and a large amount of data.

5.2. Safety Requirements

The cloud storage system will be designed to be secure. The system will use encryption to protect user data. The system will be designed to prevent unauthorized access to user data.

5.3. Security Requirements

The cloud storage system will be designed to be secure. The system will use encryption to protect user data. The system will be designed to prevent unauthorized access to user data.

5.4. Software Quality Attributes

The cloud storage system will be designed to be reliable and easy to use. The system will be tested to ensure that it meets all functional and non-functional requirements.

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5.5. Business Rules

The cloud storage system will comply with all applicable laws and regulations related to data privacy and security. The system will also have backup and disaster recovery procedures in place to ensure that user data is not lost in the event of a system failure or disaster. The cloud storage system will be developed using agile development methodologies. The development team will consist of developers, testers, and project managers. The team will work closely with stakeholders to ensure that the system meets all requirements.

Appendix A – Data Dictionary

The data dictionary for the cloud storage system consists of several data items that are crucial for the system's functionality. These data items include user account information, which stores usernames and passwords in a secure database. Users can create and manage their accounts by providing their email address and password. Additionally, there is the file data item, which represents the files uploaded by users to the system. Users can upload and download files, share them with others, synchronize them across multiple devices, and access previous versions of files. The system also allows users to back up their files to a secure cloud-based storage service and restore them in case of data loss.

Another important data item is the file link, which represents the link generated for shared files. When users share a file, the system generates a shareable link and sends it to the recipient via email. The system relies on an active internet connection to access user data, as indicated by the internet connection data item. It also integrates with cloud-based storage services, such as Amazon Web Services (AWS) and Microsoft Azure, to provide secure and reliable data storage and retrieval.

To ensure data security, the system utilizes encryption to protect user data and prevent unauthorized access. It supports multiple operating systems, including Windows, macOS, and Linux, making it compatible with a wide range of devices. Moreover, the cloud storage system complies with applicable laws and regulations related to data privacy and security, ensuring the protection of user information.

In summary, the data dictionary for the cloud storage system encompasses various data items, each playing a vital role in the system's functionality and user experience. These data items include user account information, file data, file links, internet connection status, integration with cloud storage services, encryption for data security, compatibility with different operating systems, and adherence to relevant laws and regulations.